CONSTRUCTION DOCUMENTS
PROJECT MANUAL

HIDALGO COUNTY PRECINCT 4 ADMINISTRATION AND MANTENANCE BUILDING
EDINBURG, TEXAS

OWNER:
HIDALGO COUNTY
2042 NORTH DOOLITTLE ROAD
EDINBURG, TEXAS 78542

ERO PROJECT NO. 11016
CSP No: 2012-056-02-29-MSS
DATE: 02-10-2012

ERO ARCHITECTS, LLP
ARCHITECTURE ENGINEERING
300 SOUTH 8TH STREET
MCALLEN, TEXAS 78501

SECTION 00 01 10

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Hidalgo County Purchasing Department
2812 S. Business Highway 281
Edinburg, Texas 78539
(956) 318-2626/ Fax: (956) 318-2629

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HIDALGO COUNTY PRECINCT NO. 4

COMPETITIVE SEALED PROPOSALS

"Construction of a New Multi-Purpose Facility and Mechanical Shop"

CSP No: 2012-056B-08-01-MSS

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The above mentioned items shall be found in this Request for Competitive Sealed Proposals (CSP) packet. Should you find that any of the items are not attached in its entirety please contact Purchasing by calling (956) 318-2626, advise of missing documentation, and Purchasing will forward information either through facsimile or by U.S. Mail.

Thank you.

REQUEST FOR
SEALED BIDS (RFB) AND/OR SEALED PROPOSALS (CSP)

TO SUPPLY HIDALGO COUNTY with separate sealed bids and/or proposals respectively for the following Construction Projects:

Competitive Sealed Proposals (CSP)	**2012-056B-08-01-MSS**	**-HIDALGO COUNTY PRECINCT NO. 4-"Construction of a New Multi-Purpose Facility and Mechanical Shop".**
Request for Sealed Bids (RFB)	**2012-056C-08-01-MSS**	**-HIDALGO COUNTY PRECINCT NO. 4-"Construction of a New Multi-Purpose Facility and Mechanical Shop-Civil Site Improvements"**

PROCUREMENT PACKETS may be obtained as follow:

Project No.	Project Description:	Plans Available at:	Plans/Spec Deposit
CSP NO.: 2012-056B-08-01-MSS	**-HIDALGO COUNTY PRECINCT NO. 4-"Construction of a New Multi-Purpose Facility and Mechanical Shop".**	Project Architect- **ERO International, LLP** Eli R. Ochoa, PE, AIA 300 South 8th Street McAllen, TX 78501 Ph. (956) 661-0400 FAX (956) 661-0401	$150.00 (Refundable)
RFB NO.: 2012-056C-08-01-MSS	**-HIDALGO COUNTY PRECINCT NO. 4-"Construction of a New Multi-Purpose Facility and Mechanical Shop-Civil Site Improvements"**	Project Engineer- **Hidalgo County Planning Dept.** Raul Sesin, P.E. 1304 S. 25th St. Edinburg, TX 78539 Ph. (956) 318-2842	$0.00

PRE-BID CONFERENCE is scheduled for Tuesday, July 24, 2012 at 2:00 P.M. at HIDALGO COUNTY PURCHASING DEPARTMENT CONFERENCE ROOM-2802 S. Business Hwy 281, EDINBURG, TEXAS 78539

A BIDDER'S BOND from a reliable surety company licensed to operate in the State of Texas or certified Cashier's Check, payable without recourse to the County of Hidalgo, for the amount of not less than **5%** of the total bid shall accompany the bid as guaranty that, if awarded the contract, the bidder will enter into a contract with the County of Hidalgo. A Payment Bond is required in the amount of one hundred percent (100%) of the Contract Amount, if the contract exceeds $25,000. A Performance Bond is required in the amount of one hundred percent (100%) of the Contract Amount, if the contract exceeds $100,000.

UPON SUBMITTING SEALED BID and/or PROPOSAL, bidders are required to properly identify (handwritten, typed or printed) sealed envelope and/or packet with Bidders' name and address on the upper left hand corner of the sealed envelope and/or package and **Bid No. and project name** on the lower left hand corner of sealed envelope/and or packet. **OVERNIGHT MAIL MUST ALSO BE PROPERLY LABELED ON THE OUTSIDE OF EXPRESS ENVELOPE OR PACKAGE.**

The sealed bid must contain one (1) original and seven (7) copies of bid and must be clearly identified and addressed for delivery to:

Martha L. Salazar, CPPB, Hidalgo County Purchasing Agent
Hidalgo County Purchasing Department

US Postal Mail/Courier Address: Hidalgo County New Administration Building, 2812 S. Business Hwy 281, Edinburg, TX 78539
Physical Location: Hidalgo County New Administration Building, 2802 S. Business Hwy. 281 (Southeast of Canton Rd & Business Hwy 281) Edinburg, TX

BIDS ACCEPTANCE: Sealed bids and/or proposals will be accepted until **3:00 p.m. on Wednesday, August 1, 2012** at which time they will be opened in the Hidalgo County Purchasing Department Conference Room at **Physical Location: 2802 S. Business Hwy 281, Hidalgo County New Administration Building, Edinburg, Texas 78539.** NO FACSIMILES OR LATE ARRIVALS WILL BE ACCEPTED. ANY BID RECEIVED AFTER THAT TIME WILL NOT BE OPENED AND WILL BE RETURNED.

Attention is called to the fact that not less than, the most current federally determined prevailing (**Davis-Bacon and Related Acts)** wage rate, as issued and contained in the contract documents, must be paid on this project. In addition the successful bidder must ensure that employees and applicants for employment are not discriminated against because of race, color, religion, sex, age, disability or national origin.

BIDS MAY BE HELD by the County of Hidalgo for a period not to exceed ninety (90) days from the date of the opening of bids for the purpose of reviewing the bids and investigating the qualifications of bidders, prior to awarding of the contract.

Typed-written RFI's shall be faxed to correspondent Architect or Engineer. Please follow with a call to confirm receipt of faxed RFI. RFI's will not be answered by phone. NO HAND WRITTEN RFI'S will be answered. All inquiries shall be forwarded by July 25, 2012. Inquiries beyond this date will not be responded. Contact project architect and engineer for copies of Addenda. All bidders who paid a deposit will be required to return Addenda as part of the Construction Documents in order to receive full deposit refund.

BY ORDER OF THE COMMISSIONERS COURT OF HIDALGO COUNTY, TEXAS on this the 3rd day of April, 2012.

MARTHA L. SALAZAR, CPPB
HIDALGO COUNTY PURCHASING AGENT

REPORT ROAD HAZARDS@1-866-HCR-SAFE OR 1-866-427-7233

REQUEST FOR
COMPETITIVE SEALED PROPOSALS (CSP)

"Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop"

CSP NO: 2012-056B-08-01-MSS

Acceptance Due Date: **August 1, 2012**

Martha L. Salazar, CPPB, Purchasing Agent
Hidalgo County Purchasing Department

Project Buyer Contact Information:

Moises Salazar, Buyer III
(956) 292-7000 Ext. 4863
moises.salazar@co.hidalgo.tx.us

1. **Sealed Proposals** will be received for **Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop,** in accordance with the requirements, plans and specifications attached hereto Proposals should address all requirements set forth. Proposals may suggest substitutions of features which they feel would be in the best interest of Hidalgo County ("County"). Strong rationale must be presented for any deviation from the requirements. Hidalgo County reserves the right to reject the deviation and its effect on the overall proposal.

2. **ONE (1) ORIGINAL AND SEVEN(7) COPIES** are required, with the vendor's name and address clearly typed/printed on upper left hand corner and the proper notation clearly typed/printed on the lower left hand corner of the envelope and/or package, "**CSP No: 2012-056B-08-01-MSS- Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop"** and at County's Purchasing Department with a physical address: 2802 S. Business 281 and a mailing address: 2812 S. Business Hwy 281, New Administration Building, Edinburg, Texas on **or before 3:00 p.m. WEDNESDAY, August 1, 2012.**

   NO FACSIMILES OR LATE ARRIVALS WILL BE ACCEPTED. ANY CSP RECEIVED AFTER THAT TIME WILL NOT BE OPENED AND WILL BE RETURNED. OVERNIGHT MAIL MUST ALSO BE PROPERLY LABELED ON THE OUTSIDE OF EXPRESS ENVELOPE WITH THE FOLLOWING REFERENCE: CSP NO: 2012-056B-08-01-MSS -"Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop"

   WRITTEN QUESTIONS WILL BE ACCEPTED. Typed-written RFI's shall be faxed to project architect: ERO International, LLP @ *(956) 661-0401*. Please call 956-661-0400 to confirm receipt of faxed RFI. RFI's will not be answered by phone. NO HAND WRITTEN RFI'S will be answered. All inquiries shall be forwarded by July 25, 2012. Inquiries beyond this date will not be responded. Contact project architect for copies of Addenda. All bidders who paid a deposit will be required to return Addenda as part of the Construction Documents in order to receive full deposit refund.

   Hidalgo County reserves the right to refuse and reject any/all proposals and to waive any/all formalities or technicalities, or to accept the proposal considered the best and most advantageous to Hidalgo County.

3. Hidalgo County reserves the right to: **A)** separate and accept, or eliminate any items(s) listed under this proposal that it deems necessary to accommodate budgetary and/or operational requirements; **B)** reject any or all proposals/qualifications submitted and further reserves the right to design the evaluation criteria to be used in selecting the lowest and best proposal for approval. Receipt of any proposal shall under no circumstances obligate County to accept the lowest dollar proposal and; **C)** award of this contract shall be made to the responsible offeror whose proposal is determined to be the best evaluated offer resulting from negotiation, taking into consideration the relative importance of price and other evaluation factors as herein set forth.

4. Failure of the delivered item(s) to perform as specified or failure to meet the stated delivery schedule shall release Hidalgo County from all obligations to the contracting party with regard to the item(s) in question. In such event, County may elect to award the contract to the next-lowest responsible proposer, or to reject all proposals and re-advertise.

5. For work to be performed and/or services to be provided or rendered at a County owned or operated location, each submitter shall, in its sole discretion, visit the job site before preparing the proposal and thoroughly familiarize himself/herself with existing conditions. Proposer should take field dimensions and note all circumstances which affect the proposal

6. Descriptive specifications are referenced in this document to indicate the general kind and quality of equipment desired by Hidalgo County. Due to various styles and models of equipment, proposers are required to include illustrations, specifications, explanation of warranties, and service data with their proposal including catalogue numbers and any necessary references.

7. No proposal may be withdrawn within sixty (60) days from the scheduled time to accept proposals.

8. Proposed prices are to remain firm for a minimum of ninety (90) days after priced proposal opening.

9. Any interpretations, amendments, corrections or changes to this proposal document must be in a written addendum and signed by Hidalgo County Judge or his designee. Addenda will be sent to all who are known to have received a copy of the Request for Proposals. Proposers shall acknowledge receipt of all addenda as a part of their proposal.

10. County reserves the right to accept or reject any or all CSP's

11. Costs are to be net F.O.B. destination County Prepaid.

12. County is exempt from Federal Excise Tax, State Tax and Local Tax. Do not include tax in cost figure. If it is determined that tax was included in the cost figures it will not be included in the tabulation of any awards. Tax exemption certificates will be furnished upon request.

13. Funds for this procurement have been provided through the County's budget for this fiscal year only. County on an annual basis has the right to reconsider a contract during the budget process for ensuing years if financial resources of County are insufficient to meet the liabilities of said contract. The award of a proposal or contract hereunder will not be construed to create a debt of the County which is payable out of funds beyond the current fiscal year.

14. Upon award and prior to execution of a contract, Sole Proprietorships are required to submit a copy of their social security card to the Hidalgo County Auditor in order to establish an account with the County. All awarded vendors must submit a completed W-9 and a copy of their Federal ID Number Certificate.

15. <u>DELIVERY INSTRUCTIONS:</u>

- No deliveries accepted after 3:00 P.M., Monday-Friday.
- At least seventy two (72) hours prior notice of delivery must be given to Martha L. Salazar, CPPB, Purchasing Agent, before delivery will be accepted.
- If you need additional information call the office listed below:

Hidalgo County Purchasing Department
Martha L. Salazar, CPPB, Purchasing Agent
(956) 318-2626

16. **BILLING AND PAYMENT INSTRUCTIONS**:

- Invoices must include:
  a) Name and address of successful submitter
  b) Name and address of receiving department or official
  c) Purchase Order Number (if any)
  d) Notation - **"Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop"** Descriptive information as to the items or services delivered, including product code, item number, quantity, etc.
  e) Contract Number must be indicated on all invoices

- Discount payments will be considered when offered.
- Contact person for Billing and Payment questions:

Ray Eufracio, CPA, Hidalgo County Auditor
2802 S. Business Hwy 281
Edinburg, TX 78539
(956) 318-2511

SCHEDULE OF EVENTS

Pre-Proposal Conference, 2:00 PM		**July 24, 2012**
Proposal Opening, 3:00 PM		**August 1, 2012**
Award of Contract		_____, 2012
Commence Work or Deliver Products		_____, 2012

HIDALGO COUNTY APPROVED HOLIDAYS

2012 YEAR	
New Year's Day	12/30/11 and 01/02/12
Martin Luther King Day	01/16/12
President's Day	02/20/12
Good Friday	04/06/12
Easter	04/09/12
Memorial Day	05/28/12
Independence Day	07/04/12
Labor Day	09/03/12
Columbus Day	10/08/12
Veteran's Day	11/12/12
Thanks Giving Day	11/22/12 and 11/23/12
Christmas Day	12/24/12 and 12/25/12

17. BID OR PERFORMANCE BOND AND DEBARMENT CERTIFICATION; PAYMENT UNDER CONTRACT:

- If the contract proposed is for the construction of public works or is for a contract for goods and services exceeding $100,000, all submitters shall furnish a good and sufficient bid bond in the amount of five percent of the total contract price. A bid bond must be executed with a surety company authorized to do business in Texas.

  All participants are also required to furnish a certification or acknowledgment stating that the contractor or vendor is free from suspension or debarment pursuant to federal regulation 45CFR76.

- Together with the signing of a contract or issuance of a purchase order following the acceptance of a proposal, and prior to commencement of the actual work, the proposer shall furnish a performance bond to the County for the full amount of the contract, if that contract exceeds $100,000. The performance bond must be executed with a surety company authorized to write surety bonds in Texas.

- If the contract is for $50,000 or less, no money will be paid to the contractor until completion and acceptance of the work or the fulfillment of the purchase obligation to the County, and, if applicable, the receipt by County of satisfactory evidence that all subcontractors and materialmen have been paid.

- If a contract is for the construction, alteration or repair of public buildings or public works, the contractor *shall* provide a payment bond for a contract in excess of Twenty Five Thousand Dollars ($25,000.00), as required by Tex. Govt. Code Ch. 2253. The payment bond must be executed with a surety company authorized to write surety bonds in Texas.

- For requirements contracts, bond requirements are determined by applying the proposed unit price to the estimated quantities included in the specifications.

18. **ETHICAL STANDARDS**:

- It shall be a breach of ethics to offer, give or agree to give any elected official, department head or employee, or former elected official, department head or employee, of the County, or for any elected official, department head or employee or former elected official, department head or employee of the County, to solicit, demand, accept or agree to accept from another person, entity or organization, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore pending before any department or agency of the County.

- It shall be a breach of ethics for any payment, gratuity or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor for any contract for the County, or any person associated therewith, as an inducement for the award of a subcontract or order.

- No public official shall have an interest in a contract awarded hereunder except in accordance with Tex. Loc. Govt. Code Chapter 171.

NOTICE:

ALL COMMUNICATIONS BY A VENDOR TO THE COUNTY, ITS OFFICIALS, AND DEPARTMENT HEADS REGARDING THIS PROCUREMENT SHALL BE DONE THROUGH THE HIDALGO COUNTY PURCHASING DEPARTMENT.

No vendor, its representative, agent, or employee shall engage in private communication with a member of the Hidalgo County Commissioners Court or county department heads regarding any procurement of goods or services by the County from the date that the bid, CSP, or RFQ is released. No private communication regarding the purchase shall be permitted until the procurement process is complete and a purchase order is granted or a contract is entered into. Members of the commissioners court are required to make a reasonable effort to inform themselves regarding potential procurements and have a duty to inquire of vendors, their representatives or employees, the nature of any private communication being sought prior to engaging in any communication. "Private Communication" means communication with any vendor outside of a posted meeting of the governing body, a regular meeting of a standing or
appointed committee, or a negotiation with a vendor which has been specifically authorized by the governing body.

19. DISCLOSURE OF CONFLICT OF INTEREST:

- Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor, person, consultant or contractor considering doing business with Hidalgo County ("the County") to disclose in the Conflict of Interest Questionnaire (the "CIQ") attached as Exhibit D, the vendor, person consultant or contractor's affiliation or business relationship that might cause a conflict of interest with the County. By law, the CIQ must be filed with the Hidalgo County Clerk's Office no later than the seventh business day after the date the person becomes aware of facts that require that statement to be filed. The disclosure requirement applies to a person or business who contract or seeks to contract with Hidalgo County for the sale or purchase of property, goods or service. Any purchase order or contract resulting from this process shall be considered null and void if the successful Proposer fails to comply with Texas Local Government Code Chapter 176. Vendors, consultants, contractors and others who desire to conduct business with Hidalgo County are encouraged to refer to Texas Local Government Code Chapter 176 for the details of this law. An offense under Texas Local Government Code Chapter 176 is a Class C Misdemeanor.

  Please submit complete CIQ forms to the Hidalgo County Clerk's Office located at 100 N. Closner, Edinburg, Texas 78539-Hidalgo County Courthouse.

COMPLETION AND SUBMISSION OF FORM CIQ IS THE SOLE RESPONSIBILITY OF THE PROSPECTIVE PROPOSER.

20. If, during the life of any contract or proposal awarded, the successful proposer's net prices generally available to other customers for items awarded herein are reduced below the contracted price, it is understood and agreed that the benefits of such reduction shall be extended to County.

21. Proposals, and all goods and services provided thereunder, shall comply with all federal, state and local laws concerning this type(s) of goods and/or services.

22. Minimum Standards For Responsible Prospective Proposers: A prospective proposer must affirmatively demonstrate proposer's responsibility. A prospective proposer, by submitting a proposal, represents to County that it meets the following requirements:
    - Possess or is able to obtain adequate financial resources as required to perform under the proposal;
    - Be able to comply with the required or proposed delivery schedule;
    - Have a satisfactory record of performance;
    - Have a satisfactory record of integrity and ethics;
    - Be otherwise qualified and eligible to receive an award.

24 . Successful proposer will pay or cause to be paid, without cost or expenses to County, all FICA, FUTA/SUTA and Federal Income Withholding Taxes of all employees, and all wages and benefits as required by Federal or State law. Successful proposer's officers, agents and/or employees will not be entitled to any benefits of an employee or elected official of County, including, but not limited to, benefits associated with County's civil service system.

25. Any contract award to a successful proposer will be in effect until:
    a) the contract expires;
    b) delivery and acceptance of products, and/or performance of services ordered, or;
    c) terminated by County with thirty (30) day's written notice prior to cancellation.

26. County reserves the right to enforce performance of any contract awarded hereunder in any manner prescribed by law or deemed to be in the best interest of the County in the event of breach or default by successful proposer; County reserves the right to terminate any contract immediately in the event a successful proposer fails to:

    A. Meet schedules;
    B. Pay any required fees or taxes; or
    C. Otherwise perform in accordance with the requirements.

27. Successful proposer shall defend, indemnify and save harmless County and all its elected officials, officers, agents and employees from all suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the successful proposer, or of any agent, employee, subcontractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Successful proposer indemnifies and will indemnify and save harmless County from liability, claim or demand on their part, agents, servants, customers, and/or employees whether such liability, claim or demand arise from event or casualty happening

or within the occupied premises themselves or happening upon or in any of the halls, elevators, entrances, stairways or approaches of or to the facilities within which the occupied premises are located. Successful proposer shall pay any judgment with costs which may be obtained against County growing out of such injury or damages, and shall, upon request, provide a defense to County by counsel reasonably acceptable to County. Successful proposer's indemnity hereunder shall include, but is not limited to, claims relating to patent, copyright or trademark infringement, and the like, arising out of the goods or services provided by successful proposer.

28. Successful proposer shall warrant that all items/services shall conform to the specifications and/or all warranties provided under the Uniform Commercial Code and be free from all defects in material, workmanship and the like. Items supplied under a contract pursuant to this Request for Proposal shall be subject to County's approval. Items found to be defective or not meeting specifications shall be replaced by successful proposer within two business days at no expense to County. Items not picked up within one (1) week after notification shall be deemed a donation to County and may be used or disposed of at County's discretion and without waiver of any other rights of County as to the item's nonconformity.

29. This document and any disputes arising hereunder shall be governed and construed according to the laws of the State of Texas, and will be performable exclusively in Hidalgo County, Texas.

30. The successful proposer shall not assign, sell, transfer or convey its rights under any awarded contract, in whole or in part, without the prior written consent of County.

31. Proposers shall provide with the proposal response, a list of at least three (3) references where like services have been supplied by their firm. Include the name of the business or government, address, telephone number and name of representative or contact person.

32. Proposers must provide **all** documentation requested with this Proposal in their response. Failure to provide this information may result in rejection of the proposal as non-conforming.

Proposal
for

"Hidalgo County Precinct No. 4
-Construction of a New Multi-Purpose Facility and Mechanical Shop"
2012-056B-08-01-MSS

To: Martha L. Salazar, CPPB, Purchasing Agent
Hidalgo County Purchasing Department
Physical Address: 2802 S. Business Hwy. 281
Mailing/US Postal Address: 2812 S. Business Hwy. 281
Edinburg, Texas 78539

In accordance with the Requirements, and subject to all laws and regulations of the United States and state and local laws, the undersigned submitter proposes and commits to furnish all labor, equipment, material, software and services as set forth in the documents hereinbefore mentioned. The undersigned submitter further agrees, upon acceptance of its proposal, to execute a contract and/or Purchase Order issued by Hidalgo County for performing and completing the work described in the Requirements within the time stated and for the prices proposed in the documents attached hereto and made a part hereof.

Proposer acknowledges receipt of all of the pages of the documents referenced in the Request for Proposal Checklist presented in connection with this procurement. Proposer understands that Hidalgo County reserves the right to reject any or all proposals and further reserves the right to design the evaluation criteria to be used in selecting the lowest and best proposal.

Submitter agrees that this proposal shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for accepting proposal, as contained in the Requirements.

Respectfully submitted,

Company: _____

Address: _____

By: _____

Printed Name: _____

Title: _____

EXHIBIT A

REQUIREMENTS

HIDALGO COUNTY PRECINCT NO. 4
COMPETITIVE SEALED PROPOSALS

"Construction of a New Multi-Purpose Facility and Mechanical Shop"

CSP No: 2012-056B-08-01-MSS

AUGUST 1. 2012

Hidalgo County(OWNER) is seeking Competitive Sealed Proposals (CSP) from qualified contractors to perform the construction of the Work herein described in connection with: "Hidalgo County Precinct No. 4 -**Construction of a New Multi-Purpose Facility and Mechanical Shop"** (the Project). OWNER is interested in receiving proposals from General Contractors with experience in successfully completing projects that are similar in scope, size and complexity to the Work and meeting any specialized requirements set forth below.

The Hidalgo County Purchasing Department will receive sealed envelopes containing of proposals for the provision of **"Hidalgo County Precinct No. 4 -Construction of a New Multi-Purpose Facility and Mechanical Shop"** as specified herein. Sealed proposals will be accepted until **3:00 P.M., Wednesday, August 1. 2012. ANY CSP RECEIVED AFTER THAT DATE AND TIME WILL NOT BE ACCEPTED AND WILL BE RETURNED UNOPENED.**

Deliver Proposal to:

CSP Number: **2012-056B-08-01-MSS**

US Postal Mail Address:	**Physical Address:**
Martha L. Salazar, CPPB, Purchasing Agent Hidalgo County Purchasing Department New Administration Building 2812 S. Business Hwy 281 Edinburg, TX 78539	Martha L. Salazar, CPPB, Purchasing Agent Hidalgo County Purchasing Department New Administration Building 2802 S. Business Hwy 281 Edinburg, TX 78539

The Submittal Envelope/Packet Must Show the CSP Number, Name and Acceptance Date. A total of **one (1) original and seven (7) copies** of the CSP shall be submitted to the above address.

PRE-PROPOSAL MEETING:
A pre-proposal meeting has been scheduled to be held on Tuesday, **July 24, 2012 at 2:00 P.M.** in the conference room of the Hidalgo County Purchasing Department, 2802 South Business Hwy 281, Edinburg, TX. All vendors are encouraged to attend.

SECTION I COUNTY GENERAL TERMS AND CONDITIONS

Drawings, Specifications, Contract Documents and ADDENDA

1. Copies of Drawings, Specifications, Contract Documents, and Addenda (if any) and other documents related to this Request for Competitive Sealed Proposals, are available in the office of ERO International ("project architect") as indicated in Section 3 below for a deposit amount of **$150.00** per set. The deposit will be refunded upon return of all documents in good condition to the office of the project Architect within 5 working days after the opening of Proposals.

2. The "Contract Documents" include a draft agreement of AIA A101 document for Construction Contract as modified by the OWNER, AIA A201 document General Conditions of the Contract for Construction ("General Conditions") as modified by OWNER, and OWNER'S Notice of Prevailing Wage Rates and Benefits Compliance, collectively referred to in this Request for Proposals. The AIA Agreements are in draft form and may be subject to change and negotiation after the contract award.

3. Copies of Drawings, Specifications, Contract Documents, and Addenda (if any) can be obtained from **"project architect"** in accordance with Section 1 above:

ERO INTERNATIONAL, LLP
300 South 8th Street
McAllen, TX 78501

Ph: (956) 661-0400
Fax: (956) 661-0401

WRITTEN QUESTIONS WILL BE ACCEPTED. Typed-written RFI's shall be faxed to: Eli R. Ochoa, PE, AIA, ERO International, LLP @ (956) 661-0401. Please call 956-661-0400 to confirm receipt of faxed RFI. RFI's will not be answered by phone. NO HAND WRITTEN RFI'S will be processed/answered. All inquiries shall be forwarded by **July 25, 2012**. Inquiries beyond this date will not be responded. Contact project architect for copies of Addenda. All bidders who paid a deposit will be required to return Addenda as part of the Construction Documents in order to receive full deposit refund.

REQUIREMENT FOR DISCLOSURE OF CONFLICT OF INTEREST:
A person, vendor, consultant or contractor required to file a conflict of interest must file an updated questionnaire each year that a contractual relationship or negotiation is pending with the County.

DISCLOSURE OF CONFLICT OF INTEREST: Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor, person, consultant or contractor considering doing business with Hidalgo County ("the County") to disclose in the Conflict of Interest Questionnaire (the "CIQ") attached as **Exhibit D**, the vendor, person consultant or contractor's affiliation or business relationship that might cause a conflict of interest with the County. By law, the CIQ must be filed with the Hidalgo County Clerk's Office no later than the seventh business day after the date the person becomes aware of facts that require that statement to be filed. The disclosure requirement applies to a person or business who contract or seeks to contract with Hidalgo County for the sale or purchase of property, goods or service. Any purchase order or contract resulting from this process shall be considered null and void if the successful bidder fails to comply with Texas Local Government Code Chapter 176. Vendors, consultants, contractors and others who desire to conduct business with Hidalgo County are encouraged to refer to Texas Local Government Code Chapter 176 for the details of this law. An offense under Texas Local Government Code Chapter 176 is a Class C Misdemeanor.

Please submit complete CIQ forms to the Hidalgo County Clerk's Office located at 100 No. Closner, Edinburg, Texas 78539-Hidalgo County Courthouse **COMPLETION AND SUBMISSION OF FORM CIQ IS THE SOLE RESPONSIBILITY OF THE PROSPECTIVE PARTICIPANT.**

PARTICIPANT'S AFFIDAVIT: Prior Contract award, respondents to this CSP must submit a signed Participant's Affidavit (attached herein in **Exhibit E**) certainly that the submission is (1) not the result of Collusion as described in the Participant's Affidavit, (2) that the Respondent does not have a Conflict of Interest as described in the Participant's affidavit or that the Respondent has not and will not attempt to lobby directly or indirectly as described in the Participant's Affidavit.

NON-COLLUSION: Submitters, by submitting the signed Participant's Affidavit, certify that the accompanying submission is not the result of , or affected by, any unlawful act of collusion with any other person or company engaged in the same line of business or commerce, or any other fraudulent act punishable under Texas or United States law.

NON-DISCRIMINATION: Submitters, during the performance of this contract, will not discriminate against any employee or applicant for employment because of race, religion, sex, national origin or disability except where religion, sex, national origin or disability is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor.

PROCESSING TIME FOR PAYMENT: Submitters are advised that a minimum of thirty (30) days is required to process invoices for payment.

ELECTRONIC TRANSMISSION OF PROPOSALS: Hidalgo County's Purchasing Department will not accept telegraphic or electronically transmitted submissions.

PROOF OF FINANCIAL AND BUSINESS CAPABILITY: Submitters must, upon request, furnish satisfactory evidence of their ability to furnish products or services in accordance with the terms and conditions of these requirements. Hidalgo County will make the final determination as to the submitter's ability.

SUBMITTER DEFAULT: Hidalgo County reserves the right, in case of submitter default, to procure the articles or services from other sources and hold the defaulting submitter responsible for any excess costs occasioned thereby.

RESTRICTIVE OR AMBIGUOUS REQUIREMENTS: It is the responsibility of the submitter to review the Request for Proposals (CSP) packet and to notify the Purchasing Department if the requirements are formulated in a manner that would unnecessarily restrict competition. Any such protest or question regarding the requirements or request for qualifications procedures must be received in the Purchasing Department not less than seventy-two hours prior to the time set for the opening. These criteria also apply to requirements that are ambiguous.

CSP DELIVERY: Hidalgo County requires submitters, when hand delivering proposals, to make sure that it is stamped with date and time by the County Purchasing staff.

SIGNING OF PROPOSALS: In order to be considered all submittals **must** be signed. **Please sign the original in BLUE INK**.

WAIVING OF INFORMALITIES: Hidalgo County reserves the right to waive minor informalities or technicalities when it is in the best interest of Hidalgo County.

SUBCONTRACTING: The successful submitter may not subcontract the award without the written consent of the Commissioners' Court of Hidalgo County. A list of subcontractors must be submitted with proposal.

TERM: The term of the agreement will become effective upon award and ending upon acceptance of final completion by Hidalgo County Commissioners Court. Number of days for completion of construction is a factor in this proposal's evaluation criteria.

All costs and expenses associated with the preparation and submission for (bids, proposal, statements of qualifications and/or quotes) shall be the responsibility of the participant and no reimbursement for such charges or expenses shall be passed onto Hidalgo County.

PREVAILING WAGE RATES/DAVIS BACON ACT:
The Contractor and each Subcontractor who performs work under the Contract must pay, at a minimum, the current prevailing wage rates to a worker employed by it in the performance of the Work. The Prevailing Wage Rates are set out in the General Conditions.

SECTION II- CSP SPECIFICATIONS/REQUIREMENTS

Failure to provide the requested information or adhere to any County requirements and specifications will result in disqualification of the submitted CSP

RESPONSE CONTENTS: The required documents for the CSP are included but not limited to the attached CSP Documents Submittal Check List.

PARTICIPANTS ARE TO PROVIDE A FEE SCHEDULE WITH THIS SUBMITTAL: The fee provided in the Proposal form/section of this CSP will be negotiated based on the scope of work with the number one ranked selected by Hidalgo County Commissioners' Court. The proposal information must be typed or neatly printed on the Proposal Form.

SECTION III: SELECTION AND EVALUATION CRITERIA

SELECTION PROCEDURES/EVALUATION SYSTEM: The evaluation consists of a 100-point scoring system. The Offeror that offers the best value may or may not be the Offeror that submits the lowest proposal for the cost of construction.

A. An evaluation committee will review, score and evaluate the written proposals received in response to this Hidalgo County Competitive Sealed Proposals.

B. After the proposals have been reviewed, scored and evaluated, a grid will be presented to Commissioner's Court for the purposes of ranking.

Evaluation categories are detailed in the Selection Criteria (Exhibit B) section of this CSP.

NEGOTIATION PROCESS: The number one ranked Contractor selected by County Commissioners Court will be contacted for negotiations including a Best And Final Offer. If negotiations prove unsuccessful, Commissioner's Court will terminate negotiations with the number one rank Contractor and will contact the next highest ranked contractor to open negotiations. The County of Hidalgo reserves the right to reject any and all CSPs.

TERMINATION OF SERVICES: Any contract awarded will be in effect until (a) the contract expires or (b) performance of all services are completed, or (c) terminated by County with or without cause, with ninety (90) days written notice prior to cancellation.

EXHIBIT B

EVALUATION CRITERIA

HIDALGO COUNTY PRECINCT NO. 4

COMPETITIVE SEALED PROPOSALS

"Construction of a New Multi-Purpose Facility and Mechanical Shop"

CSP No: 2012-056B-08-01-MSS

SELECTION/EVALUATION/RANKING CRITERIA

The evaluation consists of a 100-point scoring system based on the "Evaluation Criteria"-Exhibit B. The participants will be ranked after evaluation by Hidalgo County Commissioners' Court. Categories under the 100-point system include response to CSP. CSP submittal evaluation will be based on the criteria outlined below.

No.	Evaluation Criteria	Maximum Points
1	**Contractor Experience. Number of similar construction projects completed by the General Contractors during current and/or any within the last five (5) years. Such experience must be in the form of providing general contracting services for municipal/county government facilities. Provide the name and location of each project, completion date, final cost, the client, and a contact person name and phone number.**	**20**
2	**Timeline for (earliest) construction of the project. Contractor must submit a timeline for the completion of this project together with the proposal.**	**15**
3	**Submittal of subcontractors list for this project.**	**5**
4	**Favorable & unfavorable references of general contractors for similar construction projects.**	**10**
5	**Warranties**	**5**
6	**Project Cost**	**30**
7	**Understanding of the project Scope of Work. Demonstrate ability to meet the required elements listed. In addition, describe how the services requested in this instrument will be provided and how they will be supported. Describe the approach contractor will take for this project's required collaboration, scheduling and coordination.**	**10**
8	**Compliance to County Requirements. Submittal of required forms.**	**5**
	TOTAL POINTS	**100**

HIDALGO COUNTY PRECINCT NO. 4
COMPETITIVE SEALED PROPOSALS
"Construction of a New Multi-Purpose Facility and Mechanical Shop"
CSP No: 2012-056B-08-01-MSS

EVALUATION/SCORING FORM

Selection Criteria	Maximum Points	Score
1. **Contractor Experience. Number of similar construction projects completed by the General Contractors during current and/or any within the last five (5) years. Such experience must be in the form of providing general contracting services for municipal/county government facilities. Provide the name and location of each project, completion date, final cost, the client, and a contact person name and phone number.**	**20 Pts.**	_____
Comments/Rationale For Points: _____		
2. **Timeline for (earliest) construction of the project. Contractor must submit a timeline for the completion of this project together with the proposal.**	**15 Pts.**	_____
Comments/Rationale For Points: _____		
3. **Submittal of subcontractors list for this project.**	**5 Pts.**	_____
Comments/Rationale For Points: _____		
4. **Favorable & unfavorable references of general contractors for similar construction projects.**	**10 Pts.**	_____
Comments/Rationale For Points: _____		
5. **Warranties**	**5 Pts.**	_____
Comments/Rationale For Points: _____		
6. **Project Cost**	**30 Pts.**	_____
Comments/Rationale For Points: _____		

7. **Understanding of the project Scope of Work. Demonstrate ability to meet the required elements listed. In addition, describe how the services requested in this instrument will be provided and how they will be supported. Describe the approach contractor will take for this project's required collaboration, scheduling and coordination.** **10 Pts.** _____

Comments/Rationale For Points: _____

8. **Compliance to County Requirements. Submittal of required forms.** **5 Pts.** _____

Comments/Rationale For Points: _____

Total Score _____

Name of Contractor: _____

Evaluator Name: _____

Evaluator Signature: _____

Date: _____

EXHIBIT "C"

Insurance Requirements
Applicable to the Acquisition of Goods and /or Services (other than Professional Services)

The Bidder awarded the contract shall furnish proof of insurance, which will also include any subcontractor that is subcontracted by the bidder in at least the following limits, to be in place prior to providing any services under this Contract and to continue at all times in force in effect during the term of this Contract:

1. A Five Hundred Thousand Dollar ($500,000.00) Comprehensive General Liability insurance policy providing additional coverage to all underlying liabilities of County.

2. Automobile liability insurance policy with limits of at least Three Hundred Thousand Dollars ($300,000.00) per person and Five Hundred Thousand Dollars ($500,000.00) per occurrence. Coverage should include injury to or death of persons and property damage claims with limits up to Five Hundred Thousand ($500,000.00) arising out of the services provided to County hereunder.

3. Uninsured/Underinsured motorist coverage in an amount equal to the bodily injury limits set forth immediately above;

4. Workers compensation insurance in amounts established by Texas law, unless the Bidder is specifically exempted from the Texas Workers Compensation Act, Texas Labor Code Chapter 401, et. seq.

Hidalgo County will only accept certificates of insurance on an Acord form (as attached hereto). Certificates of insurance naming County as an additional insured shall be submitted to County for approval prior to any services being performed by Contractor. Each policy of insurance required hereunder shall extend for a period equivalent to, or longer than the term of the Contract, and any insurer hereunder shall be required to give at least thirty (30) days written notice to the County prior to the cancellation of any such coverage on the termination date, or otherwise. This Contract shall be automatically suspended upon the cancellation, or other termination, of any required policy of insurance hereunder, and such suspension shall continue until evidence adequate replacement coverage is provided to County. If replacement coverage is not provided within thirty (30) days following suspension of the Contract, this Contract shall automatically terminate.

ACORD

CERTIFICATE OF INSURANCE

DATE (MM/DD/YY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED

INSURER A:

INSURER B:

INSURER C:

INSURER D:

INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THER TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	**GENERAL LIABILITY** ☐ COMMERCIAL GENERAL LIABILITY ☐ ☐ CLAIMS MADE OCCUR ☐ OWNER'S & CONT. PROT ☐ OWNER'S PROTECTIVE LIABILITY GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY PROJECT ☐ LOC				EACH OCCURRENCE	$
					FIRE DAMAGE (Any one fire)	$
					MED (Any one person)	$
					PERS & ADV INJURY	$
					AL AGGREGATE	$
					ODUCTS – COMP/OP GG	$
B	**AUTOMOBILE LIABILITY** ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident)	$
					BODILY INJURY (Per person)	$
					BODILY INJURY (Per accident)	$
					PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY ☐ ANY AUTO				AUTO ONLY-EA ACCIDENT	$
					OTHER THAN AUTO ONLY EA ACC	$
					AGG	$
C	**EXCESS LIABILITY** ☐ OCCUR ☐ CLAIMS MADE ☐ DEDUCTIBLE ☐ RETENTION $				EACH OCCURENCE	$
					AGGREGATE	$
						$
						$
						$
D	**WORKERS COMPENSATION AND EMPLOYER'S LIABILIT**				WC STATU-TORY LIMITS ☐ OTHER	
					E.L. EACH ACCIDENT	$
					E.L. DISEASE-EA EMPLOYEE	$
					E.L. DISEASE-POLICY LIMIT	$
	OTHER					

SAMPLE

DESCRIPTION OF OPERATIONS / LOCATION / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

County of Hidalgo shall be named as additional insured on all Commercial General Liability policies.

CERTIFICATE HOLDER

Hidalgo County
Attn: Purchasing Department
2812 S Highway Bus. 281
Edinburg, Texas 78539

ADDITIONAL INSURED; INSURER LETTER: _____

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BY CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL ***30*** DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Insurance Requirement Acknowledgment

I, _____, authorized representative for _____,
Company/Vendor

hereby acknowledge receipt of the County's required insurance limits. Said requirements:

❒ will be acquired within 10 working days after notification from Purchasing Department of bid awarded by the Hidalgo County Commissioners' Court;

❒ will acquire additional amounts required to meet the County's requirements within 10 working days after notification from Purchasing Department of bid award by the Hidalgo County Commissioners' Court; currently carry the following:

Automobile Liability: $_____ General Liability: $_____

❒ have already been met, see attached copy of insurance certificate.

_____ _____.
Authorized Representative Date

Notice to Bidder:
A certificate of insurance for the required insurance limits shall be provided to the Purchasing Department's Contract Managers in order to qualify for award of bid and to execute a contract between your Company and the County

Failure to provide Certificates of Insurance to the Purchasing Department's Contract Managers will cause the bid award to be rescinded and re-awarded to next lowest bidder. Certificates of Insurance will be monitored and verified on a **quarterly basis** to ensure coverage policy is in place. It is the Company's obligation to maintain the appropriate insurance coverage throughout the term of the contract.

THIS FORM MUST ACCOMPANY BID PACKET

PROJECT REQUIREMENTS ACKNOWLEDGMENT

This is to certify that I, _____, possess all of the APPLICABLE:

1. Licenses: _____.
2. Bonds: _____.
3. Certificates: _____.
4. Permits: _____.
5. Other: _____.

necessary to carry out the required project. Furthermore, I am providing copies of the required documentation so that, if my company is awarded this bid, I may be eligible to enter into a contract with Hidalgo County and proceed to complete the project in a timely manner.

* Any licenses, bonds, certificates, permits, etc. which are required must be presented as part of the bid packet in order to expedite the bid evaluation process. Failure to provide said documentation will result in the disqualification of your bid.

_____ _____.
Authorized Signature Date

_____.
Company

_____.
Address

_____.
City, State, Zip

EXHIBIT "D"

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. *See* Section 176.006, Local Government Code.

A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of person who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

3 **Name of local government officer with whom filer has employment or business relationship.**

_____

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

☐ Yes ☐ No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

☐ Yes ☐ No

D. Describe each employment or business relationship with the local government officer named in this section.

4

_____ _____

Signature of person doing business with the governmental entity Date

Adopted 06/29/2007

PROPOSER'S AFFIDAVIT
Exhibit "E"

PROPOSER'S AFFIDAVIT OF NON-COLLUSION NON-CONFILICT OF INTERST, AND ANTI-LOBBYING

STATE OF TEXAS
COUNTY OF HIDALGO

Affiant, _____, being first duly sworn, deposes that:

(1) Affiant does hereby state neither the Proposer nor any of the Proposer's officers, partners, owners, agents, representatives, employees, or parties in interest, has in any way colluded, conspired, agreed, directly or indirectly with any person, firm, corporation, or other proposer, or potential proposer, to provide any money or other valuable consideration for assistance in procuring or attempting to procure a contract or fix the prices in the attached proposed or the proposal of any other proposer, and further states that no such money or other reward will be hereinafter paid.

(2) Affiant further states they have neither recommended or suggested to Hidalgo County or nay of its officials or employees, any of the terms or provisions set forth in their Request for Proposal and subsequent agreement, except at a meeting open to all interested proposers, of which proper notice was given.

(3) Affiant, further states their officers, employees, or agents have not, and will not attempt to lobby, directly or indirectly, the Hidalgo County Commissioner's Court between proposal submission date and award by the Hidalgo County County Commissioner's Court.

(4) Affiant further states no officer, or stockholder of the Proposer is a member of the staff, or related to any employee of the Hidalgo County except as noted herein below:

Signature/Title: _____

Subscribed and sworn to before me this _____day of _____, 20___.

_____

Notary Public

My commission expires:_____, 20___.

Certification
Regarding Debarment, Suspension and Ineligibility

As is required by the Federal Regulations Implementing Executive Order 12549, Debarment and Suspension, 45 CFR Part 76, Government-wide Debarment and Suspension, the applicant certifies, to the best of his or her knowledge and belief, that both it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency;

b. Have not within a three-year period preceding this bid proposal and/or application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, or local) transaction or contract under a public transaction, violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a government entity with commission of any of the offenses enumerated herein; and

d. Have not within a three-year period preceding this bid proposal and/or application had one or more public transactions terminated for cause or default.

Signature:_____
Print Name:_____
Title:_____
Telephone Number:_____
Date:_____

If the bidder is unable to certify to all of the statements in this Certification, such bidder should attach an explanation to this proposal.

HIDALGO COUNTY
PURCHASING DEPARTMENT
Bidder/Vendor Application

Complete in print or type. Please return this application to the Hidalgo County Purchasing Department
thru Facsimile: (956) 318-2629 or (956) 292-7612
in person or regular mail to:
Mailing/Postal Address: 2812 S. Business Hwy. 281
Physical Address: 2802 S. Business Hwy. 281
Edinburg, Texas 78539
or e-mail: purchasing@co.hidalgo.tx.us

Company Name: **Telephone No. ( )**

dba Name:

Legal Name:

Mailing Address: **Fax No. ( )**

Physical Address:

City, State, Zip **Tax I.D. No.**

Remit to Address : **City, State, Zip**

E-Mail Address:

Representative(s) Name(s) & Title(s)

Type of Organization (check one): _____ **Individual** _____ **Partnership** _____ **Corporation** _____**Non-Profit**
_____ **LLC** _____ **Sole Proprietor** _____ **Other, Specify**
State Identification No._____ **(Please attached completed W-9 form with this application)**
Federal Identification No. or (if individual) SS No.

State of Incorporation: _____ **Date:**_____ **Other:**

Type of Business (check one): _____ **Manufacturer** _____ **Wholesaler** _____ **Retailer** _____ **Broker**
_____ **Distributor** _____ **Service Organization** _____ **Other, Specify**

Name & Title of Person(s) Authorized to Sign Bids, Proposals, and/or Contracts:

Small and/or Disadvantaged Business Information (check application criteria)

Small Business:	**Disadvantaged Business (At Least 51% Ownership)**	
☐ Less than 125,000 annual gross receipt	☐ Black American	☐ Native American
☐ Less than 250,000 annual gross receipt	☐ Hispanic American	☐ Women
☐ Less than 499,000 annual gross receipt	☐ Asian Pacific American	☐ Other
☐ More than 500,000 annual gross receipt		

Have you been certified as a HUB or an MBE/WBE source?: ☐ Yes ☐ No

Indicate Certification No.(s):_____ **or are Certificate(s) attached?:** ☐ Yes ☐ No

What type of product(s) is/are solicited by your company?:

Would you like to be provided with specifications for procurements of such products?: ☐ Yes ☐ No

To Be Completed by the County: Rec'd by (Purchasing):_____ **Date Rec'd by (Purchasing):**

Date Forwarded Information to Auditor's Office:_____**Entry Date:** _____ **Vendor No.:**

HISTORICALLY UNDERUTILIZED BUSINESS (HUB) DECLARATION

The primary objective of the Hidalgo County HUB Program is to ensure Historically Underutilized Businesses receive a fair and equal opportunity for participation in the County's procurement process. This fact holds true for Services (Professional & Non-Professional), Commodities, and Construction contracts and any subcontracts thereto. The program strongly encourages Prime Contractors to provide subcontracting opportunities to Certified Hub Contractors/Vendors. Our goal for HUB contractor/vendor participation, as well as HUB subcontractor participation is 30%. To be considered as a "Certified HUB Contractor/Vendor" the contractor/vendor must have been certified by, and hold a current and valid certification with any of the three agencies listed below.

Have you been Certified as a HUB or an MBE/WBE source?: ☐Yes ☐ No

If yes, by whom?: ☐ Texas Building & Procurement Commission ☐ Other_____

Indicate Certification No(s).:_____ or Are Certificate(s) Attached?: ☐ Yes ☐ No

LIST OF CERTIFIED HUB SUBCONTRACTORS

(Attach additional pages if necessary)

What percentage of the Bid, RFP, or RFQ is to be subcontracted with Certified HUB sources?: _____%
(List HUB Subcontractor information below).

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ☐Texas Building & Procurement Commission ☐ other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ☐Texas Building & Procurement Commission ☐ other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ☐Texas Building & Procurement Commission ☐ other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

Form **W-9**
(Rev. January 2005)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/ Sole proprietor ☐ Corporation ☐ Partnership ☐ Other ▶ ..... ☐ Exempt from backup withholding

Address (number, street, and apt. or suite no.) | Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. *If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.*

Social security number
___ ___ ___ – ___ ___ – ___ ___ ___ ___

or

Employer identification number
___ ___ – ___ ___ ___ ___ ___ ___ ___

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. person (including a U.S. resident alien).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. (See the instructions on page 4.)

Sign Here | **Signature of U.S. person ▶** | **Date ▶**

Purpose of Form

A person who is required to file an information return with the IRS, must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

U.S. person. Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee.

Note. *If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.*

For federal tax purposes you are considered a person if you are:

- An individual who is a citizen or resident of the United States,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States, or
- Any estate (other than a foreign estate) or trust. See Regulations sections 301.7701-6(a) and 7(a) for additional information.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the recipient has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments (after December 31, 2002). This is called "backup withholding." Payments that may be subject to backup withholding include interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester, or

2. You do not certify your TIN when required (see the Part II instructions on page 4 for details), or

3. The IRS tells the requester that you furnished an incorrect TIN, or

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your social security card. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your social security card on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). If you are a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Treasury regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line. Check the appropriate box for your filing status (sole proprietor, corporation, etc.), then check the box for "Other" and enter "LLC" in the space provided.

Other entities. Enter your business name as shown on required Federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt From Backup Withholding

If you are exempt, enter your name as described above and check the appropriate box for your status, then check the "Exempt from backup withholding" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

Exempt payees. Backup withholding is not required on any payments made to the following payees:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),

2. The United States or any of its agencies or instrumentalities,

3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,

4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or

5. An international organization or any of its agencies or instrumentalities.

Other payees that may be exempt from backup withholding include:

6. A corporation,

7. A foreign central bank of issue,

8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,

9. A futures commission merchant registered with the Commodity Futures Trading Commission,

10. A real estate investment trust,

11. An entity registered at all times during the tax year under the Investment Company Act of 1940,

12. A common trust fund operated by a bank under section 584(a),

13. A financial institution,

14. A middleman known in the investment community as a nominee or custodian, or

15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt recipients listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt recipients except for 9
Broker transactions	Exempt recipients 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt recipients 1 through 5
Payments over $600 required to be reported and direct sales over $5,000 [1]	Generally, exempt recipients 1 through 7 [2]

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees; and payments for services paid by a Federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-owner LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter your SSN (or EIN, if you have one). If the LLC is a corporation, partnership, etc., enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at *www.socialsecurity.gov/online/ss-5.pdf*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses/* and clicking on Employer ID Numbers under Related Topics. You can get Forms W-7 and SS-4 from the IRS by visiting *www.irs.gov* or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Writing "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt recipients, see *Exempt From Backup Withholding* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account [1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor [2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee [1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner [1]
5. Sole proprietorship or single-owner LLC	The owner [3]
For this type of account:	**Give name and EIN of:**
6. Sole proprietorship or single-owner LLC	The owner [3]
7. A valid trust, estate, or pension trust	Legal entity [4]
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one). If you are a sole proprietor, IRS encourages you to use your SSN.

[4] List first and circle the name of the legal trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.)

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, and the District of Columbia to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

DRAFT

AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year 2012 »
(In words, indicate day, month and year)

BETWEEN the Owner:
(Name, legal status, address and other information)

County of Hidalgo
2812 S. Business Hwy 281
Edinburg, Texas 78539

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description) Design and Construction of a New Multi-Purpose Facility/Mechanical Shop for Hidalgo County Precinct No. 4

The Architect:
(Name, legal status, address and other information)

ERO International, L.L.P. d/b/a **ERO Architects**
300 S. 8th Street
McAllen, Texas 78501
Phone No.: 956.661.0400

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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User Notes: (1515532406)

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

« »

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

« »
3.1.1 Liquidated Damages: Owner and Contractor recognize that time is of the essence in this Agreement and that Owner will suffer financial loss if the Work is not completed within the time specified in this Article 3 above, plus any extension thereof allowed in accordance with Article 8 of the General Conditions. Owner and Contractoralso recognize the delays, expense and difficulties involved in providing in a legal proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring such proof, Owner and Contractor agree that as liquidated damages for delay (but not as penalty) Contractor shall pay Owner, ____Hundred Dollars ($.00) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion until the work is substantially complete.

§ 3.2 The Contract Time shall be measured from the date of commencement.

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User Notes: (1515532406)

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

« »

Portion of Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

See 3.1.1 above.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit ($ 0.00)

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Betterment Allowance	
TOTAL AMOUNT	

4.5 Commitment of Current Revenues Only. In the event that, during any term hereof, the governing body of any party does not appropriate sufficient funds to meet the obligations of such party under this Agreement, then any party may terminate this Contract upon ninety (90) days written notice to the other party. Each of the parties hereto agrees, however, to use its best efforts to secure funds necessary for the continued performance of this Contract. The parties intend this provision to be a continuing right to terminate this Agreement at the expiration of each budget period of each party hereto pursuant to the provisions of Tex. Loc. Govt. Code Ann. §271.903.

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ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect and reviewed by the Construction Manager (as such term is hereinafter defined), as evidenced by the Construction Manager's signature, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the **30th** day of a month, the Owner shall make payment of the certified amount to the Contractor not later than **the fifth day following approval by Commissioners Court.** .
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Owner, Construction Manager, and Architect may require. This schedule, unless objected to by the Architect or the Owner and Construction Manager, shall be used as a basis for reviewing the Contractor's Applications for Payment. For purposes of this Agreement "Construction Manager" is defined as Prodigy Construction Management, LLC.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of Percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction, **as modified by Owner and attached hereto as Exhibit** ;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of Percent (%);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "";**

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Construction Manager and the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "";**

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

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(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

Not Applicable

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "C"**; and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect. The Architect may not issue the final Certificate for Payment until it has been reviewed by the Construction Manager and approved by the Owner.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment **and upon acceptance by the Owner and Architect, and after satisfactory evidence has been given by the Contractor that all his bills have been paid and the entire project is free from liens.**

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "",** unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »
« »

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "",** the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2007

[« X »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

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ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » « »

§ 8.3 The Owner's representative:
(Name, address and other information)
Hidalgo County Commissioner's Court and _____, as referenced in the AIA A201-2007 General Conditions, as modified by the Owner in Section 2.1.1. as authorized representatives.
§ 8.4 The Contractor's representative:
(Name, address and other information)

« »
« »
« »
« »
« »
« »

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor, **as modified by Owner and attached hereto as Exhibit "",**

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction, **as modified by Owner and attached hereto as Exhibit "".**

§ 9.1.3 The Supplementary and other Conditions of the Contract: Not Applicable.

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

« »

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Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)
« »

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 AIA Document E201™–2007 Digital Data Protocol Exhibit, if completed by the parties, or the following:

« »

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

«
1. Exhibit '' Bid Form and Addendums from _____
2. Exhibit '' Project Manual (Specifications)
3. Exhibit '' – AIA A201-2007, as modified by the Owner.
4. Exhibit '' Notice to Proceed
5. Exhibit '' Certificate of Insurance
6. Exhibit '' Performance and Payment Bonds

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007, **as modified by Owner and attached hereto as Exhibit "",**
*(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007,,**as modified by Owner and attached hereto as Exhibit ""**).*

Type of insurance or bond	Limit of liability or bond amount ($ 0.00)

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This Agreement entered into as of the day and year first written above and is executed in three (3) original copies, of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
By: Ramon Garcia, County Judge	By: « »« »
(Printed name and title)	*(Printed name and title)*
APPROVED AS TO FORM:	**ATTEST:**
(Signature)	*(Signature)*
By: Stephen L. Crain	By: Arturo Guajardo Jr., County Clerk
(Printed name and title)	*(Printed name and title)*

DRAFT

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AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Design and Construction of a New Multi-Purpose Facility/Mechanical Shop for Hidalgo County Precinct No. 4

THE OWNER:
(Name, legal status and address)
County of Hidalgo
3100 South Business Highway 281, Suite D
Edinburg, Texas 78539

THE ARCHITECT:
(Name, legal status and address)
ERO International, L.L.P. d/b/a ERO Architects
300 S. 8th Street
McAllen, Texas 78501

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15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect pursuant to Paragraph 7.4. At the Owner's option, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.1.1 Contractor acknowledges and warrants that it has closely examined all the Contract Documents and is unaware of any instance where the documents are not suitable or are insufficient, to enable the Contractor to complete the Work in a timely manner for the Contract sum, and that they include all Work, whether or not shown or described, which reasonably may be inferred or useful for the completion of the Work in full compliance with all applicable codes, laws, ordinances, and regulations.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor (except as provided in Paragraph 5.3 and 5.4 hereof), (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations of the Contractor under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.3.1 The Work shall include the obligation of the Contractor to visit the site of the project before submitting a proposal. Such site visit shall be for the purpose of familiarizing Contractor with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, including all existing site conditions, access to the site, physical characteristics of the site and surrounding areas. It also includes all supplies, skill, supervision, transportation services and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract and all other items of cost or value needed to produce, construct and fully complete the public work identified by the Contract Documents.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams wherever located and whenever issued.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

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§ 1.1.7 INSTRUMENTS OF SERVICE
Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER
The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. Any differences between the requirements of the Drawings and the Specifications or any differences noted within the Drawings themselves or within the Specifications themselves have been referred to Owner and Architect by Contractor prior to the submission of bids and have been clarified by an Addendum issued to all bidders.

If such differences or conflicts were not called to Owner's and Architect's attention prior to submission of bids, Architect shall decide which of the conflicting requirements will govern based upon the following: the most stringent of the requirements will take precedence over the less stringent; the most expensive item will take precedence over the less expensive, and subject to the approval of Owner, Contractor shall perform the Work at no additional cost and/or time to Owner in accordance with the Architect's decision. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable as being necessary to produce the intended results.

§ 1.2.1.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

.1 The Agreement;
.2 Addenda, with those of later date having precedence over those of earlier date;
.3 Supplemental Conditions, if any;
.4 The General Conditions of the Contract for Construction;
.5 Specifications
.6 Drawings, in the case of inconsistency between the Drawings and Specifications or within either document, not clarified by Addendum, the better quality or greater quantity of Work shall be included in the Contract Documents. Clarifications of the inconsistency will be accomplished with the Contractor and, if necessary, an appropriate reduction in the contract will be accomplished with the Contractor and, if necessary, an appropriate reduction in the contract will be accomplished by Change Order. Figures given on drawings govern scale measurements. Large scale drawings take precedence over small sale drawings. Written words, take precedence over numbers. Handwritten documents take precedence over typewritten documents. Existing conditions take precedence over drawings and specifications for dimensions and shall be verified by the Contractor. The Contractor proceeds at his own risk if conflicts or discrepancies are not resolved prior to the execution of the Work.

§ 1.2.1.2 If Work is required in a manner to make it impossible to produce Work of the quality required by or reasonably inferred from the Contract Documents, or should discrepancies appear among the Contract Documents, Contractor shall request in writing an interpretation from Architect before proceeding with the Work. If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carryout Work in the required manner or provide required guarantees, warranties, or bonds, and Contractor shall not be entitled to any change in the Contract Sum or the Contract Time on account of such failure.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 Instruments of Service, including the Drawings, Specifications, and other similar or related documents and copies thereof are furnished to Contractor for the purpose of performing the Work and are, and shall remain, the property of Owner and Owner will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner or Owners' consultants reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Commissioners Court of Owner, by majority vote, is the only representative of Owner, having the power to enter into a Contract, to execute a change order requiring an increase in the Contract Sum, or agree to an extension of the contractual completion date. The Commissioners Court shall designate, as appropriate, an authorized representative(s) to act on its behalf during the course of construction. In the event that an emergency changes the scope of the Work before the next regular meeting or in order to facilitate and expedite the timely completion of the Work, the Commissioners Court's authorized representative(s) may approve construction changes that do not exceed $10,000.00 in increased costs. Any such changes shall be confirmed in writing between the Contractor and the Commissioner Court's authorized representative(s) and notice of such approved changes shall be given to the Commissioners Court at its next regular meeting. The Commissioners Court will act as soon as reasonably possible to avoid undue delays in the construction completion date.

§ 2.1.2 DELETE.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

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the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics and legal limitations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. In connection with the foregoing, Contractor shall be solely responsible for locating (and shall locate prior to performing any Work) all utilities lines, telephone company lines and cable, sewer lines, water pipes, gas lines, electrical lines, including without limitation, all buried pipelines and buried telephone cables an shall perform the Work in such a manner so as to avoid damaging any such lines, cables, pipes and pipelines. Under this provision the Architect and Engineer are in no way relieved of their responsibilities outlined in the Contract or other attached contracts for identification of existing conditions.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2 for use on this Project. All costs of reproduction are the responsibility of Contractor.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents or fails to remove and discharge (within ten (10) days) any lien filed upon Owner's or Landlord's property by anyone claiming by, through, or under Contractor; or disregards the instructions of Architect or Owner when based on the requirements of the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3, and any delay resulting from such Work stoppage shall not extend any Milestone Date identified in the Contract for Construction or the required dates of Substantial or Final Completion.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.4.1 The rights stated in Article 2 shall be in addition to and not in limitation of any other rights of Owner granted in the Contract Documents or at law or in equity.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have

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express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect and Owner in writing any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for design information in such form as the Architect may require.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect and Owner in writing any nonconformity discovered by or made known to the Contractor as a request for design information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor recognized or reasonably should have recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect and Owner.

§ 3.2.5 The Contractor shall not be entitled to additional compensation for the "rework portion" of any additional work caused by his failure to carefully study and compare the Contract Documents prior to execution of the Work.

§ 3.2.6 The Contractor shall make reasonable attempt to interpret the Contract Documents before asking the Architect for assistance in interpretation. The Contractor shall not ask the Architect for observation of work prior to the Contractor's field superintendent's personal inspection of the work and his determination that the work complies with the Contract Documents.

§ 3.2.7 If, in the opinion of the Architect, the Contractor does not make a reasonable effort to comply with the above requirements of the Contract Documents and this causes the Architect or his consultants to expend an unreasonable amount of the time in the discharge of the duties imposed on him by the Contract Documents, then the Contractor shall bear the cost of compensation for the Architect's additional services made necessary by such failure. The Architect will give the Contractor prior notice of intent to bill for additional services related to 3.2.6, 3.2.7, and 3.12 before additional services are performed.

§ 3.2.8 If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the work or to honor his Warranty, Contractor shall

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promptly notify the Architect in writing, providing substantiation for the position. Any necessary changes, including substitutions of materials, may only be accomplished by an appropriate Modification.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 Contractor shall be responsible to Owner for acts and omissions of Contractor's employees, Subcontractors, and their agents and employees, and other persons performing portions of the Work under the Contract Documents or other arrangements with Contractor.

§ 3.3.5 Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the Work, including those with respect to the safety of persons and property and their protection from damages, injury, or loss. Contractor shall promptly remedy damage and loss to property at the site caused in whole or in part by Contractor, its Subcontractor, or anyone directly or indirectly employed by any of them or by anyone for whose acts they may be liable, except for damage or loss attributable solely to acts or omissions of Owner or Architect or by anyone for whose acts either of them may be liable and not attributable to the fault or negligence of Contractor, its Subcontractor, or anyone directly or indirectly employed by them. The foregoing obligations of Contractor are in addition to Contractor's obligations under other provisions hereunder.

§ 3.3.6 Contractor shall be responsible for inspection of portion of Work already performed under the Contract for Construction to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.7 Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions, and that they provide materials on time. Contractor shall coordinate its Work with that of all others on the Project, including of construction utilities.

§ 3.3.8 Contractor shall establish and maintain bench marks and all other grades, lines, and levels necessary for the Work; report errors or inconsistencies to Owner and Architect before commencing Work; and, if applicable, review the placement of the buildings and permanent facilities on the site with Owner and Architect after all lines are staked out and before foundation Work is started. Contractor shall provide access to the Work for Owner, Architect, other persons designated by Owner, and governmental inspectors. Any encroachments made by Contractor or its Subcontractors on adjacent properties caused by construction as revealed by an improvements survey, except for encroachments arising from errors or omissions not reasonably discoverable by Contractor in the Contract Documents, shall be the sole responsibility of Contractor, and Contractor shall correct such encroachments within thirty (30) days of the improvement survey (or as soon thereafter as reasonably possible), at Contractor's sole cost and expense, either by the removal of the encroachment (and subsequent reconstruction on the Project site) or agreement with the adjacent property owner (s) (in form and substance satisfactory to Owner in its sole discretion) allowing the encroachments to remain.

§ 3.3.9 Contractor shall verify at the Work site the measurements indicated on the Drawings and Specifications and shall establish correctly the lines, levels, and positions for the Work and be responsible for their accuracy and proper

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correlation with control lines, monuments, and data, as established by surveys furnished by Owner. Work shall be erected square, plumb, level, true to line and grade, in the exact plane and to the correct elevation and/or sloped to drain as indicated. To ensure the proper execution of its subsequent Work, Contractor shall measure all Work already in place (including but not limited to utilities and grades installed or prepared by others) and shall at once report to Architect and Owner any discrepancy between said Work and the Drawings and Specifications for the Work.

§ 3.3.10 Any discrepancy or omission in the dimensions or elections shown on the Drawings and Specifications or found in previous Work which may prevent accurate layout or construction of the Work, shall immediately be reported by Contractor to Owner and Architect. If Contractor performs, permits, or causes performance of any Work when Contractor knows or reasonably should have known that such discrepancy or omission exists, without first obtaining further instruction from Architect or Owner, Contractor shall bear any and all costs arising therefrom including, without limitation, the costs of correction thereof without increase or adjustment in the Contract Sum. Omissions from the Drawings or Specifications, or the misdescription of details of Work which are reasonably inferable in order to carry out the intent of the Drawings and Specifications, or which are customarily performed, shall not relieve contractor from performing such omitted or mis-described details of the Work, and they shall be performed as if fully and correctly set forth and described in the Drawings and Specifications, at no additional cost to Owner.

§ 3.3.11 Contractor shall engage workers who are skilled in performing the Work, and all Work shall be performed with care and skill and in a good workmanlike manner under the full-time supervision of an approved engineer or foreman. Contractor shall be liable for all property damage, including repairs and replacements of the Work and economic losses, which proximately result from the breach of this duty. Contractor shall advise Architect:

1. if a specified product deviates from good construction practices;
2. if following the Specifications will affect any warranties; or
3. any objections which Contractor may have the Specifications.

Nothing contained in Subparagraph 1.1.3 shall alter the responsibilities established in this Subparagraph.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive. By making requests for substitutions based on Subparagraph 3.4.2, Contractor:

1. represents that Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
.2 represents that Contractor will provide the same warranty for the substitution that Contractor would for that specified;
.3 certifies that the cost data presented is complete and includes all related costs under this Contract except Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
.4 will coordinate the installation for the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. Contractor shall also be responsible for labor peace on the Project and shall at all times make its best efforts and judgments as an experienced Contractor to adopt and implement policies and practices designed to avoid Work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances and shall at all times maintain Project-wide labor harmony. Except as specifically provided in Subparagraph 8.3 hereof, Contractor shall be liable to Owner for all damages suffered by Owner.

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§ 3.4.4 Materials shall conform to manufacturer's standards in effect at the date of execution of the Agreement and shall be installed in strict accordance with manufacturer's directions. Contractor shall, if required by Owner or Architect, furnish satisfactory evidence as to the kind and quality of any materials. All packaged materials shall be shipped to the site in the original containers clearly labeled, and delivery slips shall be submitted with bulk materials identifying thereon the source, and warranting quality and compliance with Contract Documents.

§ 3.4.5 When the Contract Documents require the Work, or any part of same, to be above the standards required by applicable laws, ordinances, rules and regulations, and other statutory provisions pertaining to the Work, such Work shall be performed and completed by Contractor in accordance with the Contract Documents.

§ 3.4.6 When the manufacturer's name, patent numbers, underwriter's labels, model numbers or similar identifying marks are required, such markings shall be located as inconspicuously as possible.

§ 3.5 WARRANTY

§ 3.5.1

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of the best quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects. Work, materials, or equipment not conforming to these requirements may be considered defective. If required by the Architect or Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 ALL WARRANTIES SHALL INCLUDE LABOR AND MATERIALS AND THE MANUFACTURER'S WARRANTY SHALL BE SIGNED BY SUBCONTRACTOR AND COUNTERSIGNED BY CONTRACTOR. ALL WARRANTIES SHALL BE ADDRESSED TO OWNER AND DELIVERED TO ARCHITECT UPON COMPLETION OF THE WORK AND BEFORE OR WITH THE SUBMISSION OF REQUEST FOR FINAL PAYMENT.

§ 3.5.3 Contractor shall issue in writing to Owner as a condition precedent to final payment a "general warranty" reflecting the terms and conditions of this Paragraph 3.5 for all Work under the Contract.

§ 3.5.4 The warranties provided in Paragraph 3.5 shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contract Documents, and such warranty or remedy required by law or by the Contract Documents, and such warranty shall be interpreted to require Contractor to replace defective materials and equipment and re-execute defective Work which is disclosed to the Contractor by the Owner within a period of one (1) year after final completion of the entire Work unless a longer time is specifically called for in the specifications. The Contractor shall assign all components, equipment and fixture warranties to the Owner and will deliver all manuals to the Owner at the completion of construction.

§3.5.5 Except when a longer warranty time is specifically called for in the Specification Sections or is otherwise provided by law, the General Warranty shall be for twelve (12) months and shall be in form and content otherwise satisfactory to Owner.

§3.5.6 Warranties shall become effective on a date established by Owner and Architect in accordance with the Contract Documents. This date shall be the Date of Substantial Completion of the entire Work, unless otherwise provided in any Certificate of Partial Substantial Completion approved by the parties.

§3.5.7 If Architect considers it impractical, because of unsuitable test conditions or some other factors, to execute simultaneous final acceptance of all equipment, portions of properly installed and functioning equipment may be certified by Architect for final acceptance, subject to Owner's approval, when that portion of the system is complete and ready for operation as called for under Subparagraph 9.8.1.

§3.5.8 Contractor shall warrant for a period of twelve (12) months that the building(s) shall be watertight and leak proof at every point and in every area, except where leaks can be attributed to damage to the building(s) by external forces beyond Contractor's control. Contractor shall, immediately upon notification by Owner of water penetration, determine the source of water penetration and, at its own expense, do any Work necessary to make the building(s)

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watertight. Contractor shall also, at its own expense, repair or replace any other damaged material, finishes, and furnishings, damaged as a result of this water penetration, to return the building(s) to its (their) original condition.

§3.5.9 In addition to the foregoing stipulations, Contractor shall comply with all other warranties referred to in any portions of the Contract Documents or otherwise provided by law or in equity, and where warranties overlap, the more stringent requirement shall govern.

§3.5.10 If for any reason Contractor cannot warrant any part of the Work using material or construction methods that have been specified, or shown, it shall notify Owner and Architect in writing before the Contract is signed, giving reasons, together with the name of product and data on a substitution it can warrant.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall make application, secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract including, without limitation, street openings, sidewalk, and other obstructions, access over public ways and storage necessary for proper execution of the Contract and which are, legally required at the time bids are received or negotiations concluded.

§3.7.1.1 The Contractor shall also obtain all permits and approvals, and pay all fees and expenses, if any, associated with National Pollutant Discharge Elimination System (NPDES) regulations administered by the Environmental Protection Agency and state and local authorities, that require completion of documentation and/or acquisition of all permits for the Project. Contractor's obligations under this paragraph do not require it to perform engineering services during the pre-construction phase to prepare proper drainage for the construction sites. However, any drainage alterations made by Contractor during construction phase which modifies the original site drainage plan and requires the issuance of a permit shall be at Contractor's sole cost.

a. The Owner shall pay directly to the governing authority the cost of all permanent property utility assessments and similar utility connection charges.

b. The Contractor shall be responsible for obtaining and paying for all City and County Building Permits, Inspection Fees and Plan Checking Fees; temporary utility charges, tap charges and water meter charges and any other similar fees assessed by jurisdictional authorities having control over the Project.

c. The Owner shall pay fees payable to the Texas Department of Licensing and Regulations (TDLR) for document review relative to the Elimination of Architectural Barriers Act and the Architect will submit the documents to the TDLR for review and approval.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders and all other requirements of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work (including, without limitation, the installation of any materials or equipment) that it knows or reasonably should have known would be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions

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are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend to the Owner in writing, an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum shall be permitted in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or based on data provided to Contractor and by the Contractor's prior inspections, tests, reviews, and pre-construction services for the Project; or by the Contractors inspections, tests, reviews and pre-construction services that Contractor had the opportunity and obligation to make in connection with the Project but did not do so.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect in writing. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness. If a decision is needed to avoid a delay, Contractor shall notify Architect, Construction manager and Owner in writing sufficiently in advance of needed date to allow reasonable time for selections to be made.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Superintendent shall be satisfactory to the Owner and shall not be changed except with the consent of the Architect, unless the Superintendent leaves the employment of the Contractor. No increase in Contract Time or Contract Sum shall be allowed in the event the Owner or Architects object to any nominated superintendent. Such approval by the Owner shall not be unreasonably withheld.

§ 3.9.3 DELETED.

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§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's review and approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised as required herein and at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The schedule shall indicate the proposed starting and completion dates for the various subdivisions of the Work as well as the totality of the Work. The schedule shall be updated every thirty (30) days and submitted to Architect with Contractor's Applications for Payment. Each schedule shall contain a comparison of actual progress with the estimated progress for such point in time stated in the original schedule. If any schedule submitted sets such a date for Substantial Completion for the Work or any phase of the Work beyond the date(s) of Substantial Completion established in the Contract (as the same may be extended as provided in the Contract Documents), then Contractor shall submit to Architect and Owner for their review and approval a narrative description of the means and methods that Contractor intends to employ to expedite the progress of the Work to ensure timely completion of the various phases of the Work as well as the totality of the Work. To ensure such timely completion, Contractor shall take all necessary action including, without limitation, increasing the number of personnel and labor on the Project and implementing overtime and double shifts. In that event, Contractor shall not be entitled to an adjustment in the Contract Sum or the schedule.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's and Owner's approval. The Architect's and Owner's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.10.4 The process of approving Contractor's schedules and updates to Contractor's schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on Contractor's schedule. Approval of a Contractor's schedule does not constitute a commitment by the Owner to furnish any Owner-furnished information or material any earlier than Owner would otherwise be obligated to furnish that information or material under the Contract Documents. Failure of the Work to proceed in the sequence scheduled by Contractor shall not alone serve as the basis for a Claim for additional compensation or time. In the event there is interference with the Work, which is beyond its control, Contractor shall attempt to reschedule the Work in a manner that will hold resulting additional time and cost to a minimum. The construction schedule shall be in a detailed format satisfactory to the Owner and the Architect and shall also:

.1 Provide a graphic representation of all activities and events that will occur during performance of the Work;
.2 identify each phase of construction and occupancy; and
.3 set forth dates that are critical in ensuing the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents hereinafter referred to as Milestone Dates.

§ 3.10.5 The Owner shall have the right to reschedule the time of day for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenants or invitees thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any rescheduling of performance of the Work under this Subparagraph 3.10.5 may be grounds for an extension of the Contract Time, if permitted under Subparagraph 8.3.1 and an equitable adjustments in the Contract Sum, if: (1) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, (2) such rescheduling is required for the convenience of the Owner and is not attributable to any act of omission of Contractor, and (3) if Owner agrees to the Contract Sum adjustment prior to any rescheduling.

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§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections (all changes and selections to be approved by Owner and Architect in advance) made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 At the Date of Substantial Completion and as a condition precedent to final payment, Contractor shall furnish the following documents to Architect for submittal to Owner: Record Drawings showing the field changes and selections (all changes and selections to be approved by Owner and Architect in advance) affecting the general construction, mechanical, electrical, plumbing, and all other Work, and indicating the Work as actually installed. These shall consist of carefully drawn markings on a set of reproducible prints of Architect's Drawings obtained and paid for by Contractor. Contractor shall maintain at the job site one (1) set of Architect's Drawings and indicate thereon each field change as it occurs. The Contractor shall post all Addenda on Construction Documents prior to commencing work on the site.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. If, in the opinion of the Architect, the Shop Drawings, Product Data, Samples and similar submittals are incomplete, indicate an inadequate understanding of the work covered by the submittals, or indicate a lack of study and review by the Contractor prior to submittal to the Architect, the submittals will be returned, unchecked, to the Contractor for correction of these three deficiencies and subsequent re-submittal. Additional service charges as outlined in 3.2.7 may be charged by the Architect in this event.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect

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in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional and who shall comply with requirements of Owner regarding qualifications and insurance and, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 The Contractor shall submit Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents to the Architect at least 30 days prior to the date the Contractor needs the reviewed submittals returned. Where colors are to be selected by the Architect, the Contractor shall submit all Samples in adequate time to allow the Architect to prepare a complete selection schedule. In general, all submittals requiring color selection shall be submitted to the Architect within four weeks of the date of the Contract for construction.

§3.12.12 The Contractor shall submit the number of copies of Shop Drawings, Product Data, Samples and similar submittals which the Contractor and his Subcontractors need for their use plus two additional sets for the Architect and one additional set for each of the Architect's consultants involved with the particular section of work. Where shop drawings are involved, the Contractor shall submit one high quality reproducible transparency and one opaque print of the shop drawing for the Architect plus one additional opaque print for each of the Architect's consultants involved with the particular section of work. The reproducible transparency will be marked by the Architect and/or his consultants and returned to the Contractor for his use, distribution, correction or re-submittal as required. The Architect and his consultants will retain the marked up prints. After final review and correction of the submittal, the Contractor shall send two corrected sets to the Architect, and one to each of the Architect's consultants involved with the particular section of work.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§3.13.1 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§3.13.2 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without written consent of the Owner.

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§3.13.3 Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision on the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of: (1) any area and buildings adjacent to the site or the Work or (2) the Building in the event of partial occupancy.

§3.13.4 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories, toilets, entrance and parking areas other than those designated by Owner. Without limitation of any other provisions of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.15.3 Prior to the Architect's inspection for Submittal Completion the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roof, gutters and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

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§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law, Contractor shall indemnify, defend, and hold harmless Owner, the Commissioners Court of Owner, all elected officials, employees and agents of Owner of any of the above mentioned parties (the "INDEMNIFIED PARTIES") from and against any and all loss, cost, expense, damage, injury, liability, claim, demand, penalty, or cause of action (including attorneys' fees), directly or indirectly arising out of, resulting from, or related to (in whole or in part), (1) the Work performed hereunder, (2) the Contract, or (3) the act or omission of Contractor, a Subcontractor, or an individual, partnership, joint venture, or corporation (a) directly or indirectly employed by Contractor or a Subcontractor, or (b) for whose acts or omissions Contractor or a Subcontractor may be liable (excluding property damage to the Work itself, covered by Owner's all-risk builder's risk insurance, subject to Contractor's liability for any deductible amounts thereunder). The obligations of Contractor under this indemnification shall apply to all matters except those arising solely from the wanton and willful negligence or the malicious acts or omissions of Owner. Further, the obligations of Contractor under this indemnification shall not extend to the liability of Architect, its agents, or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs, or Specifications, (2) the giving of or failure to give directions or instructions by Architect, its agents, or employees, provided such giving or failure to give is the primary cause of the injury or damage, or (3) any matter prohibited by Section 130.002, Texas Civil Practice and Remedies Code. Contractor shall promptly advise Owner in writing of any action, administrative or legal proceeding , or investigation as to which this indemnification may apply, and Contractor, at Contractor's expense, shall assume on behalf of Owner and conduct with due diligence and in good faith the defense thereof with counsel satisfactory to Owner; provided, Owner shall have the right to be represented therein by advisory counsel of its own selection and at its own expense; and provided further, that if the defendants in any such action include both Contractor and Owner and Owner shall have reasonably concluded that they may be legal defenses available to it that are different from, or additional to, or inconsistent with, those available to it that are different from, or additional to, or inconsistent with, those available to Contractor. Owner shall have the right to select separate counsel to participate in the defense of such action on its own behalf at Contractor's expense. In the event of failure by Contractor to fully perform in accordance with this indemnification paragraph. Owner, at its option, and without relieving Contractor of its obligations hereunder, may so perform, but all costs and expenses so incurred by Owner in that event shall be reimbursed by Contractor to Owner, together with interest on the same from the date any such expense was paid by Owner until reimbursed by Contractor, at the rate of interest provided to be paid on judgments, by the law of the jurisdiction to which the interpretation of the Contract is subject. The obligations of Contractor under this Section shall survive the expiration of the Contract and specifically shall survive the limitations contained in Subparagraph 15.1 hereof.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.19 SUBSTITUTIONS OF PRODUCTS AND SYSTEMS, "OR EQUAL" BRANDS

§ 3.19.1 The materials, products and the systems covered by these specifications have been selected as a standard because of quality, particular suitability, or record of satisfactory performance. It is not intended to preclude the use of equivalent or better materials, products or systems provided that it meet the requirements of the particular project and have been approved in an addendum as a substitution prior to the submission of bids. If prior written approval in an addendum has not been obtained, it will be assumed that the Bid is based upon the materials, products, and systems described in the Bidding Documents and no substitutions will be permitted, except as provided hereinafter.

§3.19.2 If, after award of contract, the Contractor or one of his Subcontractors or Suppliers determines that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the work or to honor the Warranty, the Contractor shall promptly notify the Architect, in writing, providing detailed substantiation for his position. Any changes deemed necessary by the Owner and Architect, including substitution of materials and change in Contract Sum, either upward or downward, if any, shall be accompanied by appropriate modification.

§3.20 RECORD DRAWINGS

§3.20.1 At the completion of the project, the Contractor shall submit one complete set of blue lines showing all changes and routing of utilities made during construction, excluding Architect made CAD changes, to the Architect. Drafting shall be legible to the Architect's satisfaction. The Contractor shall pay for the cost of the required

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recording/drafting. The record set shall be kept up to date on a daily basis and the Architect shall review its status at the project meetings. The Architect shall furnish the Contractor with a blueline set at contract award which shall have all Addenda incorporated. The Owner will pay for the printing of the blueline set. The Architect will incorporate any record information into the construction (CAD) documents and provide the Owner with an electronic copy of the record information on the Construction documents that have all bid and construction changes incorporated. The cost for incorporating the record information into the CD will be paid for by the Owner. The Architect will transmit the electronic CD to the Owner with a copy of the transmittal to the Contractor's construction manager.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect whose status under the Contract Documents shall be that of the former Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative, along with a representative designated by the Owner, during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect as a representative of the Owner, will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Architect will be required to make on-site inspections as necessary to kept the Owner informed of the progress of the Work and as necessary to guard the Owner against defects and deficiencies in the Work. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. Architect shall not have control over or charge of and shall not be responsible for safety precautions and programs in connection with the Work. Architect shall be responsible for promptly notifying Contractor of the failure of Contractor, Subcontractors or any other persons performing any of the Work, in failing to use proper construction means, methods, techniques, sequences, procedures, safety precautions and programs, but only to the extent Architect becomes aware of, or should, exercising due professional diligence, be aware of, same. Architect shall also promptly notify Owner in writing of the failure of any of the foregoing parties to carry out the Work in accordance with the Contract Documents.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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§ 4.2.5 Based on the Architect's and Construction Manager's evaluations of the Contractor's Applications for Payment, the Architect and Construction Manager will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority and the responsibility to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve or reject, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 DELETED.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site or to otherwise furnish labor, material, or other services with respect to a portion of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site or to otherwise furnish labor, material, or other services with respect to a portion of the Work. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, but no later than 10 days prior to the submittal date for the Contractor's first Application for Payment, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection. Failure of the Contractor to submit the subject names in a timely manner may delay processing of the Contractor's Application for Payment.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.1 All subcontracts shall be in written form and shall specifically provide that Owner is an intended third-party beneficiary of the subcontract.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

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.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

§ 5.5 Contractor shall promptly notify Owner and Architect of any material defaults by any Sub-contractor. Notwithstanding any provision contained in Article 5 to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Sub-contractor or other materialman or workman employed by Contractor the right to obtain a personal judgment or to create a lien against Owner for the amount due from the Contractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 DELETED.

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§ 6.2.4 The Contractor shall promptly remedy damage the Contractor causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may only be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents and is subject to the approval of Owner.

§ 7.1.2 A Change Order shall be only based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect and is subject to the approval of Owner.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work. Except as permitted in Paragraph 7.3 and 9.7, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work and no claim that Owner has been unjustly enriched by any alteration of or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited, to all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule.

§7.2.3 Contractor shall keep and periodically submit to Owner copies of a log for all Change Orders.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. Contractor shall keep and periodically submit to Owner copies of a log for all Construction Change Directives and a log for all requests for information.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

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.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit not to exceed a total maximum of **fifteen** percent **(15%)** for all Work, and further limited to as follows, not to exceed five percent (5%) for Work done by Contractor's employees and **ten** percent **(10%)** of such Work's actual cost to be apportioned between any and all Subcontractors and Sub-subcontractor. "*Actual cost*" does not include any item that could be deemed to be a general conditions cost or overhead, such as, but not limited to, the cost of Contractor and Subcontractor supervisory personnel assigned to the Work, and field office and related expenses. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such

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agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority after having obtained Owner's approval to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.1.1 The Work shall be fully completed within the time limit and/or date stated in the Contract between Owner and Contractor.

§ 8.1.1.2 Liquidated Damages: If the Contractor should fail to fully complete the Work within the stated time (subject however to extension of time duly granted in the manner and for the causes specified in the General Conditions), Contractor shall be charged by and shall pay to Owner, as liquidated damages, the sum specified in Article 3 of the AIA document A101 – 2007 Edition, as modified by the Owner, per calendar day that the Work remains incomplete beyond the time fixed for completion. Contractor hereby agrees that from the nature of the project it would be impracticable and extremely difficult to fix the actual damage that would or will be suffered in the event that Contractor should fail to fully complete the Work by the time limit or date stated and the amount of the liquidated damages are fair and reasonable. The parties agree that the liquidated damages are a reasonable forecast of just compensation for the harm done to Owner that would be caused by Contractor's failure to timely complete the Work. Contractor agrees that the amount of liquidated damages due Owner may be deducted by Owner from any monies that might otherwise be or become payable to Contractor.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation, or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine provided, however, that such extension of Contract time shall be net of any delays caused by or due to the fault or negligence of Contractor or that are otherwise the responsibility of Contractor and shall also be net of any contingency or "float" time allowance included in Contractor's construction schedule. Contractor shall, in the event of any occurrence likely to cause a delay, cooperate in good faith with

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Architect and Owner to minimize and mitigate the impact of any such occurrence and do all things reasonable under the circumstances to achieve this goal..

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Contactor shall not be entitled to damages of any type for delays caused by Owner, his servant, agents, employees, or separate Contractors hired or retained by Owner. Contractor may receive an extension or extensions for additional time in which to complete the Contract but shall not receive any damages of any type for such delays. Changes in the Work, regardless of the extent or number of such Changes or Owner's exercise of any of its remedies of suspension of the Work or requirement of correction or re-execution of any defective Work, shall not under any circumstances be construed as intentional interference with Contractor's performance of the Work.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.1 COMMITMENT OF CURRENT REVENUES ONLY

As reflected in paragraph 4.5 of the modified AIA document A 101 – 2007 Edition by and between Owner and Contractor dated of even date herewith, in the event that, during any term hereof, the governing body of any party does not appropriate sufficient funds to meet the obligations of such party under this Contract, then any party may terminate this Contract upon ninety (90) days written notice to the other party. Each of the parties hereto agrees, however, to use its best efforts to secure funds necessary for the continued performance of this Agreement. The parties intend this provision to be a continuing right to terminate this Agreement at the expiration of each budget period of each party hereto pursuant to the provisions of Tex. Loc. Govt. Code Ann. 271.903.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Owner and to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work which in the aggregate equals the total Contract Sum, divided so as to facilitate payments to Subcontractors, supported by such evidence of correctness as Architect may direct or as required by Owner or by Owner upon consultation with Construction Manager ("Construction Manager" shall have the same meaning as defined in the AIA Document A101-2007 as modified by the Owner). This schedule, when approved by Architect and Owner, shall be used to monitor the progress of the Work and as a basis for Certificates for Payment. All items with entered values will be transferred by Contractor to the "Application and Certificate for Payment," and shall include the latest approved Change Orders and Construction Change Directives. Change Order values and Construction Change Directives values shall be broken down to show the various subcontracts. The Application for Payment shall be on a form as provided by Architect and approved by Owner. Each item shall show its total scheduled value, value of previous applications, value of the application, percentage completed, value completed, and value yet to be completed. All blanks and columns must be filled in, including every percentage complete figure. This schedule, unless objected to by the Architect and Construction Manager, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. Any allowances included in the Application for Payment shall be separately itemized with supporting data attached. The Application for Payment shall be accompanied by a certification by an office of Contractor to the effect that:

> There are no known mechanics', materialman's or laborers' liens or claims, or any other liens or claims, legal or equitable, contractual, statutory, or constitutional, outstanding or known to exist at the date of this Application; all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current Application and there is no known

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basis for the filing of any mechanics', materialman's or laborers' lien or claim, or any other lien or claim, legal or equitable, contractual, statutory, or constitutional, on the Work; and waivers and releases from all Subcontractors, laborers, and material men for Work done and materials furnished have been obtained in such form as to constitute an effective waiver and release of all such liens and claims under the laws of the state within which the Project is located and shall be delivered to Architect together with Contractor's waiver and release of liens and claims at the time of submission of the Application for Payment.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing by the Owner and Surety. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site. Under no circumstances will the Owner reimburse the Contractor for down payments, deposits, or other advance payments for materials or equipment.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The vesting of such title shall not impose any obligations on Owner or relieve Contractor of any of its obligations under the Contract, that Contractor shall remain responsible for damage to or loss of the Work, whether completed or under construction, until responsibility for the Work has been accepted by Owner in the manner set forth in the Contract Documents.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment (which such Application for Payment shall be reviewed by the Construction Manager as evidenced by the Construction Manager's signature in the Certificate for Payment provided to the Owner), either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager's review shall be conducted concurrently with the Architect's review and completed in time for the Architect to certify the Application for Payment within seven (7) days.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and on all other information available to Architect including, without limitation, the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified and that the aggregate amount theretofore paid to Contractor plus any applicable retention does not exceed the value of the completed portion of the Work. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed

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construction means, methods, techniques, sequences or procedures, or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, or that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.5.4 Notwithstanding any provision contained within this Article, if the Work has not attained Substantial Completion with the contract time, subject to extensions of time allowed under these Conditions, Architect may withhold any further payment to Contractor to the extent necessary to preserve sufficient funds to complete the construction of the Project and to cover liquidated damages assessed against Contractor up to the time of the Application for Payment and to the time it is reasonably anticipated that Substantial Completion will be achieved.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect. Owner may refuse to make payment on any Certificate for Payment for any default of the Contract, including, but not limited to, those defaults set forth in Clauses 9.5.1.1 through 9.5.1.7. Owner shall not be deemed in default by reason of withholding payment while any of such defaults remain uncured.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted

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Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 DELETED.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not, for reasons other than a default of the Contract, including, but not limited to, those defaults set forth in Clauses 9.5.1.1 through 9.5.1.7 pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect , then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.7.1 If Owner is entitled to reimbursement or payment from Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if Contractor fails to promptly make any payment due Owner, or if Owner incurs any costs and expenses to cure any default of Contractor or to correct defective Work, Owner shall have an absolute right to offset such amount against the Contract Sum and may, in Owner sole discretion, elect either to (i) deduct an amount equal to that which Owner is entitled from any payment then or thereafter due Contractor from Owner, or (ii) issue a written notice to Contractor reducing the Contract Sum by an amount equal to that which Owner is entitled.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof (which Owner agrees to accept separately) is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of issuance of the certificate of final payment by Architect unless otherwise provided in the Certificate of Substantial Completion. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of Owner's personnel in the operation of systems has been completed,

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and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that Owner and/or Owner's employees and if applicable, the public, could occupy the building on that date and the completing of the Work by Contractor would not materially interfere or hamper Owner's or Owner's employees and if applicable, the public, (or those claiming by, through, or under Owner) from normal County operations. As a further condition of Substantial Completion acceptance, Contractor shall certify that all remaining Work will be completed within thirty (30) consecutive calendar days or as agreed upon following the Date of Substantial Completion. If Contractor requests a Substantial Completion review, and Architect, after performing the Substantial Completion review, finds that the Project was not ready for the Substantial Completion review, then Contractor shall pay the Architect's fees for any additional Substantial Completion reviews.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§9.8.6 In order for the project or a major portion thereof to be considered substantially complete, the following conditions must be met: (1) All inspections by governmental authorities have jurisdiction over the project must have been finalized, any remedial work required by those authorities must have been completed, and Certificates of Occupancy and similar governmental approval forms must have been issued and copies delivered to the Owner and Architect. (2) All work, both interior and exterior, shall have been completed and cleaned except minor items which if completed after occupancy, will not, in the Owner's opinion, cause interference to the Owner's use of the building or any portion thereof. A significantly large number of items to be completed or corrected will preclude the Architect from issuing a Certificate of Substantial Completion. The Owner and Architect will be the sole judge of what constitutes a significantly large number of items.

§9.8.7 After the date of Substantial Completion of the Project is evidenced by the Certificate of Substantial Completion, the Contractor will be allowed a period of thirty (30) days, unless extended by mutual agreement or provision of the Contract, within which to correct all deficiencies attached to the Certificate of Substantial Completion. Failure of the Contractor to complete such corrections within the stipulated time will be reported to the Contractor's surety. In this report, the Contactor and surety will be informed that, should correction remain incomplete for fifteen (15) days, the Owner may initiate action to complete corrective work out of the remaining Contract funds in accordance with Article 14.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information

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and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** faulty or defective Work appearing after Substantial Completion.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

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§ 10.3.3 DELETED.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 DELETED.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor and Owner from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

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§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.5 SCHEDULE OF INSURANCE COVERAGES

§ 11.1.5.1 Contractor shall carry and keep in full force for the duration of the project the following Coverage.

Coverage	**Minimum Amounts and Limits**
Worker's Compensation	Statutory Limits
Employer's Liability:	
Bodily Injury by Accident	$500,000.00/each accident
Bodily Injury by Disease	$500,000.00/each employee
Bodily Injury by Disease	$500,000.00/Policy Limit
Commercial General Liability	
Bodily Injury/Property Damage	$1,000,000.00 per occurrence $2,000,000.00 aggregate

(Premises Operations, Independent Contractors, Product/Completed Operations, Personal Injury, Contractual Liability, Explosion, Collapse, Underground and Broad Form Property Damage).

Comprehensive Automobile Liability	$1,000,000.00 Combined Single Limit per Occurrence

Auto liability insurance shall be on a standard form written to cover all owned, hired, and non-owned automobiles. The policy shall be endorsed to include the Indemnified Parties (paragraph 3.18) as additional insured, contain cross-liability and severability of interest endorsements, and state that this insurance is primary insurance as regards to any other insurance carried by the Indemnified Parties (see paragraph 3.18).

§11.1.5.2 All policies shall contain special endorsements to include:

.1 The Owner as an additional insured (except for Worker's Compensation) and all other parties identified in 3.18 (Indemnified Parties);

.2 Wavier of Subrogation in favor of Owner under the Worker's Compensation and Employer's Liability policies.

.3. A statement that a notice shall be given to Owner by certified mail thirty (30) days prior to cancellation or upon any material changes in coverage.

4. Contain cross-liability and severability of interest endorsements;

5. state that this insurance is primary insurance in regard to any other insurance carried by the an Indemnified Party (see 3.18);

.6 the following coverage:

a. Premises/Operations;
b. Independent Contractors;
c. Completed Operations for a period of two years following the acceptance of Contractor's Work;
d. Comprehensive General Liability Endorsement to include Blanket Contractual Liability (specifically covering, but not limited to, the contractual obligations assumed by Contractor, Broad Form Property Damage, and Personal Injury Liability with employee and contractual exclusions removed;
e. Deletion of exclusions relative to Collapse, Explosion, and Underground Property Damage Hazards;

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f. Personal Injury Liability with the contractual exclusions removed;
g. Cross Liability Endorsement.

§11.1.5.6 Umbrella Excess Liability Insurance

Bodily Injury and	$2,000,000.00 per occurrence
Property Damage	$2,000,000.00 aggregate

This policy shall be written on an umbrella excess basis above, the coverage described in this Article 11. The policy shall be endorsed to include the Indemnified Parties (3.18) as additional insureds. The policy shall contain cross-liability and severability of interest endorsements and shall state, as regard the Indemnified Parties that the insurance is primary insurance as to any other insurance carried by any Indemnified Party. The policy shall be endorsed to provide the defense coverage obligation.

§11.1.6 Further, Contractor shall require all Subcontractors to carry similar insurance coverage and limits of liability as required under this Article 11, adjusted to the nature of Subcontractor's operations and submit same to Owner for approval before any Work commences.

§11.1.7 In the event Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, Contractor shall indemnify, defend, and hold harmless the indemnified parties from any and all claims for which the required insurance would have provided coverage.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.2.1 By signing the Contract or providing or causing to be provided a Certificate of Coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that coverage will be based on proper reporting or classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

§11.2.2 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Article 11.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Contractor shall obtain a builder's risk "all-risk" or equivalent policy in the amount of the initial Contract Sum (or, if applicable Guaranteed Maximum Price), plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. The policy must also name its subcontractors and the Owner as additional insured, as their respective interests may appear. Coverage shall include material stored on-site and in transit. Such insurance will be with a company or companies lawfully authorized to do business in Texas. The policy must have the following endorsement:"This insurance shall be specific as to coverage and not considered as contributing insurance with any permanent insurance maintained on the present premises".

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any

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applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.1.1 For any claim made against Contractor's Builder's Risk Insurance, the deductible shall not exceed $2,500.00 for a Contract Sum of less than $4 million. For a Contract Sum of $4 million or more, the deductible shall not exceed $5,000.00.

§11.3.1.1.2 The Contractor waives all rights against (1) Owner, the Subcontractors, Sub-subcontractors, agents, and employees, and (2) the Architect, Architect's consultants, separate contractors, if any, and any of their Subcontractors, Sub-subcontractors, agents, and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this paragraph or other property insurance applicable to the Work, except such rights as Contractor has to proceeds of such insurance held by the Contractor as a fiduciary. The Contractor, as appropriate, shall require of any separate contractors, Subcontractors, Sub-subcontractors, agents, and employees of any of them by appropriate written agreements, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had a insurable interest in the property damaged.

§11.3.1.1.3 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers. The Contractor shall pay all Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements shall require Subcontractors to make payment to their Sub-subcontractors in similar manner. If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor under the insurance proceeds.

§ 11.3.1.2 DELETED.

§ 11.3.1.3 DELETED.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use shall not affect the validity or coverage of property insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE
DELETED.

§ 11.3.3 LOSS OF USE INSURANCE
DELETED. .

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 DELETED.

§ 11.3.6 DELETED.

§ 11.3.7 WAIVERS OF SUBROGATION
The Contractor waives all rights against (1) Owner, the Subcontractors, Sub-subcontractors, agents, and employees, and (2) the Architect, Architect's consultants, separate contractors, if any, and any of their Subcontractors, Sub-subcontractors, agents, and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to Article 11 or other property insurance applicable to the Work, except such rights as Contractor has to proceeds of such insurance held by the Contractor as a fiduciary. The Contractor, as appropriate,

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shall require of any separate contractors, Subcontractors, Sub-subcontractors, agents, and employees of any of them by appropriate written agreements, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had a insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 DELETED.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum, as security for the faithful performance of the Contract and also a one hundred percent (100%) Payment Bond, as security for the payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with the Contract. The Performance Bond and the Payment Bond may be in one or in separate instruments in accordance with local law. Surety companies must be authorized to write surety bonds in Texas and any such surety bond must comply with the requirements of Subchapter A of Chapter 3503 of the Texas Insurance Code.

§11.4.1.1 The Contractor shall deliver the required Bonds to the Owner not later than the date of the preconstruction meeting. All Bonds will be reviewed by the Architect for compliance with the Contract Documents prior to the execution of the Contract. In the event that Architect has any questions concerning the sufficiency of the bonds, Architect shall refer the bonds to Owner or Owner's representative for decision.

§11.4.1.2 All bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required Bonds on behalf of the Surety to affix thereto a certified and current copy of the power-of-attorney. The name, address, and telephone number of a contact person for the Bonding Company shall be provided.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.3 The Bonds shall be provided to comply with the terms and provisions of Chapter 2253 of the Texas Government Code. Bonds shall be signed by an agent resident in the State of Texas and date of bond shall be on or after the date of execution of the Contract but prior to the date of the notice to proceed. If at any time during the continuance of the Contract, the surety of the Contractor's bonds becomes insufficient, the Owner shall have the right to require additional and sufficient sureties which the Contractor shall furnish to the satisfaction of the Owner within ten (10) days after notice to do so. In default thereof, the Contractor may be suspended, and all payment or money due to the Contractor withheld until sufficient bonds are provided by Contractor.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such

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costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect as incomplete, defective, or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the entire Work (unless otherwise provided in any Certificate of Partial Substantial Completion approved by the parties), or within such longer period of time as may be prescribed by law or in equity, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be defective or otherwise not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This corrective period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. Corrective Work shall be warranted to be free from defects for a period equal to the longer of six (6) months after the completion of the corrective Work or one (1) year after the Date of Substantial Completion (subject to extension as previously described) or such longer period of time as may be prescribed by law or in equity, or expiration of the term of any applicable special warranty, if applicable, required by the Contract Documents. Any defect in such Work shall be corrected again by Contractor promptly upon notice of the defect from Owner. This obligation under this Subparagraph 12.2.2.1 shall survive acceptance of the Work under the Contract and termination of the Contract by the Owner. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§12.2.2.4 Just before the termination of the various guarantee periods, Contractor shall accompany Owner's agent and Architect on an inspection tour of the building and shall note any defects and shall start remedying these defects within ten (10) days of the inspection tour and shall prosecute the Work without interruption until accepted by Owner and Architect, even though such prosecution should extend beyond the limit of the guarantee period.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused in whole or in part by the Contractor's correction or removal of Work that is defective or otherwise not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents or under law or in equity. Establishment of the period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

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§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is defective or otherwise not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

§13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice or if delivered by facsimile to the offices of the person or corporation for which it was intended. Facsimiles received after 5:00 p.m. on a business day, or on a weekend or legal holiday on which the recipient's offices are closed, notice shall be deemed to have been duly served on the next business day.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law or in equity or by any other agreement, and any such rights and remedies shall survive the acceptance of the Work and/or any termination of the Contract Documents.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Architect, Owner and Contractor shall be afforded a reasonable opportunity to attend, observe, and witness all inspections and tests of the Work. Architect or Owner may at any time request and receive from Contractor satisfactory evidence that materials, supplies, or equipment are in conformance with the Contract Documents. The conduct of any inspection or test and the receipt of any approval shall not operate to relieve Contractor from its obligations under the Contract Documents unless specifically so stated by Owner in writing.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures.

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§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, or reveal faulty or otherwise defective Work, or if the necessity of any such testing, inspection, or approval procedures arises out of the fault, neglect, or omission of Contractor, Contractor shall bear all costs of such testing, inspection, and approval procedures and all other costs made necessary by Contractor's failures, including, without limitation, those costs of repeated and additional procedures and compensation for Architect's services and expenses of Owner's personnel and consultant fees and expenses. Such costs shall be paid by Contractor within ten (10) days of receipt of invoice from Owner with supporting data attached.

§ 13.5.4 Required certificates of testing, inspection or approval shall, be secured by the Contractor and delivered to Owner, unless such testing or inspection services are arranged by Owner.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

An overdue payment bears interest at the rate of one percent (1%) each month, or at the legal rate established by the Texas Government Code, currently in Section 2251.025. Any such payment shall be deemed overdue on the thirty-first (31st) day after Owner receives an invoice from Contractor.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract within the time period specified by applicable law.

§ 13.8 EQUAL OPPORTUNITY

§ 13.8.1 The Contractor shall maintain policies of employment as follows: "The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following: employment, promotion, demotion, or transfer; recruitment, or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the nondiscrimination policies."

§13.8.1.1 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf; state that all qualified applicants will receive consideration for employment with regard to race, religion, color, sex, or national origin.

§13.9 CERTIFICATION OF ASBESTOS-FREE PROJECT

§13.9.1 Contractor shall submit to the Architect a letter addressed to the Owner certifying that all materials used in the construction of this Project contain less than 0.10 by weight of asbestos and for which it can be demonstrated that, under reasonably foreseeable job site conditions, will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter. Certification letters shall be dated, shall reference this specific Project, and shall be signed by not less than two (2) officers of the construction company.

§13.9.2 Certification shall further state that should asbestos fibers be found at this Project in concentrations greater than 0.1 fibers per cubic centimeter, that Contractor shall be responsible for determining which materials contain asbestos fibers and shall take corrective action to remove those materials from the Project at no additional cost to the Owner.

§13.9.3 Final payment shall not be made until this letter of certification has been received.

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ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work properly executed in accordance with the Contract Documents.

§ 14.1.4 Owner shall not be responsible for damages for loss of anticipated profits on Work not performed on account of any termination described in Subparagraphs 14.1.1 and 14.1.2.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials and equipment;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 disregards the instructions of Architect or Owner (when such instructions are based on the requirements of the Contract Documents);

.5 is adjudged bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act, or to reorganize under bankruptcy or similar law; or

.6 otherwise does not fully comply with the Contract Documents**.**

§ 14.2.2 When any of the above reasons exist, the Owner, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 To the extent the costs of completing Work, including compensation for additional professional services and expenses, exceed those costs that would have been payable to Contractor to complete the Work except for Contractor's default, Contractor will pay the difference to Owner, and this obligation for payment shall survive termination of the Contract. Such costs incurred by Owner will be determined by Owner and confirmed by Architect.

§14.2.5 In addition to Owner's right to remove Contractor from any part of Work pursuant to the Contract

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Documents, Owner may, at any time, at will and without cause, terminate any part of Work or any subcontract or all remaining Work for any reason whatsoever by giving seven (7) days' prior written notice to Contractor specifying the part of Work or subcontract to be terminated and the effective date of termination. Contractor shall continue to prosecute the part of Work not terminated. If any part of Work or subcontract is so terminated, Contractor shall be entitled to payment for Work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) and for costs directly related to Work thereafter performed by Contractor in terminating such Work or subcontract including reasonable demobilization and cancellation charges provided said Work is authorized in advance by Architect and Owner. No payment shall be made by Owner, however, to the extent that such Work or subcontract is, was, or could have been terminated under the Contract Documents or an equitable adjustment is made or denied under another provision of the Contract. In case of such termination, Owner will issue a Construction Change Directive or authorize a Change Order making any required adjustment to the Date of Substantial Completion and/or the Contract Sum. For the remainder of the Work, the Contract Documents shall remain in full force and effect.

§14.2.6 Owner shall not be responsible for damages for loss of anticipated profits on Work not performed on account of any termination described in Subparagraph 14.2.5.

§14.2.7 Upon a determination by a court of competent jurisdiction that termination of Contractor pursuant to Subparagraph 14.2.1 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Subparagraph 14.2.5 and Contractor's remedy for wrongful termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Subparagraph 14.2.5

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- **.1** that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right adjustment or interpretation of the Contract Terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. Claims must be by written notice.

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§ 15.1.2 NOTICE OF CLAIMS
Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Said written notice of claims shall state specifically the reason for the claim, the date or dates of the cause or causes of the claim, and if any extension of time is requested, the number of days of extension requested.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner and Architect. No such claim shall be value unless so made. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction. Extensions of time may be requested for any month of construction for days lost due to adverse weather in excess of the normally expected lost time; provided, however, if Architect determines that the seasonal average of adverse weather days during construction is less than would be normally expected, no Change Order shall be issued and the request for extension of time shall be denied.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES
Contractor shall not be entitled to claims for additional time and/or increase in Contract Price due to a problem or non-performance of a subcontractor.

§ 15.1.7 In the event the Contractor fails to achieve substantial completion by the date indicated in the Contract, and extended by approved Change Order, the Owner shall be entitled to liquidated damages in the amount as stated in Subparagraph 3.1.1 of the modified AIA document A 101 – 2007 Edition by and between Owner and Contractor dated of even date herewith per day until the Work is substantially completed. It is expressly understood that the said sum per day is agreed upon as a fair estimate of the pecuniary damages, which will be sustained by Owner in the event that the Work is not completed within the agreed time, or within the legally extended time, if any. Said sum shall be considered as liquidated damages only, the exact ascertainment of which is difficult and in no sense be considered a penalty.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been

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rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim in whole or in part, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to litigation.

§ 15.2.6 DELETED.

§ 15.2.6.1 DELETED.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 DELETED.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract may be subject to mediation as a condition precedent to litigation.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation.

§ 15.3.3 The parties shall share the mediator's fee. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

The parties expressly agree that disputes or claims arising under the Contract Documents shall not be subject to arbitration unless mutually agreed by the parties in writing.

§ 15.4.1 DELETED..

§ 15.4.1.1 DELETED.

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§ 15.4.2 DELETED.

§ 15.4.3 DELETED.

§ 15.4.4 CONSOLIDATION OR JOINDER
§ 15.4.4.1 DELETED.

§ 15.4.4.2 DELETED.

§ 15.4.4.3 DELETED.

DRAFT

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HIDALGO COUNTY PRECINCT NO. 4

COMPETITIVE SEALED PROPOSALS

"Construction of a New Multi-Purpose Facility and Mechanical Shop"

CSP No: 2012-056B-08-01-MSS

County Forms SUBMITTAL CHECK LIST

The following list of forms from the County "Front End Documents" must be included in the CSP response, failure to submit any of these forms may be considered non responsive.

Indicate with a check mark (✓) the Forms completed and included in this response:

_____ Page 9 of Legal Notice

_____ Exhibit "C" -Acknowledgement forms (pages 3 and 4)

_____ Exhibit "D" -CIQ Form.

_____ Exhibit "E" –Proposers Affidavit

_____ Certification Regarding Debarment

_____ Vendor Bidder Application and IRS form W-9

_____ One (1) original, seven (7) copies of complete Response, including any other documentation requested in this CSP not herein listed (i.e. proposal page, Sub-Contractors List, references, etc).

Name:_____

Signature: _____ Date: _____

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

SUMMARY

1.01 See AIA Document A701 (1997 Edition), Instructions to Bidders following this document.

1.02 DOCUMENT INCLUDES

A. Invitation
   1. Bid Submission
   2. Intent
   3. Work Identified in the Contract Documents
   4. Contract Time

B. Bid Documents and Contract Documents
   1. Definitions
   2. Contract Documents Identification
   3. Availability
   4. Examination
   5. Inquiries/Addenda
   6. Product/Assembly/System Substitutions

C. Site Assessment
   1. Site Examination
   2. Prebid Conference

D. Qualifications
   1. Qualifications
   2. Subcontractors/Suppliers/Others

E. Bid Enclosures/Requirements
   1. Bid Form Signature

INVITATION

2.01 BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received at the office of the Hidalgo County Precinct 4 at _____ before _____ a.m. local standard time on the ____ day of _____.

B. Offers submitted after the above time shall be returned to the bidder unopened.

C. Offers will be opened publicly immediately after the time for receipt of bids.

2.02 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete a new Administration and Maintenance Building located at _____ for a Stipulated Sum contract, in accordance with the Contract Documents.

2.03 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises building construction, including general construction Work.

2.04 CONTRACT TIME

A. Perform the Work in 270 calendar days.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

A. Bid, Offer, or Bidding: Act of submitting an offer under seal.

B. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

3.02 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as Project Number 11016, as prepared by ERO Architects who is located at 300 South 8th Street - McAllen, Texas 78501, and with contents as identified in the Table of Contents.

3.03 AVAILABILITY

A. Bid Documents may be obtained at the office of ERO Architects which is located at 300 South 8th Street - McAllen, Texas 78501.

3.04 EXAMINATION

A. Bid Documents may be viewed at the office of ERO Architects which is located at 300 South 8th Street - McAllen, Texas 78501.

B. Upon receipt of Bid Documents verify that documents are complete. Notify ERO Architects should the documents be incomplete.

C. Immediately notify ERO Architects upon finding discrepancies or omissions in the Bid Documents.

3.05 INQUIRIES/ADDENDA

A. Direct questions to ERO Architects, telephone 956-661-0400.

B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.

C. Verbal answers are not binding on any party.

D. Clarifications requested by bidders must be in writing not less than 10 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients .

3.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

A. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 10 days before receipt of bids.

B. When a request to substitute a product is made, ERO Architects may approve the substitution and will issue an Addendum to known bidders.

C. The submission shall provide sufficient information to determine acceptability of such products.

D. Provide complete information on required revisions to other work to accommodate each proposed substitution.

E. Provide products as specified unless substitutions are submitted in this manner and accepted.

F. See Section 01 60 00 - Product Requirements for additional requirements.

SITE ASSESSMENT

4.01 SITE EXAMINATION

A. Examine the project site before submitting a bid.

4.02 PREBID CONFERENCE

A. A bidders conference has been scheduled for _____ a.m. on the _____ day of _____ at the location of _____.

B. All general contract bidders and suppliers are invited.

C. Representatives of ERO Architects will be in attendance.

D. Summarized minutes of this meeting will be circulated to attendees. These minutes will not form part of the Contract Documents.

E. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS

5.01 EVIDENCE OF QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, bidders may be requested to submit written evidence of financial position , license to perform work in the State and Texas.

5.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

A. Hidalgo County Precinct 4 reserves the right to reject a proposed subcontractor for reasonable cause.

B. Refer to General Conditions.

BID SUBMISSION

BID ENCLOSURES/REQUIREMENTS

7.01 BID FORM REQUIREMENTS

7.02 BID FORM SIGNATURE

A. The Bid Form shall be signed by the bidder, as follows:
   1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
   2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
   3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
   4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of 45 days after the bid closing date.

8.02 ACCEPTANCE OF OFFER

A. Hidalgo County Precinct 4 reserves the right to accept or reject any or all offers.

B. After acceptance by Hidalgo County Precinct 4 , ERO Architects on behalf of Hidalgo County Precinct 4 , will issue to the successful bidder, a written Bid Acceptance.

END OF INSTRUCTIONS TO BIDDERS

AIA® Document A701™ – 1997

Instructions to Bidders

for the following PROJECT:
(Name and location or address)
Hidalgo County Precinct 4 Administration and Maintenance Building

THE OWNER:
(Name, legal status and address)
County of Hidalgo
3100 South Business Highway 281, Ste. D
Edinburg, Texas 78539

THE ARCHITECT:
(Name, legal status and address)
ERO International dba ERO Architects
300 S. 8th Street
McAllen, Texas 78501

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

TABLE OF ARTICLES

1 DEFINITIONS

2 BIDDER'S REPRESENTATIONS

3 BIDDING DOCUMENTS

4 BIDDING PROCEDURES

5 CONSIDERATION OF BIDS

6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

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§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

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§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the

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signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1)

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withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

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SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

EXISTING REPORTS AND SURVEYS

2.01 SUBSURFACE INVESTIGATION REPORT

A. A copy of a geotechnical report with respect to the building site is included with this document:
   1. Date:
      11/16/11
   2. Prepared by:
      L & G Engineering Laboratory
      Project No. GL11029

B. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of ERO Architects.

C. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.

D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Sum accruing to Hidalgo County Precinct 4 .

2.02 TOPOGRAPHIC SURVEY AND EXISTING CONDITIONS SURVEY

A. A copy of the existing topographic and site survey, "Existing Plan Layout", with respect to the project site is included in the Working Drawings.

B. These surveys identifies grade elevations and conditions of existing construction prepared primarily for the use of ERO Architects in establishing new grades, indentifying natural water shed and in establishing the extent of the new versus existing.

PART 3 EXECUTION (NOT USED)

END OF SECTION

L&G Engineering Laboratory
Construction Material Testing
Geotechnical Engineering

L&G Engineering Laboratory LLC
2100 W. Expressway 83
Mercedes TX 78570
Telephone: 956-565-0760

KEY TO SYMBOLS

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- CH: USCS High Plasticity Clay
- CL: USCS Low Plasticity Clay
- GC: USCS Clayey Gravel
- SC: USCS Clayey Sand

SAMPLER SYMBOLS

- Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

- Water Level at Time Drilling, or as Shown
- Water Level at End of Drilling, or as Shown
- Water Level After 24 Hours, or as Shown

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Telephone: 956-565-0760

BORING NUMBER B-1

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** --- No Water Strike Encountered

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **24hrs AFTER DRILLING** 10.67 ft / Elev 80.33 ft (Cave in - 11.5')

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) Gravelly lean clay, brown, very stiff, dry	SPT 1		8-14-13 (27)			13				57
		(CL) Lean clay w/ sand, brown w/ calcareous nodules, stiff, moist	SPT 2		5-5-6 (11)			21	39	17	22	
5			SPT 3		4-5-6 (11)			16	45	18	27	74
		(CH) Fat clay w/ sand, brown (w/ calcareous nodules from 6-10 ft.), stiff to very stiff, moist to wet	SPT 4		4-6-9 (15)			19	52	19	33	74
			SPT 5		5-6-10 (16)			17				73
10		▼										
			SPT 6		6-12-12 (24)			21	67	24	43	
15												
			SPT 7		4-4-9 (13)			28				77
20		Bottom of borehole at 20.0 feet.										

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Construction Material Testing
Geotechnical Engineering

L&G Engineering Laboratory LLC
2100 W. Expressway 83
Mercedes TX 78570
Telephone: 956-565-0760

BORING NUMBER B-2

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** --- No Water Strike Encountered

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(GC) Clayey gravel, brown, medium dense, dry	SPT 1		10-16-7 (23)			12				45
		(CL) Lean clay w/ sand, brown w/ calcareous nodules, medium stiff to very stiff, moist	SPT 2		3-3-5 (8)			20	40	15	25	70
5			SPT 3		2-4-6 (10)			22	44	19	25	
			SPT 4		5-8-11 (19)			17				73
		(CH) Fat clay, brown, very stiff, moist	SPT 5		4-8-7 (15)			20	57	12	45	
10												
			SPT 6		4-11-12 (23)			22				97
15												
			SPT 7		8-12-13 (25)			19	71	20	51	98
20												

Bottom of borehole at 20.0 feet.

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2100 W. Expressway 83
Mercedes TX 78570
Telephone: 956-565-0760

BORING NUMBER B-3

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** 17.00 ft / Elev 74.00 ft

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **24hrs AFTER DRILLING** 9.25 ft / Elev 81.75 ft Cave in - 9.5'

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(GC) Clayey gravel, brown, very dense, dry	SPT 1		12-50			8				25
		(CL) Sandy lean clay, brown w/ calcareous nodules, stiff to very stiff, moist	SPT 2		3-3-6 (9)			16	45	18	27	64
5			SPT 3		7-9-14 (23)			16				54
		(CH) Sandy fat clay, brown w/ calcareous nodules, stiff to very stiff, moist	SPT 4		6-9-11 (20)			18	71	21	50	74
10			SPT 5		4-5-7 (12)			21	68	20	48	67
			SPT 6		6-9-11 (20)			23	59	17	42	
15												
		(SC) Clayey sand, light brown, medium dense, wet	SPT 7		3-4-7 (11)			25				34
20												

Bottom of borehole at 20.0 feet.

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Construction Material Testing
Geotechnical Engineering

L&G Engineering Laboratory LLC
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Mercedes TX 78570
Telephone: 956-565-0760

BORING NUMBER P-1

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** --- No Water Strike Encountered

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(CL) Sandy lean clay, brown w/ calcareous nodules, medium stiff to stiff, dry										
			SPT 1		3-3-4 (7)			20	34	16	18	61
5			SPT 2		5-6-7 (13)			19	39	18	21	60
		Bottom of borehole at 5.0 feet.										

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Geotechnical Engineering

L&G Engineering Laboratory LLC
2100 W. Expressway 83
Mercedes TX 78570
Telephone: 956-565-0760

BORING NUMBER P-2

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** --- No Water Strike Encountered

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(CL) Sandy lean clay, brown w/ calcareous nodules, stiff to medium stiff, dry										
			SPT 1		9-9-5 (14)			12	35	19	16	60
5			SPT 2		3-4-4 (8)			23	40	20	20	70
		Bottom of borehole at 5.0 feet.										

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Mercedes TX 78570
Telephone: 956-565-0760

BORING NUMBER P-3

CLIENT Hidalgo County Pct. 4 **PROJECT NAME** New Administration Building

PROJECT NUMBER GL11029 **PROJECT LOCATION** Edinburg, Texas

DATE STARTED 11/2/11 **COMPLETED** 11/2/11 **GROUND ELEVATION** 91 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR L&G Engineering Laboratory **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger / Mud Rotary **AT TIME OF DRILLING** --- No Water Strike Encountered

LOGGED BY J. Garcia **CHECKED BY** Rene Casares, E.I.T. **AT END OF DRILLING** ---

NOTES Elevations are approximate. **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) Sandy lean clay, brown w/ clacareous nodules, stiff, dry	SPT 1		1-4-7 (11)			17	41	19	22	68
		(CH) Fat clay w/ sand, brown w/ clacareous nodules, stiff, dry	SPT 2		5-6-7 (13)			22	53	22	31	74
5		Bottom of borehole at 5.0 feet.										

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Bearing Capacity of Soils

The bearing capacity of the existing natural ground is the ability to safely support the imposed loadings (surcharge), without experiencing failure due to excessive settlement or shearing. The ultimate bearing capacity is a measure of the soil's maximum resistance immediately prior to a bearing capacity failure. The ultimate bearing capacity was estimated using the methods and equations, as recommended by the USACE in Manual EM 1110-1-1905 titled "Bearing Capacity of Soils":

$$q_u = c\,N_c\zeta_c + \tfrac{1}{2}\,B\,\gamma_h\,N_\gamma\zeta_\gamma + \sigma\,N_q\zeta_q$$

where:
- q_u = ultimate bearing capacity
- c = soil cohesion
- B = effective width of foundation
- γ_h = effective unit weight of soil within failure zone
- σ = effective soil surcharge pressure at depth
- N_c, N_γ, N_q = Bearing capacity factors
- ζ_c ζ_γ ζ_q = dimensionless correction factors for cohesion, soil unit weight, and surcharge

N_c, N_γ, and N_q are the dimensionless bearing capacity factors for general shear failure listed in Table 4-4 of EM 1110-1-1905. Cohesion values for cohesive soils were estimated using a correlation to the Standard Penetration N-Value as approved by the USACE. No unconfined compression tests were performed due to the dry nature of the soils and the unsuccessful attempts to retrieve thin walled tube samples. The angle of friction value for cohesive soils was assumed to equal zero due to the large presence of fine particles. Angle of friction values for granular soils (sands) were correlated through the Standard Penetration N-Values. All correlations used were in accordance with the applicable USACE manuals.

The factor of safety used in our analysis was equal to 3.0, as recommended by Chapter 1 of EM 1110-1-1905. The maximum allowable bearing capacity was calculated by dividing the ultimate bearing capacity by the factor of safety. All recommendations reflect the maximum allowable bearing capacity in pounds per square foot.

Bearing Capacity of Shallow Square Footing

Square footings may be used to support concentrated column loads for the structure. The **maximum allowable bearing capacity for square footings is 3,000 pounds per square foot**. This value was calculated using a factor of safety equal to 3. Square footings should bear in compacted fill or subgrade material at a minimum twenty-four (24) inches below proposed grade. The footing reinforcement should be designed by a structural engineer to resist the dead load of the structure and the live loadings caused by wind, occupancy, and other loadings using the load combinations and factors of safety provided by the applicable building codes.

Bearing Capacity of Perimeter Footings

Perimeter footings (also called grade beams) may be constructed around the slab foundation to support the exterior wall loads of the structure. The **maximum allowable bearing capacity for perimeter footings is 2,500 pounds per square foot**. This value was calculated using a factor of safety equal to 3. Strip footings should bear in compacted fill or subgrade material at a minimum twenty-four (24) inches below proposed grade. The reinforcement of these footings should be designed by a structural engineer to resist the dead load of the structure and the live loadings caused by wind, occupancy, and other loadings using the load combinations and factors of safety provided by the applicable building codes.

PRELIMINARY

Potential Vertical Rise (Slab on Grade)

The soils found at this site consisted of lean clays with sand and underlying fat, highly plastic, clays in the top twenty (20) feet of the soil profile, which have a potential for vertical (heave) movements with corresponding moisture changes. Due to the dry natural moisture content of the surface soils, this potential is slightly increased in the areas of the foundation. The Potential Vertical Rise (PVR) calculations for the soil profiles found at each boring were performed using the Texas Department of Transportation's (TxDOT) TEX 124-E method. Based on this method we calculated an average existing ***PVR*** of ***2.3*** inches. This value represents total vertical in-situ movements and does not consider differential swell between any two points on the ground; nor does it take into account movements caused by uncontrolled water sources such as poor drainage, migration of subsurface water from off-site locations, and utility line leaks. Generally in this area, ***PVR*** values of about ***1 inch*** are considered acceptable for most common slab-on-grade and shallow footing foundation designs. **L&G** recommends the following earthwork and subgrade remediation to reduce the PVR within the building footprint areas as preparation for foundation placement:

- The existing subgrade under foundation areas should be stripped of existing vegetation, and excavated to a depth of 24" below existing natural ground. This material should be stockpiled on site for later use.

- The exposed subgrade should be moisture conditioned and tested (minimum depth of 12 inches) to a range of optimum moisture to plus three (3) percentage points above optimum, and compacted to a minimum 95% of the maximum dry density, as determined by the Standard Proctor (ASTM D-698).

- The stockpiled material (excavated subgrade) should then be re-installed using 6 inch compacted lifts, maintaining a moisture content between optimum and plus three (3) percentage points above optimum and compacted to a minimum 95% of the maximum dry density, as determined by the Standard Proctor (ASTM D-698).

- The foundation area should then be built up an additional 12 inches using compacted select fill (in accordance with the following sections of this report) to raise the pad area above natural grade and provide positive storm water drainage away from the foundation. This will also provide additional surcharge to prevent swill potential of in-situ subgrade soils. The pad area should include gradual slopes away from the foundation to prevent water from ponding adjacent to the foundation.

PRELIMINARY

Post-Tensioning Slab Design Parameters

The recommendations for foundation design criteria in this section have been calculated using the method described by the Post-Tensioning Institute manual, "Design of Post-Tensioned Slabs-on-Ground" Third Edition; also know as the PTI method. This method gives soil parameters for ribbed or uniform thickness (monolithic) foundations that can be used in the design of post-tensioned or traditionally reinforced foundations. The PTI method does not allow for the development of design parameters for collapsing soils or other highly unusual conditions. It must be emphasized that the determination of these parameters is based upon normal climate-moisture variance from season to season in the local area and are invalid when influenced to any significant degree by other conditions, including but not limited to those mentioned in the previous sections.

The edge moisture variation distances (e_m) for the center and edge lift conditions were derived based on a Thornthwaite index of -32 for the project site. The Thornthwaite index is based on the average rainfall over a significant period of time (e.g. 20 or 30 years) in excess or deficit of the average evapotranspiration rates of the area. Other parameters and influencing variables were derived using information collected from the laboratory tests performed on the recovered soil samples as stated in the PTI guidelines for geotechnical exploration and laboratory testing schedule. Table lists the PTI design parameters for a slab-on-grade foundation supported in the shallow surface soils.

	Center Lift Conditions		Edge Lift Conditions	
Equilibrium Soil Suction (pF)	Edge Moisture Variation Distance e_m (ft)	Est. Differential Movement y_m (in)	Edge Moisture Variation Distance e_m (ft)	Est. Differential Movement y_m (in)
4.07	**8.5'**	**0.19"**	**4.4'**	**0.95"**

Table 1 - Recommended PTI Slab Design Parameters

Wire Reinforcement Institute Slab Design Parameters

The Wire Reinforcement Institute (WRI) method is an empirically derived foundation design method that was developed by observing slab performance over time and creating and modifying equations to give results which approximate foundation designs that exhibit the best results. While the WRI method deals only with foundations reinforced with reinforcing bars or welded wire reinforcement, the procedure has been developed to be independent of the type of reinforcement used.

The climatic rating reflects the stability of the moisture content which may be expected in the soil due to the climatic conditions which may vary from year to year. The effective design Plasticity Index was obtained by weighting the test values in each boring as described in the WRI procedures. The slope correction factor is based on the average slope of the tract of land. Since the slope is small (as shown on Figure 4 in Appendix I) the adjustment factor was negligible. Table 4 lists these WRI design parameters for a slab-on-grade foundation supported in the shallow surface soils.

Effective PI	Climatic Rating	Slope Coefficient	Soil Support Index
29	**15**	**1.00**	**0.15**

Table 2 - Recommended WRI Slab Design Parameters

PRELIMINARY

SECTION 00 41 00

PROPOSAL FORM

THE PROJECT AND THE PARTIES

1.01 TO:

A. The County of Hidalgo
   1. The County of Hidalgo
      2812 South Business Highway 281
      Edinburg, Texas 78539

1.02 FOR:

A. Hidalgo County Precinct No. 4
   The County of Hidalgo Texas - CSP No.: 2012-056-02-29-MSS
   ERO Architects Project No. 11016

1.03 DATE: _____ (Bidder to enter date)

1.04 SUBMITTED BY: (Bidder to enter name and address)

A. Bidder's Full Name _____
   1. Address _____
   2. City, State, Zip_____

1.05 OFFER

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by ERO Architects for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Unit Prices listed in this bid form of:

   _____
   _____ dollars ($_____),
   in lawful money of the United States of America.

B. All Expenditure Allowances described in Section 01 21 00 are included in the Bid Sum. One Hundred Sixty Three Thousand Five Hundred Dollars ($163,500.00), in lawful money of the United States of America.

C. BID BOND: Offerors will be required to provide Bid Security in the form of a Bid Bond in the amount of 5 percent of the largest possible total proposal. Failure to provide the Bid Bond with the proposal will constitute a non-responsive proposal and the proposal will not be considered.

D. PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS: The successful Offeror will be required to provide 100% Performance and Labor and Materials. Payment Bond in strict conformance with all the requirements of the Contract Documents. Failure to do so will result in cancellation of the contract award and forfeiture of the Bid Bond security as liquidated damages.

E. All applicable federal taxes are included and State of Texas taxes are included in the Bid Sum.

F. All Cash and Contingency Allowances described in Section 01 21 00 are included in the Bid Sum.

1.06 ACCEPTANCE

A. This Bidder shall be open to acceptance and is irrevocable for thirty days from the bid closing date.

B. If this bid is accepted by County of Hidalgo within the time period stated above, we will:
   1. Execute the Agreement within seven days of receipt of Notice of Award.
   2. Furnish the required bonds within seven days of receipt of Notice of Award.
   3. Commence work within seven days after written Notice to Proceed of this bid.

C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to County of Hidalgo by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

A. If the Bid is accepted, project will be substantially complete as follows: Complete the Work in Two Hundred and Seventy 270 calendar days from Notice to Proceed.

B. Liquidated Damages: County of Hidalgo has the right under contract to assess liquidated damages for each calendar day beyond the date for substantial completion set out in the contract in which the Work fails to be substantially complete due to unexcused delay. In the event the Contractor fails to achieve Substantial Completion of the work within the time indicated in the Bid Form, or as mutually agreed upon, or as such date may be extended or shortened by approved Change Order, the Owner shall be entitled to liquidated damages in the amount of $500.00 per day for each day that the work is not substantially complete - the date on the Certificate of Substantial Completion.

C. Back Charges: County of Hidalgo has the right under contract to back charge amounts that are spent to complete a portion of the work not completed by the contractor based on schedule and repairs of damage caused by work associated with the construction that requires quick response due to County of Hidalgo operations and contractor has failed to respond. This will be deducted from contractor's contract amount and written as a change order to the contract.

D. Rain/Off Days: Rain Days must be submitted within 3 days of event or with each pay application (weekly report) failure to provide notification with proper proof within the time period will not be accepted. Any additional days after rain days that the contractor fails to work will be charged as work days unless authorized in writting by both the contractor and Owner, refer to 1.07 Contract Time, A.

E. Completion of Work
   1. If this Bid is accepted, we will:
   2. Complete the Work in _____ calendar weeks from Notice to Proceed.

1.08 CHANGES TO THE WORK

A. All approved change orders must be signed by the Owner and Architect. Architect will issue a Proposal Request (PR) to the Contractor; Contractor will prepare detail cost and time information including sub-contractor breakdown (Change Proposal) and submit to Architect for review, within 10 days of receipt of the Proposed Change; Architect will submit proposal and all information to Owner for review and approval.

B. Allowances shall be handled in a similar manner as a change order, refer to 1.08, B. Contractor shall prepare detail cost and time information and submit to Architect for review; Architect will submit proposal and all information to Owner for review and approval.

1.09 ADDENDA

A. The following Addenda have been received. The modifications to the Proposal Documents noted below have been considered and all costs are included in the Proposal Sum.
   1. ____Addendum # 1 Dated _____.
   2. ____Addendum # 2 Dated _____.
   3. ____Addendum # 3 Dated _____.
   4. ____Addendum # 4 Dated _____.
   5. ____Addendum # 5 Dated _____.

1.10 BID FORM SIGNATURE(S)

A. The Corporate Seal of

B. _____

C. (Bidder - print the full name of your firm)

D. was hereunto affixed in the presence of:

E. _____

F. (Authorized signing officer, Title)

G. (Seal)

H. _____

I. (Authorized signing officer, Title)

1.11 If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF BID FORM

SECTION 00 43 23

ALTERNATES FORM

PARTICULARS

1.01 The following is the list of Alternatives referenced in the bid submitted by:

1.02 (Bidder) _____

1.03 TO (Owner) .....

1.04 Dated _____ and which is an integral part of the Bid Form.

ALTERNATIVES LIST

2.01 The following amounts shall be added to or deducted from the Bid Amount. Refer to Section 01 23 00 - Alternatives: Schedule of Alternatives.

2.02 Alternative # 1: (Add) (Deduct) $ _____

2.03 Alternative # 2: (Add) (Deduct) $ _____

2.04 Alternative # 3: (Add) (Deduct) $ _____(refer to Civil Specifications at End of Project Manuel for Bid Form required)

END OF SUPPLEMENT C

SECTION 00 50 00

CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 Contractor is responsible for obtaining a valid license to use all copyrighted documents specified but not included in the Project Manual.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 00 52 00 for the Agreement form to be executed.

B. See Section 00 72 00 for the General Conditions.

C. See Section 00 73 00 for the Supplementary Conditions.

D. The Agreement is based on AIA A101.

E. The General Conditions are based on AIA A201.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Bond Forms:
   1. Bid Bond Form: AIA A310
   2. Performance and Payment Bond Form: AIA A312.

C. Post-Award Certificates and Other Forms:
   1. Application for Payment Form: AIA G702 and G703.

D. Clarification and Modification Forms:
   1. Construction Change Directive Form: AIA G714.
   2. Change Order Form: AIA G701.

E. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.

1.04 REFERENCE STANDARDS

A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum; 2007.

B. AIA A201 - General Conditions of the Contract for Construction; 2007.

C. AIA A312 - Performance Bond and Payment Bond; 1984.

D. AIA G701 - Change Order; 2001.

E. AIA G702 - Application and Certificate for Payment; 1992.

F. AIA G704 - Certificate of Substantial Completion; 2000.

G. AIA G714 - Construction Change Directive; 2007.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Hidalgo County
3100 South Business Highway 281, Suite D
Edinburg, Texas 78539

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Hidalgo County Precinct 4 Administration and Maintenance Building

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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(1865887560)

Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

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(1865887560)

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Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Hidalgo County
3100 South Business Highway 281, Suite D
Edinburg, Texas 78539

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Hidalgo County Precinct 4 Administration and Maintenance Building

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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(1917545588)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Hidalgo County
3100 South Business Highway 281, Suite D
Edinburg, Texas 78539

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Hidalgo County Precinct 4 Administration and Maintenance Building

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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User Notes: (1128821617)

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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(1128821617)

AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:

PROJECT: Hidalgo County Precinct 4 Administration and Maintenance Building

APPLICATION NO: 001
PERIOD TO:
CONTRACT FOR: General Construction
CONTRACT DATE:
PROJECT NOS: 11016 / /

Distribution to:
OWNER:
ARCHITECT:
CONTRACTOR:
FIELD:
OTHER:

FROM CONTRACTOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. **ORIGINAL CONTRACT SUM**		$ 0.00
2. **NET CHANGE BY CHANGE ORDERS**		$ 0.00
3. **CONTRACT SUM TO DATE** (Line 1 ± 2)		$ 0.00
4. **TOTAL COMPLETED & STORED TO DATE** (Column G on G703)		$ 0.00
5. **RETAINAGE:**		
a. 0 % of Completed Work (Column D + E on G703)	$ 0.00	
b. 0 % of Stored Material (Column F on G703)	$ 0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$ 0.00
6. **TOTAL EARNED LESS RETAINAGE** (Line 4 Less Line 5 Total)		$ 0.00
7. **LESS PREVIOUS CERTIFICATES FOR PAYMENT** (Line 6 from prior Certificate)		$ 0.00
8. **CURRENT PAYMENT DUE**		$ 0.00
9. **BALANCE TO FINISH, INCLUDING RETAINAGE** (Line 3 less Line 6)	$ 0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$ 0.00	$ 0.00
Total approved this Month	$ 0.00	$ 0.00
TOTALS	$ 0.00	$ 0.00
NET CHANGES by Change Order	$ 0.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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AIA® Document G714™ – 2007

Construction Change Directive

PROJECT: *(Name and address)* Hidalgo County Precinct 4 Administration and Maintenance Building	**DIRECTIVE NUMBER:** 001 **DATE:**	OWNER: ☐ ARCHITECT: ☐
	CONTRACT FOR: General Construction	CONSULTANT: ☐
TO CONTRACTOR: *(Name and address)*	**CONTRACT DATED:** **ARCHITECT'S PROJECT NUMBER:** 11016	CONTRACTOR: ☐ FIELD: ☐ OTHER: ☐

You are hereby directed to make the following change(s) in this Contract:
(Describe briefly any proposed changes or list any attached information in the alternative)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:
   - ☒ • Lump Sum decrease of $0.00
   - ☐ • Unit Price of $ per
   - ☐ • As provided in Section 7.3.3 of AIA Document A201-2007
   - ☐ • As follows:

2. The Contract Time is proposed to (remain unchanged). The proposed adjustment, if any, is 0 days.

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

ARCHITECT *(Firm name)*	**OWNER** *(Firm name)*	**CONTRACTOR** *(Firm name)*
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

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AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address):*	**CHANGE ORDER NUMBER:** 001	OWNER: ☐
Hidalgo County Precinct 4 Administration and Maintenance Building	**DATE:**	ARCHITECT: ☐
		CONTRACTOR: ☐
TO CONTRACTOR *(Name and address):*	**ARCHITECT'S PROJECT NUMBER:** 11016	FIELD: ☐
	CONTRACT DATE:	OTHER: ☐
	CONTRACT FOR: General Construction	

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

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User Notes: (1953247061)

AIA® Document G704™ – 2000

Certificate of Substantial Completion

PROJECT:
(Name and address)
Hidalgo County Precinct 4
Administration and Maintenance
Building

PROJECT NUMBER: 11016/
CONTRACT FOR: General Construction
CONTRACT DATE:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO OWNER:
(Name and address)

TO CONTRACTOR:
(Name and address)

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty **Date of Commencement**

ARCHITECT	BY	DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: $0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR	BY	DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

OWNER	BY	DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

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SECTION 00 52 00

AGREEMENT FORM

PART 1 GENERAL

1.01 FORM OF AGREEMENT

1.02 The Agreement (AIA Document A 101) refer to The County of Hidalgo Invitation to Submit Competitive Sealed Proposals.

1.03 RELATED REQUIREMENTS

A. Section 00 72 00 - General Conditions.

B. Section 00 73 00 - Supplementary Conditions.

C. Section 01 42 16 - Definitions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF AGREEMENT

SECTION 00 71 00

CONTRACTING DEFINITIONS

PART 1 GENERAL

1.01 APPLICABILITY: These definitions are integral to the Agreement.

1.02 DEFINITIONS - TIME PERIODS AND MILESTONE DATES

A. Proposal: The time period during which prospective Proposers prepare their Proposals.
   1. Substantiation specified to occur during the Proposal period are intended to accompany the Proposal.

B. Construction: The time period from the beginning of work on the project site until final payment as defined by the Conditions of the Contract.

C. Substantial Completion: The date as defined in the Conditions of the Contract. The date of substantial completion is the due date for the following:
   1. County of Hidalgo's complete punchlist of items to be completed.
   2. Compliance with requirements of governing authorities, for submittals, inspections, and permits.
   3. Compliance with County of Hidalgo's requirements for access to areas occupied by the County of Hidalgo.
   4. Final cleaning.
   5. Maintenance manuals.
   6. Warranties.
   7. Spare parts and extra materials.
   8. Maintenance supplies and tools.
   9. Project record documents.
   10. Training of County of Hidalgo's personnel.

D. Closeout: The time period during which all details of both construction and commissioning are completed.
   1. The Closeout period is the time from the Date of Substantial Completion until final payment , both as defined by the Conditions of the Contract.
   2. Before and during the Closeout period, the County of Hidalgo will ascertain whether the completed project complies with the the Contract Documents.

E. Occupancy: The time period during which the project is occupied for its intended purpose.
   1. The Occupancy period begins at the Date of Substantial Completion , as defined by the Conditions of the Contract.

F. Correction Period: The time period defined by the Conditions of the Contract.

END OF SECTION

SECTION 00 72 00

GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.01 The General Conditions (AIA Document A201) refer to The County of Hidalgo Invitation to Submit Competitive Sealed Proposals.

RELATED REQUIREMENTS

2.01 Section 00 52 00 - Agreement Form - AIA Document A 101.

2.02 Section 01 42 16 - Definitions.

EXECUTION

3.01 AIA Document A201 - General Conditions Form - 2007 Edition, General Conditions of the Contract for Construction

END OF DOCUMENT

SECTION 00 82 00

WAGE RATE

PART 1 GENERAL

1.01 PREVAILING WAGE RATE

A. This determination of prevailing wages shall not be construed to prohibit the paymnet of more than the rates named Under no condition shall any laborer, workman, or mechanic employed on this job be paid less than the minimum wage scale.

B. In execution of this contract, the contractor must comply with all applicable state and federal laws including but not limited to laws concerned with labor, equal employment opportunity, safety and minimum wage.

C. The Davis-Bacon and Related Acts (DBRA) requires rules be followed when federal funds are used for contacts in excee of $2,000 (two thousand dollars) for the construction, alteration or repair (including painting and decorating) of public buildings or public works.

1. Rules associated with the Davis-Bacon Act include:
    a. Contractors and subcontractors must pay laborers and mechanics employed directly upon the site of the work at least the locally prevailing wages (including fringe benefits), listed in the Davis-Bacon wage determination in the contract, for the work performed. Davis-Bacon labor standards clauses must be included in covered contracts.
    b. Contractors and subcontractors are required to pay covered workers weekly and submit weekly certified payroll records to the contracting agency (school district, city, county, etc.). Records are submitted via the WH-347 form.
    c. Contractors and subcontractors are required to post the applicable Davis-Bacon wage determination with the Davis-Bacon poster (WH-1321) on the job site in a prominent and accessible place where they can be easily seen by the workers.
    d. Davis-Bacon wage determinations are published on the Wage Determinations On-Line website for contracting agencies to incorporate them into covered contracts.
    e. It is imperative that contracting agencies (schools, cities, counties, etc.) ensure the Davis-Bacon requirements are met by the contractors/subcontractors with whom they contract when federal funds are involved. It si the responsibility of the contracting agency to inform all contrtactors and subcontractors that federal funds are being expended for the contracted project.
    f. It is the responsibility of TIPS/TAPS awarded vendors to ensure required documentation is submitted to the contracting agency as required by law. Failure to comply with these requirements may result in a suspension of the vendor's TIPS/TAPS contract.
    g. For more details, assistance and to obtain copies of the reuired forms and posters please visit the following website: http://www.dol.gov/whd/contracts/dbra.htm
    h. Please be aware that the Davis-Bacon Act requirements are not the only requirements that must be met by vendors and contarcting agenies. Other requirements related to construction activies include: bonding, engineering, architectural and licensing. These requirements vary by state. TIPS/TAPS vendors and cooperative members should always work closely together to ensure all requirements are met as dicated by law.

1.02 WAGE DETERMING FACTOR

A. Use the current version of the Davis-Bacon Act Building Construction Wage Rates for General Decision Number: TX100006 - 03/12-2010, TX6, Cameron & Hidalgo County, Texas (refer to attached document following this section).

END OF SECTION

General Decision Number: TX120005 01/06/2012 TX5

Superseded General Decision Number: TX20100006

State: Texas

Construction Types: Building and Residential

Counties: Cameron and Hidalgo Counties in Texas.

BUILDING AND RESIDENTIAL CONSTRUCTION PROJECTS (including single family homes and garden apartments up to and including 4 stories).

Modification Number	Publication Date
0	01/06/2012

* SUTX1990-013 05/01/1990

	Rates	Fringes
BOILERMAKER		
RESIDENTIAL CONSTRUCTION ONLY	$ 16.35	2.315
BRICKLAYER		
RESIDENTIAL CONSTRUCTION ONLY	$ 7.25	
CARPENTER (Including Drywall Hanging and Acoustical Ceiling Installation)		
BUILDING CONSTRUCTION ONLY Excluding Batt Insulation	$ 7.25	
CARPENTER		
RESIDENTIAL CONSTRUCTION ONLY	$ 7.25	
CEMENT MASON/CONCRETE FINISHER (Excluding Form Setting)		
BUILDING CONSTRUCTION ONLY	$ 7.25	
CEMENT MASON/CONCRETE FINISHER		
RESIDENTIAL CONSTRUCTION ONLY	$ 7.25	
ELECTRICIAN		
BUILDING CONSTRUCTION ONLY	$ 8.30	
Electricians: (Residential)		
RESIDENTIAL CONSTRUCTION ONLY	$ 7.25	
FLOOR LAYER: CARPET (SOFT) FLOOR		
BUILDING CONSTRUCTION ONLY	$ 7.25	
RESIDENTIAL CONSTRUCTION		

```
     ONLY.....................$  7.25

Insulation Installer
     RESIDENTIAL CONSTRUCTION
     ONLY.....................$  7.25

IRONWORKER, REINFORCING
     RESIDENTIAL CONSTRUCTION
     ONLY.....................$  7.25

Laborer, common
     BUILDING CONSTRUCTION ONLY..$  7.25

LABORER
     RESIDENTIAL CONSTRUCTION
     ONLY
      Pipelayer...............$  7.25
      Unskilled...............$  7.25

PAINTER (Including Drywall
Finishing, Taping, and
Bedding)
     BUILDING CONSTRUCTION ONLY..$  7.25

PAINTER
     RESIDENTIAL CONSTRUCTION
     ONLY.....................$  7.25

PIPEFITTER (Including HVAC
Work)
     BUILDING CONSTRUCTION ONLY..$  7.28             .12

Plasterer tender
     BUILDING CONSTRUCTION ONLY..$  7.25

PLASTERER
     BUILDING CONSTRUCTION ONLY..$  8.41
     RESIDENTIAL CONSTRUCTION
     ONLY.....................$  7.25

PLUMBER (Excluding HVAC Work)
     BUILDING CONSTRUCTION ONLY..$  7.50             .48

Plumbers and Pipefitters
     RESIDENTIAL CONSTRUCTION
     ONLY.....................$  8.20

Power equipment operators:
     BUILDING CONSTRUCTION ONLY
      Backhoe.................$  7.25             .48
     RESIDENTIAL CONSTRUCTION
     ONLY
      Backhoe.................$  7.25
      Grader..................$  7.25
      Loader..................$  7.25

ROOFER, Including Built Up,
Composition and Single Ply
Roofs
     RESIDENTIAL CONSTRUCTION
```

ONLY.....$ 7.25

Sheet metal worker
RESIDENTIAL CONSTRUCTION
ONLY.....$ 7.25

Sheet Rock Installer
RESIDENTIAL CONSTRUCTION
ONLY.....$ 7.25

SHEETMETAL WORKER (Including
HVAC duct Work)
BUILDING CONSTRUCTION ONLY..$ 7.25

TILE SETTER
BUILDING CONSTRUCTION ONLY..$ 7.25
RESIDENTIAL CONSTRUCTION
ONLY.....$ 7.25

TRUCK DRIVER
BUILDING CONSTRUCTION ONLY..$ 7.25
RESIDENTIAL CONSTRUCTION
ONLY.....$ 7.25

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current

negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Hidalgo County Precinct 4 Administration & Maintenance Buildings.

B. Owner's Name: County of Hidalgo.

C. Architect's Name: ERO Architects - Eli R. Ochoa, PE, AIA (956-661-0400.

D. The Project consists of the construction of new stand alone buildings and associated items.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

1.03 WORK BY OWNER

A. The County of Hidalgo will provide all paving and items associated with paving.

B. Items noted NIC (Not in Contract) will be supplied and installed by County of Hidalgo before Substantial Completion. Some items include:
   1. Furnishings.
   2. Small equipment.
   3. Artwork.

1.04 OWNER OCCUPANCY

A. County of Hidalgo intends to occupy the Project upon Substantial Completion.

B. Cooperate with County of Hidalgo to minimize conflict and to facilitate County of Hidalgo's operations.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:
   1. Work by County of Hidalgo.
   2. Use of site and premises by the public.

C. Provide access to and from site as required by law and by County of Hidalgo:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Existing building spaces may not be used for storage.

E. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.
   2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to County of Hidalgo and authorities having jurisdiction.
   3. Prevent accidental disruption of utility services to other facilities.
   4. Do not shut off water, power, gas or any other utilities without written notification to the Owner and Owners approval in writing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Price and Contract Time.

C. Change procedures.

1.02 RELATED REQUIREMENTS

A. Document 00 52 00 - Agreement Form: Contract Price , retainages , payment period , monetary values of unit prices.

B. Document 00 72 00 - General Conditions : Additional requirements for progress payments, final payment, changes in the Work.

C. Section 01 21 00 - Allowances: Payment procedures relating to allowances.

1.03 SCHEDULE OF VALUES

A. The entire construction contract amount shall be broken down in the General Contractor's Schedule of Values.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to ERO Architects for approval.

C. Forms filled out by hand will not be accepted.

D. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

E. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

F. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.

G. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

H. Include in the Schedule of Values, each line item, all of the General Contractor's overhead and profit.

I. Revise schedule to list approved Change Orders, with each Application For Payment, during the course of the project.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to ERO Architects for approval.

C. Forms filled out by hand will not be accepted.

D. Present required information on electronic media printout.

E. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.

F. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.

9. Balance to Finish.
10. Retainage.

G. Execute certification by signature of authorized officer.

H. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

I. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

J. Submit three copies of each Application for Payment.

K. Include the following with the application:
1. Transmittal letter as specified for Submittals in Section 01 30 00.
2. Construction progress schedule, revised and current as specified in Section 01 30 00.
3. Current construction photographs specified in Section 01 30 00.
4. Affidavits attesting to off-site stored products. Pictures and invoices are required of all product or material stored.

L. When ERO Architects requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Price or Contract Time, ERO Architects will issue instructions directly to.

B. ERO Architects will advise of changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

C. For other required changes, ERO Architects will issue a document signed by County of Hidalgo instructing to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Price or Contract Time.
2. Promptly execute the change.

D. For changes for which advance pricing is desired, ERO Architects will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 30 days.

E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by ERO Architects for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.

F. Substantiation of Costs: Provide full information required for evaluation.
1. Provide following data:
   a. Quantities of products, labor, and equipment.
   b. Taxes, insurance, and bonds.
   c. Overhead and profit.
   d. Justification for any change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.
   b. Dates and times work was performed, and by whom.
   c. Time records and wage rates paid.
   d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

G. Execution of Change Orders: ERO Architects will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 70 00.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:

PROJECT: Hidalgo County Precinct 4 Administration and Maintenance Building

APPLICATION NO: 001
PERIOD TO:
CONTRACT FOR: General Construction
CONTRACT DATE:
PROJECT NOS: 11016 / /

Distribution to:
OWNER:
ARCHITECT:
CONTRACTOR:
FIELD:
OTHER:

FROM CONTRACTOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. **ORIGINAL CONTRACT SUM**		$ 0.00
2. **NET CHANGE BY CHANGE ORDERS**		$ 0.00
3. **CONTRACT SUM TO DATE** (Line 1 ± 2)		$ 0.00
4. **TOTAL COMPLETED & STORED TO DATE** (Column G on G703)		$ 0.00
5. **RETAINAGE:**		
a. 0 % of Completed Work (Column D + E on G703)	$ 0.00	
b. 0 % of Stored Material (Column F on G703)	$ 0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$ 0.00
6. **TOTAL EARNED LESS RETAINAGE** (Line 4 Less Line 5 Total)		$ 0.00
7. **LESS PREVIOUS CERTIFICATES FOR PAYMENT** (Line 6 from prior Certificate)		$ 0.00
8. **CURRENT PAYMENT DUE**		$ 0.00
9. **BALANCE TO FINISH, INCLUDING RETAINAGE** (Line 3 less Line 6)	$ 0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$ 0.00	$ 0.00
Total approved this Month	$ 0.00	$ 0.00
TOTALS	$ 0.00	$ 0.00
NET CHANGES by Change Order	$ 0.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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SECTION 01 21 00
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash allowances.

B. Expendure allowance.

C. Inspecting and testing allowances.

1.02 RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to or subcontractor, less applicable trade discounts .

B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

C. ERO Architects Responsibilities:
   1. Consult with Contractor for consideration and selection of products, suppliers , and installers.
   2. Select products in consultation with County of Hidalgo and transmit decision to Contractor.
   3. Prepare Change Order.

D. General Contractors Responsibilities:
   1. Assist ERO Architects in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   4. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

1.04 EXPENDURE ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

B. Funds will be drawn from the Contingency Allowance only by Change Order.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.05 ALLOWANCES SCHEDULE

A. Architect's Standard Level of Care Allowance in the stipulated sum of Thirty Thousand Dollars ($30,000).
   1. Funds will be drawn from the Expendure Allowance only by Change Order. Allowance should only be used for unforseen circumstances, unless otherwise approved by the Owner. Allowance could be used for, but is not limited to, architectural items, engineering items.
   2. At close-out of the Construction Contract, funds remaining in the Construction Expensure Allowance will be credited to the Owner by Change Order.

B. Owner Contengency Allowance: include the stipulated sum of Thirty Thousand Dollars ($30,000). Funds will be drawn similar to the Expendure Allowance only by Change Order.

C. Landscape and Irrigation Allowance: Include the stipulated sum of One Hundred Fifty Thousand Dollars ($100,000)

D. Cast Metal Dedication Allowance: Include the stipulated sum of Three Thousand Five Hundred Dollars ($3,500)

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of alternates.

B. Procedures for pricing alternates.

C. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

B. Document 00 43 23 - Alternates Form: List of alternatives as supplement to Bid Form.

C. Document 00 52 00 - Agreement Form: Incorporating monetary value of accepted alternatives.

1.03 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at County of Hidalgo's option. Accepted alternates will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.04 SCHEDULE OF ALTERNATES

A. Alternate No. 01 - Maintenance Building paint for Shop floor :
   1. Base Bid Item: Section 09 90 00 Painting and Coating - Products Section 2.04 Paints System - Interior - Letter D - 1 and Drawing number AE108 including _____.
   2. Alternative Item: Section 09 90 00 Painting and Coating - Products Section 2.04 Paints System - Interior - Letter D - 2 and Drawing number AE108 including _____.

B. Alternate No. 02 - Parking Canopies: Deduct Canopies and related items.
   1. Base Bid Item: Section 05 50 00 Miscellaneous Metals and Drawing number SF107, SF503, SB501, AS401 and AS402 including _____.

C. Alternate No. 03 - Refer to Civil Specifications at the end of Project Manuel.:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

C. Retain subparagraph below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
   1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.02 DEFINITIONS

A. Retain terms that remain after this Section has been edited for a project.
   1. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.03 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use CSI Form 1.5C (During the Bidding/Negotiating Stage)
   2. Substitution Request Form: Use CSI Form 13.1A.(After the Bidding/Negotiating Phase)
   3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
      j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
      k. Cost information, including a proposal of change, if any, in the Contract Sum.
      l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
      m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
5. Architect may determine in each case which of the revision forms in "Forms of Acceptance" Subparagraph below is appropriate for incorporating a Contractor's substitution requests into the Contract Documents. See the Evaluations in Division 01 Section "Contract Modification Procedures" for discussion of contract modification methods and forms.
    a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
    b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.04 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
    1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
        a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
        b. Requested substitution will not adversely affect Contractor's construction schedule.
        c. Requested substitution has received necessary approvals of authorities having jurisdiction.
        d. Requested substitution is compatible with other portions of the Work.
        e. Requested substitution has been coordinated with other portions of the Work.
        f. Requested substitution provides specified warranty.
        g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice of Award.
    1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
        a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
        b. Requested substitution does not require extensive revisions to the Contract Documents.
        c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
        d. Requested substitution will not adversely affect Contractor's construction schedule.
        e. Requested substitution has received necessary approvals of authorities having jurisdiction.
        f. Requested substitution is compatible with other portions of the Work.
        g. Requested substitution has been coordinated with other portions of the Work.
        h. Requested substitution provides specified warranty.
        i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Knowledge for Creating and Sustaining the Built Environment

SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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June 2004
CSI Form 1.5C

Knowledge for Creating and Sustaining the Built Environment

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Phone: _____

Address: _____

Trade Name: _____ Model No.: _____

Installer: _____ Phone: _____

Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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Form Version: June 2004
CSI Form 13.1A

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: ☐

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ Other:

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Form Version: June 2004
CSI Form 13.1A

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.
B. Site mobilization meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Progress photographs.
F. Submittals for review, information, and project closeout.
G. Number of copies of submittals.
H. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Dates for applications for payment.
B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
C. Section 01 78 00 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: General Contractor.
B. During construction, coordinate use of site and facilities through the Project Coordinator.
C. Make the following types of submittals to ERO Architects through the Project Coordinator:
    1. Requests for interpretation.
    2. Requests for substitution.
    3. Shop drawings, product data, and samples.
    4. Test and inspection reports.
    5. Manufacturer's instructions and field reports.
    6. Applications for payment and change order requests.
    7. Progress schedules.
    8. Coordination drawings.
    9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. ERO Architects or General Constractor will schedule a meeting after Notice of Award.
B. Attendance Required:
    1. County of Hidalgo selected representatives.
    2. ERO Architects and Design Consultants.
    3. The General Contractor and sub-contractors.
C. Agenda:
    1. Execution of County of Hidalgo-Contractor Agreement.
    2. Submission of executed bonds and insurance certificates.
    3. Distribution of Contract Documents.
    4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
    5. Designation of personnel representing the parties to Contract, Donna Independent School District and ERO Architects.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Observations of the Work and deficiency reports by the Owner and Architect.
8. Scheduling.

D. Record minutes and distribute copies within three days after meeting to participants, with two copies to ERO Architects, County of Hidalgo, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. County of Hidalgo will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
1. County of Hidalgo.
2. ERO Architects.
3. Special Consultants.
4. Contractors Superintendent.
5. Major Subcontractors.

C. Agenda:
1. Use of premises by County of Hidalgoand Campus Staff.
2. County of Hidalgo's requirements and occupancy prior to completion.
3. Temporary utilities provided by County of Hidalgo.
4. Survey and building layout.
5. Security and housekeeping procedures.
6. Schedules.
7. Application for payment procedures.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within three days after meeting to participants, with two copies to ERO Architects, County of Hidalgo, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. General Contractor shall make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, County of Hidalgo, ERO Architects, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. General Contractor shall record minutes and distribute copies within three days after meeting to participants, with two copies to ERO Architects, County of Hidalgo, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.05 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.

C. Photography Type: Digital; electronic files.

D. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to ERO Architects.

E. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Completion of site clearing.
   2. Excavations in progress.
   3. Foundations in progress and upon completion.
   4. Structural framing in progress and upon completion.
   5. Enclosure of building, upon completion.
   6. Final completion, minimum of ten (10) photos.

F. Views:
   1. Consult with ERO Architects for instructions on views required.
   2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.06 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to ERO Architects for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - CLOSEOUT SUBMITTALS.

3.07 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. LEED submittals and reports.

3. Certificates.
4. Test reports.
5. Inspection reports.
6. Manufacturer's instructions.
7. Manufacturer's field reports.
8. Other types indicated.

B. Submit for ERO Architects's knowledge as contract administrator or for County of Hidalgo. No action will be taken.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

B. Submit for County of Hidalgo's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by ERO Architects.
2. Larger Sheets, Not Larger Than 24x36 inches: Submit the number of opaque reproductions that requires, plus two copies that will be retained by ERO Architects.

B. Documents for Information: Submit two copies.

C. Extra Copies at Project Closeout: See Section 01 78 00.

D. Samples: Submit the number specified in individual specification sections; one of which will be retained by ERO Architects.
1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Deliver submittals to ERO Architects at business address.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and ERO Architects review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS

A. Section 01 10 00 - Summary: Work sequence.

1.03 REFERENCES

A. AGC (CPSM) - Construction Planning and Scheduling Manual; Associated General Contractors of America; 2004.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM, O'Brien, McGraw-Hill Book Company; 2006.

1.04 SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work. Provide a list of products which have a long lead-time and will need to be prioritized in the project schedule.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by ERO Architects.

1.05 QUALITY ASSURANCE

A. Scheduler: personnel or specialist Consultant specializing in CPM scheduling with five years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.06 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Maximum 11x17 inches or width required.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of separate stages and other logically grouped activities.

D. Provide sub-schedules to define critical portions of the entire schedule.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from ERO Architects. Indicate decision dates for selection of finishes.

G. Indicate delivery dates for owner-furnished products.

H. Coordinate content with schedule of values specified in Section 01 20 00.

I. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with ERO Architects at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, ERO Architects, County of Hidalgo , and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Security measures including formal security program, entry control, personnel identification, guard service, and miscellaneous restrictions.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: use of premises and occupancy.

B. Section 01 50 00 - Temporary Facilities and Controls: Temporary lighting.

1.03 SECURITY PROGRAM

A. Protect Work , existing premises and County of Hidalgo's operations from theft, vandalism, and unauthorized entry.

B. Initiate program at project mobilization.

C. Maintain program throughout construction period until County of Hidalgo occupancy.

1.04 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into Project site and existing facilities.

B. Allow entrance only to authorized persons with proper identification.

C. Maintain log of workers and visitors, make available to County of Hidalgo on request.

D. Coordinate access of County of Hidalgo's personnel to site in coordination with County of Hidalgo's security forces.

1.05 PERSONNEL IDENTIFICATION

A. Provide identification badge to each person authorized to enter premises.

B. Badge To Include: Personal photograph, name, assigned number , expiration date and employer.

C. Require return of badges at expiration of their employment on the Work.

1.06 GUARD SERVICE

1.07 RESTRICTIONS

A. Do not allow cameras on site or photographs taken except by written approval of County of Hidalgo.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mock-ups.

B. Control of installation.

C. Tolerances.

D. Testing and inspection services.

E. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.

B. Section 01 21 00 - Allowances: Allowance for payment of testing services.

C. Section 01 30 00 - Administrative Requirements: Submittal procedures.

D. Section 01 42 16 - Definitions.

E. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008.

B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2011.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2009.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2010.

E. ASTM E329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2011.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2009.

1.04 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

B. Design Data: Submit for ERO Architects's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for County of Hidalgo's information.

C. Test Reports: After each test/inspection, promptly submit two copies of report to ERO Architects and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.

j. Conformance with Contract Documents.
k. When requested by ERO Architects, provide interpretation of results.

2. Test report submittals are for ERO Architects's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for County of Hidalgo's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to ERO Architects, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to ERO Architects.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the County of Hidalgo's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for ERO Architects's benefit as contract administrator or for County of Hidalgo.
1. Submit report in duplicate within 30 days of observation to ERO Architects for information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for ERO Architects's benefit as contract administrator or for County of Hidalgo.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by ERO Architects or County of Hidalgo.

1.05 OWNER-PROVIDED TESTING AND INSPECTION AGENCIES

A. County of Hidalgowill employ and pay for services of an independent testing agency to perform specified testing which is not required to be provided by the Contractor.

B. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing which is not required to be provided by the owner.

C. Employment of agency in no way relieves of obligation to perform Work in accordance with requirements of Contract Documents.

D. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, and ASTM C 1093.
2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
3. Laboratory: Authorized to operate in Texas.
4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from ERO Architects before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by ERO Architects and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from ERO Architects before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with ERO Architects and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify ERO Architects and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by ERO Architects.
   6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify ERO Architects and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with County of Hidalgo's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by ERO Architects.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by the General Contractor.

G. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by ERO Architects. Payment for re-testing will be charged to the General Contractor by deducting testing charges from the Contract Price.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to ERO Architects 30 days in advance of required observations.
1. Observer subject to approval of ERO Architects.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of ERO Architects, it is not practical to remove and replace the Work, ERO Architects will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 42 16
DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

A. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

A. Furnish: To supply, deliver, unload, and inspect for damage.

B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.

C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.

D. Provide: To furnish and install.

E. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.
B. Temporary telecommunications services.
C. Temporary telephone service.
D. Temporary sanitary facilities.
E. Temporary Controls: Barriers, enclosures, and fencing.
F. Security requirements.
G. Vehicular access and parking.
H. Recycle Containers and Waste removal facilities and services.
I. Project identification sign.
J. Field offices.

1.02 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
B. Existing facilities may not be used.
C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
B. Telecommunications services shall include:
    1. Telephone Land Lines: One line, minimum; one handset per line.
    2. Internet Connections: Minimum of one; DSL modem or faster.
    3. Facsimile Service: Minimum of one dedicated fax machine/printer, with dedicated phone line.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
B. Maintain daily in clean and sanitary condition.
C. At end of construction, return facilities to same or better condition as originally found.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
D. Traffic Controls: Signage for construction entrances and parking.

1.06 FENCING

A. Construction: Commercial grade chain link fence.
B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient

temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and County of Hidalgo's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with County of Hidalgo's security program.

1.09 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and County of Hidalgo.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Designated existing on-site roads may be used for construction traffic.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

F. Do not allow vehicle parking on existing pavement.

G. Designate two parking spaces for County of Hidalgo and ERO Architects use.

1.10 PROJECT IDENTIFICATION

A. No signs are allowed without County of Hidalgo permission except those required by law.

1.11 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Locate offices a minimum distance of 30 feet from existing and new structures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Procedures for County of Hidalgo-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

B. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.
   3. Identify products which have a long lead-time and will by priority for early submittal and review.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Unforeseen historic items encountered remain the property of the County of Hidalgo; notify County of Hidalgo promptly upon discovery; protect, remove, handle, and store as directed by County of Hidalgo.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the County of Hidalgo, or otherwise indicated as to remain the property of the County of Hidalgo, become the property of the Contractor; remove from site.

D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. ERO Architects will consider requests for substitutions only within 30 days after date of Agreement.

B. Substitutions may be considered when a product becomes unavailable through no fault of the contractor or their sub contractor .

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

D. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to County of Hidalgo.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will reimburse County of Hidalgo and ERO Architects for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The ERO Architects will notify Contractor in writing of decision to accept or reject request.

3.02 OWNER-SUPPLIED PRODUCTS

A. County of Hidalgo's Responsibilities:
   1. Arrange for and deliver County of Hidalgo reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
   1. Review County of Hidalgo reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with County of Hidalgo.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of County of Hidalgo personnel.

I. Closeout procedures, except payment procedures.

J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures.

C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

D. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2009.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of County of Hidalgoor separate Contractor.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in Texas and acceptable to ERO Architects. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Texas.

C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in Texas.

1.06 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After County of Hidalgo occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of County of Hidalgo's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify ERO Architects four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within three days after meeting to participants, with two copies to ERO Architects, County of Hidalgo, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify ERO Architects of any discrepancies discovered.

C. Control datum for survey is that established by County of Hidalgo provided survey.

D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

E. Promptly report to ERO Architects the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to ERO Architects.

G. Utilize recognized engineering survey practices.

H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to ERO Architects before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. See Section 01 10 00 for other limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities.

E. Protect existing work to remain.
   1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   2. Repair adjacent construction and finishes damaged during removal work.

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

H. Refinish existing surfaces as indicated:
   1. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

I. Clean existing systems and equipment.

J. Recycle demolition debris and abandoned items from alterations areas; do not burn or bury.

K. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Match work that has been cut to adjacent work.
   4. Repair areas adjacent to cuts to required condition.
   5. Repair new work damaged by subsequent work.
   6. Remove samples of installed work for testing when requested.
   7. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.08 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site daily and recycle; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.10 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify ERO Architects and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

A. See Section 01 79 00 - Demonstration and Training.

B. Demonstrate operation and maintenance of products to County of Hidalgo's personnel two weeks prior to date of Substantial Completion.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

F. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with County of Hidalgo's personnel in detail to explain all aspects of operation and maintenance.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section Mechanical Specifications.

3.13 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.
   1. Clean areas to be occupied by County of Hidalgo prior to final completion before County of Hidalgo occupancy.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

3.14 CLOSEOUT PROCEDURES

A. On or about the end of the project, the following items shall be performed in order to achieve Substantial Completion and project close-out:
   1. Make submittals that are required by governing or other authorities.
      a. Provide copies to ERO Architects and County of Hidalgo.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
   1. Notify ERO Architects when work is considered ready for Substantial Completion.
   2. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for ERO Architects's review.

C. County of Hidalgo will occupy all of the building as specified in Section 01 10 00.
   1. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to County of Hidalgo-occupied areas.

D. Accompany Project Coordinator on preliminary final inspection.
   1. Notify ERO Architects when work is considered finally complete.
   2. Complete items of work determined by ERO Architects's final inspection.

E. Substantial Completion:
   1. The following items are a list of requirements, as applicable to the Project, that must be completed prior to establish Substantial Completion.
      a. Contractor submits a thorough List of Items to be completed (punch list) or corrected, along with a written request for Substantial Completion and inspection of the work.
      b. The Architect and Engineer will inspect the project utilizing the Contractor's prepared punch list, noting completed items, incomplete items and prepare a supplemental list of items that have been omitted or incomplete items that were not previously noted. The Architect's Project Representative, at his/her discretion, may attend and assist in the preparation of the Contractor's punch list.
      c. Contractor completes corrections. Architect and Engineer reinspect (with Owner) to establish Date of Substantial Completion. Note: Any items remaining on Date of Substantial Completion are appended to Certificate (AIA G704).
      d. Operation and Maintenance Manuals: to be submitted in 3-ring D-slant binders. All manuals will contain an index listing the information submitted. The index sections will be divided by division of work and identified by tabbing each section as listed in the index. Submit O & M Manuals to respective consultants (Civil, MEP, Structural, etc…) prior to submitting to Architect.
      e. Certificate of Substantial Completion (AIA G704) prepared and executed by all parties and returned to Architect. Items on the appended punch list are to be completed or corrected within the time limits established in the Certificate of Substantial Completion.
      f. All fire alarm system components must be completed and demonstrated to the Owner.
      g. Local fire marshal approval certificate must be delivered to the Owner.
      h. All exterior clean-up and landscaping must be complete.
      i. All final interior clean-up must be complete.
      j. All HVAC air and water balancing must be complete.
      k. All Energy Management Systems must be complete and fully operational and demonstrated to the Owner.
      l. All communications equipment, telephone system, and P.A. systems must be complete and demonstrated to the Owner.
      m. All final lockset cores must be installed and all final Owner directed keying completed.

n. All room plaques and exterior signage must be completed.
o. All Owner demonstrations must be completed including kitchen equipment, HVAC equipment, plumbing equipment, and electrical equipment.
p. A final certificate of occupancy must be signed by the Contractor and delivered to the Owner.
q. All operation and maintenance manuals are delivered and approved ("D-slant" ring binders in triplicate).
r. A letter from all subcontractors that the project is Asbestos and Lead free.
s. All warranties shall be Notarized.

F. Project Close-out:
1. Contractor submits written notice that work is ready for final inspection and acceptance, and shall specifically note each item on the punch list as being complete or the status of any incomplete item.
2. A-E (with Owner) make final inspection.
3. Final Change Order executed. (Including allowance adjustments).
4. Contractor submits Final Application for Payment
5. Close-out documentation binders:
6. Contractor must submit Final Close-out Documentation Items in "D-slant" 3-ring binders, One (1) Original and Two (2) Copies. It is to include a detailed table of contents with page numbers, section tabs and index tabs for each division of work. Behind each division of work tab the paperwork is to be arranged according to specification section and in the following order; Release of Lien, Hazardous Material Certificate and Warranty/Guarantee. The close-out documents must be neatly organized and easily useable as determined by the Architect and Owner. The following items should be in each close-out binder:
7. AIA G707 - Consent of Surety to Final Payment.
8. AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
9. AIA G706A - Contractor's Affidavit of Release of Liens
   a. Must include contractors, subcontractors and suppliers separate final releases. (Close-out Form "A.1" - Affidavit of Subcontractor's Release of Lien).
10. General Contractor's Guarantee/Warranty submitted on company letterhead.. This Guarantee must state all sections of work performed by General Contractor and warranty period for each section of work as well as be notarized.
11. Subcontractors' Guarantee/Warranty submitted on attached Close-out Form "B.1". This Guarantee/Warranty must state all sections of work performed by the subcontractor and warranty period as well as be notarized.
12. Certificate of Project Compliance - See attached Close-out Form "C.1".
    a. Owner and Architect will initiate form and forward to Contractor for signature once Substantial Completion is established.
13. Copy of Certificate of Substantial Completion (AIA G704)
14. Copy of All Permits
15. Copy of Final Utility Bill or letter of transfer
16. Copy of Certificate of Occupancy.
17. Final List of Subcontractors. All General Contractor's vendors/suppliers and subcontractors that provided materials or performed any work related to this project must be listed on this form.
18. Hazardous Material Certificate - submitted on Close-out Form "D.1".
    a. Affidavits from Contractor, Subcontractors and General Contractor's vendors or suppliers stating that no hazardous materials/products have been used or installed in this project.
19. Provide original receipts for delivery of "Extra Stock" items, (if applicable). Receipts must be signed by the Owner.
20. Provide original receipts for delivery of "Keys", (if applicable). Receipts must be signed by the Owner.

G. Failure to complete and close-out project after Substantial Completion will result in liquidated damages being assessed until close-out occurs. All close-outs must be reviewed and approved by Owner, Architect and/or Consultants prior to the deadline.

H. Final release of retainage will not be authorized by the Architect until 15 days after Contractor completes all requirements for close-out of work of this package.

I. 11 Month Inspection:

1. Immediately prior to expiration of the one (1) year guarantee period, the Contractor shall make an inspection of the work in the company of the Architect and the Owner. The Architect and the Owner shall be given not less than thirty (30) days notice prior to the anticipated date of terminal inspection.
2. Where any portion of the work has proven to be defective and requires replacement, repair or adjustment, the Contractor shall immediately provide materials and labor necessary to remedy such defective work and shall execute such work without delay until completed to the satisfaction of the Architect and the Owner, even though the date of completion of the corrective work may extend beyond the expiration date of the guarantee period.
3. The Contractor shall not be responsible for correction of work which has been damaged because of neglect or abuse by the Owner nor the replacement of parts necessitated by normal wear in use.
4.

3.15 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the County of Hidalgo.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to ERO Architects with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. ERO Architects will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by County of Hidalgo, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with ERO Architects comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with County of Hidalgo's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addendas.
   4. ASIs & RFIs
   5. Change Orders and other modifications to the Contract.
   6. Reviewed shop drawings, product data, and samples.
   7. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by County of Hidalgo.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

G. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

H. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of ERO Architects, , Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.
      d. Photocopies of warranties and bonds.

I. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of ERO Architects , Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with

County of Hidalgo's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.

B. Training of County of Hidalgo personnel in operation and maintenance is required for:
   1. All software-operated systems.
   2. HVAC systems and equipment.
   3. Plumbing equipment.
   4. Electrical systems and equipment.
   5. Landscape irrigation.

C. Training of County of Hidalgo personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
   2. Finishes, including flooring, wall finishes, ceiling finishes.
   3. Fixtures and fittings.

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.

B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Training Plan: County of Hidalgo will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to ERO Architects for transmittal to County of Hidalgo.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by County of Hidalgo.

B. Demonstration may be combined with County of Hidalgo personnel training if applicable.

C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. County of Hidalgo will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two hour segments.

D. Training schedule will be subject to availability of County of Hidalgo's personnel to be trained; re-schedule training sessions as required by County of Hidalgo; once schedule has been approved by County of Hidalgo failure to conduct sessions according to schedule will be cause for County of Hidalgo to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventive maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.
   8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
   9. Review recommended tools and spare parts inventory suggestions of manufacturers.
   10. Review spare parts and tools required to be furnished by Contractor.
   11. Review spare parts suppliers and sources and procurement procedures.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Form accessories.

C. Form stripping.

1.2 RELATED REQUIREMENTS

A. Section 03 20 00 – Concrete Reinforcing.

B. Section 03 30 00 – Cast-in-Place Concrete.

C. Section 03 39 00 – Concrete Curing.

D. Section 04 20 00 – Unit Masonry: Spacing for veneer anchor reglets recessed in concrete.

1.3 REFERENCE STANDARDS

A. ACI 117 – Standards Specifications for Tolerances for Concrete Construction and Materials; 2006.

B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute; 2005.

C. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2008.

D. ASME A17.1 – Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers; 2007.

1.4 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.5 SUBMITTALS

A. See Section 01 33 00 – Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.6 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Maintain one copy of each installation standard on site throughout the duration of concrete work.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver void forms and installation instructions in manufacturer's packaging.

B. Storage void forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

2.2 WOOD FORM MATERIALS

A Form Materials: At the discretion of the Engineer.

2.3 PREFABRICATED FORMS

A. Manufacturers:
1. Alabama Metal Industries Corporation: www.amico-online.com
2. Molded Fiber Glass Construction Products Co: www.mfgcp.com
3. Reward Wall Systems: www.rewardwalls.com
4. Substitutions: See Section 01 25 13 – Product requirements.

B. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.4 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Colorless mineral oil that will not stain concrete.

C. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

D. Waterstops: Preformed mineral colloid strips, 3/8 inch thick, moisture expanding.

PART 3 EXECTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 1301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and strip. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

F. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instruction form Hinojosa Engineering, Inc. before proceeding.

3.3 APPLICATION – FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to replacement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.4 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Construct formed cavities of debris prior to placing concrete.

3.5 FORM TOLERANCES

A. Construct formwork to maintain tolerances required by AC 117.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1

3.6 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 23.

3.7 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005

B. ACI SP-66 – ACI detailing Manual; American Concrete Institute International; 2004.

C. ASTM A 185/A 185M – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

D. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.

E. CRSI (DA4) – Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2001.

1.4 SUBMITTALS

A. See Section 01 33 00 – Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420)
   1. Deformed billet-steel bars.
   2. Unfinished.

B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.

1. Flat Sheets.
2. Mesh Size: 4 x 4.
3. Wire Gage: W2.9 x W2.9 or as indicated on the plans.

C. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel or plastic components for placement within 1-1/2 inches of weathering surfaces.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) – Manual of Standards Practice.

B. Welding of reinforcement is not permitted.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as follows:
1. Footings and Concrete Formed Against Earth: 3 inch.
2. Slabs on Fill: 2 inch.

E. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Labor, materials, services and equipment required in conjunction with or properly incidental to placing of cast-in-place concrete slabs, building members, and MEP equipment pads as described herein or as shown on the Drawings, including but not limited to:
   1. Concrete mix designs.
   2. Assistance with Owner provided laboratory testing of concrete.
   3. Installation of items to be built-in formwork or embedded in concrete but furnished by other trades, including metal anchors, anchor slots, reglets, hangers, supports, ties, inserts, bolts, corner guards, and sleeves.
   4. Cast-in-place concrete, with formwork, under slab vapor barrier, reinforcing, accessories, appurtenances, finishing and curing required to complete concrete work.
   5. Grouting under structural steel base plates.
   6. Foundation for columns, walls, and slabs on grade.
   7. Super-structure for walls, columns, slabs, curbs, stairs, steps, equipment pads, walks, and pre-moulded expansions joints.

B. Examine the drawings for Plumbing, Mechanical, and Electrical work. These subcontractors will furnish and set sleeves or box forms required for openings. Contractor shall use care in placing reinforcement and pouring concrete so as not to displace such sleeves or boxes.
   1. All slots, chases, recesses, or openings indicated on the drawings, which are not formed by sleeves or boxes shall be provided in locations shown. When the work of other contractors is completed, the excess part of the openings shall be completely closed with concrete.

1.2 RELATED REQUIREMENTS

A. Division 1 Sections applicable to the Work of this Section.

1.3 RELATED SECTIONS

A. Section 01 45 23 - Testing and Inspecting Services

B. Section 02 32 00 - Geotechnical Report

C. Section 04 20 00 - Unit Masonry

D. Section 05 12 00 - Structural Steel

E. Section 05 50 00 - Miscellaneous Metals

F. Section 07 92 00 - Building sealants

G. Section 31 00 00 - Earthwork

H. Section 31 63 29 - Drilled and Reamed Foundation

I. Section 32 13 13 - Concrete Paving

J. Electrical and Mechanical Drawings and Specifications for sleeves, conduit, and other items embedded in concrete.

1.4 QUALITY ASSURANCE

A. Where standards or requirements of this Section are in conflict with those noted on the Contract Drawings, or the Building Code, the more stringent requirements shall govern. Bring all conflicts and discrepancies to the attention of the Architect and do not start work until such conflicts and discrepancies are clarified and corrected. Failure to do so will not relieve the Contractor from performing the Work correctly at no additional expense to the Owner.

B. Testing Laboratory Services:
1. Test results shall meet or exceed established standards. A technician from the Owner's Testing Laboratory must be present during all operations.

C. Evaluation and Acceptance:
1. Codes and Standards: The Work described in this Section, unless otherwise noted on the Drawings, or herein specified, shall be governed by the editions of the following codes or specifications approved by authorities having jurisdiction.
   a. American Association of State Highway and Transportation Officials (AASHTO)
      1) TP 23, "Proposed Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying"
   b. American Concrete Institute (ACI)
      1) 211.1, "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete"
      2) 214, "Recommended Practice for Evaluation of Strength Test Results of Concrete"
      3) 301, "Specifications for Structural Concrete for Buildings"
      4) 302, "Guide for Concrete Floor and Slab Construction"
      5) 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
      6) 305, "Hot Weather Concreting"
      7) 306, "Cold Weather Concreting"
      8) 309, "Standard Practice for Consolidation of Concrete"
      9) 311, "ACI Manual of Concrete Inspection"
      10) 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures"
      11) 318, "Building Code Requirements for Reinforced Concrete"
      12) 347, "Recommended Practice for Concrete Formwork"
      13) Keep one copy of "Manual of Concrete Practice" at job site at all times.
   c. American Society for Testing and Materials (ASTM)
      1) A36, Standard Specification for Carbon Structural Steel
      2) A108, Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
      3) A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
      4) A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

5) A615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
6) A704, Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
7) C33, Standard Specification for Concrete Aggregate
8) C42, Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
9) C94, Standard Specification for Ready-Mix Concrete
10) C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates
11) C150, Standard Specification for Portland Cement
12) C172, Standard Practice for Sampling Freshly Mixed Concrete
13) C260, Standard Specification for Air-Entraining Admixtures
14) C330, Standard Specification for Lightweight Aggregates for Structural Concrete
15) C494, Standard Specification for Chemical Admixtures for Concrete
16) C595, Standard Specification for Blended Hydraulic Cements
17) C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
18) C979, Standard Specification for Pigments for Integrally Colored Concrete
19) C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)
20) C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
21) E96, Standard Test Methods for Water Vapor Transmission of Materials
22) E1643, Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs
23) E1745, Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
24) F710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

d. American Welding Society (AWS)
1) D1.4 Structural Welding Code- Reinforcing Steel

e. Federal Specification (FS)
1) FF-S-325
2) QQ-Z-325C

e. Concrete Reinforcing Steel Institute (CRSI)
1) "Reinforced Concrete – A Manual of Standard Practice"
2) "Recommended Practice for Placing Reinforcing Bars"
3) "Recommended Practice for Placing Bar Supports"

D. Source Quality Control:
1. Concrete production facilities shall meet the requirement for certification by the National Ready Mixed Concrete Association. All ready mix concrete trucks proposed for use on the project shall meet the requirements of NRMCA, Certification of Ready Mix Concrete Production Facilities.
2. Concrete batchers shall be completely interlocked semi-automatic or automatic batchers, as defined by the Concrete Plant Manufacturers Bureau.
3. Concrete batchers shall have graphic, digital, or photographic recorders, which shall register both empty balance and total weight (or volume of water or

admixture) of each batched material, time to the nearest minute, date, identification of batch, and numerical count of each batch. Copies of the record shall be furnished to the Inspection and Testing Laboratory.

4. The Inspection and Testing Laboratory shall provide concrete batch plant inspection as follows:
   a. Provide a qualified inspector with necessary equipment and apparatus to inspect weighing and batching of controlled concrete at batch plant on a random basis, approximately once daily as the concrete is being placed on this project.
   b. Make certain that materials and batch equipment used are in accordance with requirements of Specifications.
   c. Check for adjustment in batch weights to compensate for variations in moisture content.
   d. Submit promptly to Architect, certification of weights used in loads of acceptable concrete which has been batched during plant inspection time.

E. Concrete Mix Design Criteria:
1. Design concrete mixes in accordance with ACI 318, Section 5.3, Proportioning on the basis of field experience and/or trial mixtures.
2. Submit the proposed mix designs for each concrete mix type proposed.
3. Determination of required average strength above specified strength shall be in accordance with ACI 318.
4. If trial mixes are used as the basis for the proposed mix design, mold and cure test cylinders in accordance with ASTM C39. Do not place concrete on project until laboratory reports and results of confirmation cylinder tests have been evaluated by the Inspection and Testing Laboratory and results indicate that proposed mixes will develop required strengths.
5. Inspection and Testing Laboratory shall furnish the Architect with a written evaluation of each proposed concrete mix design submitted by the Contractor.
6. Check mix designs and revise if necessary wherever changes are made in aggregates or in surface water content of aggregate or workability of concrete. Water content shall be the minimum to produce workable mix. The water content shall be verified in the field by use of the Microwave Test.

1.5 SUBMITTALS

A. Mix Designs: Submit proposed mix designs, including confirmation cylinder test results, in accordance with ACI 318, Section 5.3, Proportioning on the basis of field experience and/or trial mixtures. Submit mix designs to Architect/Engineer and Inspection and Testing Laboratory for evaluation a minimum of 14 days prior to placing concrete. Key requirements:
1. Combined aggregate gradation**.**
2. Proportions of cement, fine and coarse aggregates, and water.
3. Type, color and dosage of integral coloring compounds, where applicable.
4. Range of ambient temperature and humidity for which design is valid.
5. Any special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product.

B. Complete test data for trial mixes or a complete summary of previous project test results for mix design based on standard deviation analysis must be included.

C. Provide duplicate delivery tickets for each load of ready-mix concrete delivered to site, in accordance with ASTM C94. Show batch weights on each ticket.

D. Provide mill test reports on an as-used basis for each type and brand of cementitious material used.

E. Provide certification from independent test laboratory indicating underslab vapor retarder compliance with specification and ASTM 1745 Class A requirements.

F. Provide product data for each accessories item specified but necessarily not listed above which are required for a complete installation, including, but not limited to reinforcing, chairs, admixtures, stains and color pigments, grouts, sealers, vapor retarders and barriers, water stops, epoxy adhesives, curing compounds and anchors.

G. Provide Shop Drawings for all reinforcing steel. Show bending diagrams, splicing and laps of rods, shapes, dimensions and details of bar reinforcement and accessories.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Mix and deliver concrete to project ready-mixed in accordance with ASTM C94. Mix concrete a minimum of 70 revolutions of transit mix drum at mixing speed. A minimum of 40 revolutions shall be at the production plant.

B. Schedule delivery so that continuity of any pour will not be interrupted for over 15 minutes.

C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

D. Store bagged cement on platforms off ground. Protect stored cement against the elements. Handle and store fine and coarse aggregate separately in manner to prevent intrusion of foreign material or segregation of the material. Protect all reinforcement until used. Do not use any hardened cement.

E. Mild steel reinforcement at the time of placement of concrete shall be clean and free of all loose dirt, form oil, and other coatings affecting bond.

1.7 JOB CONDITIONS

A. Hot Weather Concreting:
   1. Follow ACI 301 and ACI 305.
   2. Provide water-reducing retarding admixture conforming to ASTM C494, Type D when necessary to retard initial set. The admixture shall be dispensed in accordance with manufacturer's recommendations.
   3. Maximum concrete temperature shall not exceed 95 degrees F at time of placement.
      a. Concrete with temperatures above 90 degrees F shall be placed only if a high range water reducer (superplasticizer) is added to the mix as directed by the Testing Laboratory to maintain the specified slump during placement.

B. Cold Weather Concreting: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures.
   1. Follow ACI 301 and ACI 306.
   2. When ambient temperature at site is below 40 degrees F or is expected to fall to that temperature within ensuing 24 hours, heat water and/or aggregate prior to adding to mix so that temperature of concrete will be between 55 degrees F and 85 degrees F at time of placement.

3. Maintain temperature of deposited concrete between 50 degrees F and 70 degrees F for minimum of seven (7) days after placing.
4. Add the specified non-corrosive accelerator for all floor concrete placed at air temperatures below 50 degrees F.

C. Temperature Changes: Maintain changes in concrete temperature as uniformly as possible, but in no case exceed change of 5 degrees F per hour or 25 degrees F in any 24 hour period.

D. Combustion heaters shall not be used during the first 48 hours without precautions to prevent exposure of concrete and workmen to exhaust gasses containing carbon dioxide and/or carbon monoxide.

E. Admixtures intended to accelerate hardening of concrete or produce higher than normal strength at early periods will not be permitted unless approved by the Architect. The use of calcium chloride is specifically prohibited.

1.8 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 – Project Coordination

1.9 SEQUENCING/SCHEDULING

A. Coordinate Work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Manufacturers named within this Section are approved for use on the Project for the product for which they are specified. Other manufacturers must have a minimum of five (5) years experience manufacturing the product specified and meet or exceed the specifications for that product. Substitution of products must be in accordance with the General Conditions, Supplementary Conditions, and Section 01300, Submittals to be considered prior to proposal.

2.2 MATERIALS

A. Formwork:
1. General: Contractor may use any of the following formwork materials as long as material meets the following and will not stain, or impart any undesirable texture, i.e. wood grain, where such texture would be objectionable in an exposed location.
   a. Wood Forms:
      1) Plywood: PS 1, Douglas Fir or Spruce species.
      2) Medium Density Overlay (MDO): One (1) side grade; sound undamaged sheets with clean, true edges.
      3) Lumber: Southern Yellow Pine species; No. 2 grade, with grade stamp clearly visible.
   b. Pre-Fabricated Forms:
      1) Preformed Steel Forms: Minimum 16 gauge matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2) Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

c. Form Liner: Any material recommended by manufacturer to impart finish which will exhibit the finish or design characteristics, i.e. smooth, textured, ribbed, etc. detailed by the Architect for exposed locations as shown or required and capable of being stripped from complex designs without damaging the finish or design. Form liner shall be as manufactured by Symons Corporation, Greenstreak, Inc. or Architect approved equal.

d. Self-expanding corkboard expansion joint fillers should conform to ASTM D1752 for exterior work. Joint fillers shall extend full depth of slab or joint and be of thickness and lengths indicated on drawings.

B. Metal Reinforcement:
1. Bars:
a. General: Conform to ACI 315, latest edition.
b. Comply with ASTM A615, Grade 60.
c. Number 3 bars comply with ASTM A615, Grade 40
2. Welded Steel Wire Fabric (Mesh): Not permitted in structural concrete, unless approved by Structural Engineer

C. Concrete, General:
1. Ready-mixed concrete, ASTM C94
2. Comply with ACI 318.
3. Concrete must be approved by Architect through design mix and cylinder test of testing laboratory.
4. Unless approved otherwise by the Architect, use one (1) brand of cement throughout the work where finished surface will be exposed to view.
5. Strength: Refer to Paragraph 2.3, A.
6. Unless approved otherwise by the Structural Engineer, use one (1) ready-mix concrete company throughout the project.

D. Concrete Materials:
1. Cement:
a. Portland Cement, Type I or III, conforming to the requirements of ASTM C150.
b. Combined aggregate gradation for slabs and other designated concrete shall be 8 percent - 18 percent for large top size aggregates (1-1/2 in.) or 8 percent - 22 percent for smaller top size aggregates (1 in. or 3/4 in.) retained on each sieve below the top size and above the No. 100.
2. Fly ash: Maximum of 25% fly ash by weight is acceptable.

E. Aggregate:
1. Fine Aggregate: ASTM C33; clean, hard, durable, uncoated, natural and manufactured sand, free of silt, loam or clay.
2. Coarse Aggregate: ASTM C33; hard, durable, uncoated, crushed stone; gradation in accordance with Size No. 467 for piers and concrete footings and Size No. 67 for all other concrete. Maximum aggregate size in accordance with ACI 318.
3. Grading shall be in accordance with “Standard Method for Fine Analysis of Sieve and Coarse Aggregates” (ASTM C136).

F. Water: ASTM C94, Paragraph 4.1.3; potable, clean and free from oil, acid and injurious amount of vegetable matter, alkalies, and other impurities.

G. Admixtures:
1. Cement-dispersing, water-reducing types. Admixtures shall conform to ASTM C494, Type A or D, and shall be used strictly in accordance with manufacturer's recommendations and as determined by the Inspection and Testing Laboratory. Admixture shall not discolor concrete or in any way affect the appearance of the concrete.
   a. High-range water reducing admixture conforming to ASTM C494, Type F or G shall be used as required and shall be one (1) of the following or Architect approved equal:
      1) Eucon 37 (Type F), Eucon 537 (Type G) by The Euclid Chemical Company
      2) Rheobuild 1000 (Type F), Rheobuild 716 (Type G) by Master Builders
      3) Sikament 300 (Type F), Sikament 86 (Type G) by Sika Chemical Corp.
      4) WRDA-19 (Type F), Daracem 100 (Type G) by W.R. Grace
2. An air-entraining admixture conforming to ASTM C260 shall be used as required on the Drawings and shall be one (1) of the following or Architect approved equal:
   a. Air-Mix or AEA-92 by The Euclid Chemical Company
   b. Sika Aer by Sika Corporation
   c. MB-VR or MB-AE by Master Builders
3. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.
4. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Architect/Engineer.

H. Non-Shrink Cement Grout:
1. The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, “Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).” In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent bearing under a 4 foot x 4 foot base plate. Provide one (1) of the following or Architect approved equal:
   a. NS Grout by The Euclid Chemical Company
   b. Five Star Grout by U.S. Grout Corp.
   c. Horn Non-Corrosive Non-Shrink Grout by Tamms Industries
   d. Duragrout by L & M Construction Chemicals, Inc.
   e. Masterflow 713 by Master Builders
   f. SikaGrout 212 by Sika Corp.
   g. Sonogrout 10K by Sonneborn
   h. 588 Grout by W. R. Meadows, Inc.
   i. US SPEC GP Grout by US Mix Products Company
2. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout shall conform to ASTM C1107, “Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-Shrink).” In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent bearing under a 18 inch x 36 inch base plate. Provide one (1) of the following or Architect approved equal:
   a. Hi-Flow Grout by The Euclid Chemical Company
   b. Crystex by L & M Construction Chemicals, Inc.
   c. Masterflow 928 by Master Builders

d. CG-86 Grout by W. R. Meadows, Inc.
e. US SPEC MP Grout by US Mix Products Company

I. Evaporation Retardant:
1. Evaporation Retardant shall be a thin, continuous film which prevents rapid moisture loss from the concrete surface. For use when concrete operations must be performed in direct sun, wind, high temperatures, or for relative humidity. Products: Subject to compliance with requirements, provide one (1) of the following or Architect approved equal:
a. Eucobar by The Euclid Chemical Company
b. Confilm by Master Builders
c. Evapre by W. R. Meadows, Inc.
d. US SPEC Monofilm ER by US Mix Products Company.
e. E-Con by L& M Construction Chemicals

K Sealer/Densifier: Provide “Euco Diamond Hard” by The Euclid Chemical Company, “Sealhard” by L&M Construction Chemicals, or equal by Master Builders, Sika Corp., Sonneborn, US SPEC, or Architect approved equal.

L. Chemical Hardener/Dustproofer: Provide “Surfhard” by The Euclid Chemical Company, “Chemhard” by L&M Construction Chemicals, or equal by Master Builders, Sika Corp., Sonneborn, US SPEC, or Architect approved equal.

M. Curing Compound: dissipating resin type, which chemically breaks down after approximately eight (8) weeks. Membrane forming compound shall meet ASTM C309, Types 1 and 1D Class B, water based, VOC/AIM Compliant. Provide “Kurez DR VOX” by The Euclid Chemical Company, “Cure R” by L&M Construction Chemicals, “1100 Clear” by W. R. Meadows, Inc., US SPEC “Maxcure Resin Clear” by US Mix Products Company, or equal by Master Builders, Sika Corp., BASF, or Architect approved equal.

N. Curing and Sealing Compound: high solids acrylic copolymer emulsion blend. Membrane forming compound shall meet ASTM C1315, Type 1 Class B. Provide “Super Rez-Seal” by The Euclid Chemical Company, “Dress & Seal” by L&M Construction Chemicals, “VOCOMP 25 1315” by W. R. Meadows, Inc., US SPEC “CS-25-1315” by US Mix Products Company, or equal by Master Builders, Sika Corp., BASF, or Architect approved equal.

O. Epoxy Adhesive: ASTM C881, two (2) component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. Provide one (1) of the following or Architect approved equal:
a. Euco #452 Epoxy System or Euco #620 Epoxy System by The Euclid Chemical Company
b. Sikadur Hi-Mod by Sika Corp.
c. Rezi-Weld 1000 by W. R. Meadows, Inc.
d. US SPEC Maxibond 2500 by US Mix Products Company.
e. Epobond by L& M Construction Chemicals.

P. Underslab Vapor Retarders and Barriers:
1. Vapor Retarder Membrane:
a. Requirements:
1) Class: ASTM E1745, Class A.
2) Water Vapor Permeance: ASTM E96, 0.01 perms maximum.
3) Tensile Strength: ASTM E154 (Section 9, Average), 45.0 pounds per inch, minimum.

4) Puncture Resistance: ASTM D1709 (Method B), 2300 grams, minimum.

b. Provide compatible seam taping and pipe boots or sealing mastic in accordance with manufacturer's requirements.

c. Provide proof of compliance to Architect at time of delivery of materials.

d. Provide one (1) of the following under entire slab, unless noted otherwise:

1) Fortifiber Building Products "Moistop Ultra A"
2) Reef Industries, Inc. "Griffolyn T-85
3) Stego Industries, LLC "Stego-Wrap 10-mil"

2. Vapor Barrier: Under Wood Floors at Gymnasiums, Stages, and Dance Floors, and at Auditorium Areas Below Finish Floor Level: Premoulded Membrane Vapor Seal with Plasmatic Core manufactured by W.R. Meadows, Inc., Hempshire, IL; or Architect approved equal.

3. Below Grade Waterproofing: Provide below grade waterproofing at vertical walls below grade and beneath elevator pit in accordance with Section 07140.

Q. Miscellaneous Structural Metals Associated with Structural Concrete:

1. Structural steel pieces, including miscellaneous structural metals placed in concrete, exposed to weather, in permanent contact with soil, or accessible to salt intrusion shall be hot dipped galvanized in accordance with ASTM A123.
2. Structural steel pieces embedded in concrete shall conform to ASTM A36, unless noted otherwise on the Drawings.
3. Welding of inserts, anchors and other steel pieces used in conjunction with structural concrete shall conform to AWS Dl.4.
4. Welding of reinforcing steel used in conjunction with structural concrete shall conform to AWS Dl.4.
5. Headed stud anchors shall conform to ASTM A108, minimum tensile strength 60,000 PSI.
6. Concrete expansion anchors shall be wedge-type anchors, meeting the requirements of FS FF-S-325, Group 11, Type 4, Class 1, plated in accordance with FS QQ-Z-325C, Type 11, Class 3. Size and location shall be as indicated on the Drawings. Products shall be by Hilti Corp., Powers Fasteners, Inc. or Architect approved equal.

R. Miscellaneous Materials and Accessories:

1. Form ties: Adjustable length and type which will not leave holes larger than 1 inch in diameter in face of concrete. Ties shall be such that when forms are removed, no metal will be within 1 inch of the finished concrete surface. The holes must be patched.
2. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages, Fasteners: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
3. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.
4. Chairs and Spacers: Heavy-duty plastic-type sized to support all reinforcing steel to proper height. Use type with sand cushion pads where concrete is on grade. Provide chairs and spacers Series "B" by W.H.C. Products, Inc., E-Z Chair by Aztec Concrete Accessories, Inc., GTI Bar Chair by General Technologies, Inc., or Architect approved equal.
5. Waterstops:
   a. Ribbed flat 3/16 inch by six (6) inch with 1/8 inch ribs, rated for 75 foot of head pressure. Provide factory made corner fittings weld splices with thermostatically controlled heating iron. Style No. 782 by Greenstreak, Inc., or Architect approved equal.

b. Contractor's Material Option: Specially formulated preformed joint sealant that provides a lasting,, watertight bond to both fresh and cured concrete surfaces. Synko-Flex Preformed Plastic Adhesive Waterstop and Synko-Flex Primer manufactured by Synko-Flex Products, Division of Henry Company, Houston, Texas; (713) 671-9502 or Architect approved equal.

6. Carton Void Forms: If shown or required, shall be wax impregnated cardboard trapezoidal shape, with 1/8 inch thick tempered hardboard for top plane when requested by Architect.
7. Corners: Chamfer, wood strip type; one (1) inch x one (1) inch size; maximum possible lengths.
8. Dovetail Anchor Slot: Galvanized steel, 22 gauge thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
9. Flashing Reglets: Galvanized steel, 22 gauge thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
10. Bonding Agent: Acrylic latex emulsion type as recommended for bonding new concrete to old concrete.
11. Integral Color Pigment (If shown or required): Mineral oxide, lightfast, lime-proof, water-resistant type conforming to ASTM C979. Color(s) shall be as selected by Architect from manufacturer's standard color line. Provide one (1) of the following or Architect approved equal:
    a. ChemSystems, Inc.
    b. Davis Colors
    c. New Riverside Ochre Co., Inc.
    d. L.M. Scofield Company
12. Color Stain (If shown or required): A chemically reactive stain, designed for adding variegated color to new or old concrete. Color(s) shall be as selected by Architect from manufacturer's standard color line. Provide Lithochrome Chemstain by L.M. Scofield Company or Architect approved equal.
13. Joint Sealants: Refer to Section 07900, Building Sealants

2.3 CONCRETE MIXES

A. Strength: Concrete is classified and specified by ultimate compressive strength (f c) at the age of 28 days. Unless indicated otherwise on the Drawings, strengths shall be as follows:
   1. All concrete including grade beams, footings, slabs, and pads: 5 sack/3,000 psi/28 days.
   2. Strength recommendations on Structural Drawings supersede when they are greater than specified here.

B. Interior slabs subjected to vehicular traffic: This concrete shall have a maximum W/cm of 0.48 and maximum air content of 3 percent. No air-entraining admixture shall be added to this mix.

C. Concrete permanently exposed to freezing and thawing shall contain an air-entraining admixture to produce 4.5 percent - 7.5 percent of air by volume of concrete.

D. Proportions: Proportions of cement, aggregate, admixture and water to attain required plasticity and compressive strength shall be in accordance with ACI 318, Section 5.3, Proportioning on the basis of field experience and/or trial mixtures. Do not make changes in proportions without submitting proposed changes to Inspection and Testing Laboratory for evaluation.

1. Trial mixtures having proportions and consistencies suitable for the work shall be made based on ACI 211. 1, using at least three (3) different water-cement ratios which will produce a range of strengths encompassing those required for this project.
2. Trial mixes shall be designed to produce a slump within 3/4 inch of the maximum permitted, and for air-entrained concrete, within 0.5 percent of maximum allowable air content. The temperature of concrete used in trial batches shall not exceed the maximum temperature specified.
3. For each water-cement ratio, at least three confirmation compression test cylinders for each test age shall be made and cured in accordance with ASTM C192. Confirmation cylinders shall be tested at seven (7) and 28 days in accordance with ASTM C39.
4. From the results of the 28 day confirmation tests, a curve shall be plotted showing the relationship between the water-cement ratio and compressive strengths. From this curve, the water-cement ratio to be used in the concrete shall be selected to produce the average strength required.
5. The cement content and mixture proportions to be used shall be such that this water-cement ratio is not exceeded when slump is the maximum permitted. Control in the field shall be based upon maintenance of proper cement, water content, slump and air content.
6. Mix designs furnished by the concrete supplier, shall be based on the standard deviation analysis of previous test records meeting the requirements of Section 5.3.1 - Standard deviation of ACI 318. These mixes will be accepted in lieu of trial mixtures described in paragraphs above.
    a. Temperature of concrete in test data shall be within 5 degrees F of maximum temperature specified for this project.
    b. Strengths indicated in test data shall be in accordance with ACI 318, Section 5.3.
    c. The specified strength of concrete used in supporting test data shall vary no more than 500 PSI plus or minus from that specified for this project.
    d. The Testing Laboratory shall keep a strength and standard deviation record of all concrete for the duration of the project as specified in this section.

PART 3 - EXECUTION

3.1 GENERAL

A. Inserts: Give the various trades and subcontractors ample notification and opportunity to furnish all anchors, nailers, pipes, conduits, boxes, inserts, thimbles, sleeves, frame vents, wires, supports, or other items required to be built into the concrete by the provisions of the Drawings or of the Specification governing the work of such trades and subcontractors, or as it may be necessary for the proper execution of their work. Obtain suitable templates or instructions for the installation of such items which are required to be placed in the forms.

B. Install under-slab vapor retarder as instructed by manufacturer in accordance with ASTM E1643. Penetrations shall be sealed to maintain integrity of barrier. Tape around all openings and seal all penetrations as instructed by the barrier manufacturer. Grade stakes shall not be driven through the vapor barrier. Avoid punctures during reinforcement and concrete placement.

C. Slump:

1. Concrete not containing a high range water reducing admixture shall not be placed when its plasticity, as measured by slump test, is outside the following limits:
   a. Footings: 6 inches maximum, 4 inches minimum
   b. All other Structural Concrete: 5 inches maximum, 3 inches minimum
   c. Pavement: 4 inches maximum. Coordinate slump with requirements in Section 02520, Concrete Paving.
   d. Slump drop not to exceed 2 inches when pumped.
2. Concrete containing a high range water reducing admixture shall not be placed when its plasticity, as measured by slump test, is outside the following limits:
   a. Prior to addition high range water reducer: 3 inches maximum, 2 inches minimum.
   b. After addition of high range water reducer: 9 inches maximum.

D. Classes of Concrete and Usage: Concrete of the several classes of concrete required shall have the characteristics shown on the Drawings.

E. Mixing:
1. Transit-mixed concrete conforming to the requirements of ASTM C94 and ACI 304 shall be used in lieu of concrete mixed at the job site. Concrete shall not be transported or used in any case after a period in excess of 90 minutes has elapsed after the introduction of water into the mixer.
2. Indiscriminate addition of water to increase slump of concrete is prohibited. Add water only at the direction of the Testing Laboratory. No water shall be added which increases the water cement ratio of the concrete in excess of the water cement ratio indicated on the approved mix design. At the direction of the Inspection and Testing Laboratory the addition of a high range water reducing admixture may be used to retemper concrete.
3. The agency supplying transit-mixed concrete shall have a plant of sufficient capacity and adequate transportation facilities, to assure continuous delivery at the rate required. The frequency of deliveries to the site of the work must be such as to provide for placing the concrete continuously throughout any one (1) pour.

F. Conveying Concrete: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of the ingredients. Concrete to be conveyed by pumping shall be submitted to the Inspection and Testing Laboratory for evaluation for each class of concrete specified before being used. Test cylinders for pumped concrete shall be taken at the discharge end of the pumping equipment.

G. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to assure a practically continuous flow of concrete at the delivery end without separation of the materials. The use of gravity-flow or aluminum chutes or conveyors for transporting concrete horizontally will not be permitted.

H. Miscellaneous Materials and Accessories: if not specifically noted, install all materials and accessories per manufacturer's instructions as if noted here in full.

I. Extend underslab vapor barrier continuously under entire slab, slab turn downs, vertical face of grade beams and footings to completely protect concrete adjacent to earth. Overlap joints and install seam tape and pipe boots, and seal penetrations as instructed by manufacturer.

J. Bars shall be supported on chairs or spacers on metal hangers, accurately placed and securely fastened to steel reinforcement in place. No wood or clay brick will be permitted inside forms.

K. All reinforcing shall be set in place, spaced, and rigidly and securely tied or wired at all splices and at all crossing points and intersections.

L. Minimum center to center distance between parallel bars shall be in accordance with the details on the drawings. Where not shown, the clear spacing shall be 1-1/2 times the bar diameter but never less than 1-1/2 inches.

M. Lap of splices where shown and noted on the drawings shall be a minimum of 32 bar diameters but never less than 12 inches.

N. Except where shown on the drawings, minimum concrete coverage for reinforcing steel shall be:

1) 3 inches…where concrete is placed against earth
2) 1-1/2 inches…over column ties
3) 1-1/2 inches…for #5 and smaller bars in formed walls
4) 2 inches…for all bars larger than #5 in formed walls
5) 1 inch…for #11 and smaller bars in suspended slabs
6) 1-1/2 inches…for all bars larger than #11 in suspended slabs

3.2 CONCRETE CONTROL AND TESTING

A. Inspection and Testing laboratory services shall be in accordance with Section 01115, Inspection and Testing Laboratory Services.

B. Except as noted below, all inspection and testing related to concrete placement, including reinforcing and embedded items, shall be the responsibility of the Owner. The Owner will directly engage the services of a qualified Testing and Inspection Laboratory, however, the Contractor shall provide access to the Owner’s consultant, and, if required, the Contractor shall provide patching and repairing of surfaces removed to facilitate testing and inspection.

C. Should the strength of concrete fall below the minimum, then additional tests, including load tests, may be required. These tests, if required, shall be made at the Contractor's expense and shall be in accordance with ASTM C42 and ACI 318. If tests do not meet the applicable requirements, then the structure, or any part of the structure, shall be removed and replaced at the Contractor's expense.

D. Any concrete testing requested by the Contractor for early formwork or shoring removal, etc., shall be at the Contractor's expense.

E. Do not permit placement of concrete having a measured slump outside limits given on Drawings or Specifications, except when approved by Architect/Engineer.

3.3 PLACING CONCRETE

A. Place concrete in reasonably uniform layers, approximately horizontal, and not more than 18 inches deep, exercising care to avoid vertical joints or inclined planes. The piling up of concrete in the forms in such a manner as to cause the separation or loss of any of its ingredients will not be permitted. Concrete which has partially set or hardened shall not, under any circumstances, be deposited in the work. All slabs shall be placed for full

thickness in one operation without change in proportions, screeded to proper elevation, and floated. Dusting of surfaces with cement is prohibited.

B. Place concrete in the forms as nearly in its final position as is practical to avoid rehandling. Exercise special care to prevent splashing the forms or reinforcement with concrete. Remove any hardened or partially hardened concrete which has accumulated on the forms or reinforcement before the work proceeds. Do not place concrete on previously deposited concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the respective member of section, except as hereinafter specified.

C. Do not permit concrete to drop freely any distance greater than five (5) feet. Where longer drops are necessary, use a chute, tremie, or other acceptable conveyance to assist the concrete into place without separation. Do not pour directly into any excavations where water is standing.

D. Vibration: As soon as concrete is deposited, thoroughly agitate same by means of mechanical vibrators and suitable hand tools, so manipulated as to work the mixture well into all parts and corners of the forms, and entirely around the reinforcement and inserts. Mechanical vibrators shall maintain frequencies in accordance with the recommendations of ACI 309. Table 5.1.4, and shall be operated by competent workmen. Over vibrating and use of vibrators to transport concrete within forms shall not be allowed. A spare vibrator shall be kept on the job site during all concrete placing operations.

E. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, the surface of the latter shall be thoroughly roughened and cleaned of all foreign matter, scum and laitance. The specified or an Architect approved bonding agent or epoxy adhesive shall be used.

F. Construction Joints: Except as otherwise specifically indicated on the Drawings, each concrete member shall be considered as a single unit of operation, and all concrete for the same shall be placed continuously in order that such unit will be monolithic in construction. Should construction joints prove to be absolutely unavoidable, same shall be located at or near the midpoints of spans. Additional construction joints shall not be made under any circumstances without prior review by the Architect.

G. Protect all freshly placed concrete from washing by rain, flowing water, etc. Do not allow the concrete to dry out from the time it is deposited in the forms until the expiration of the curing period.

H. Imperfect or damaged work, or any material damaged or determined to be defective before final completion and acceptance of the entire job, shall be satisfactorily replaced at the Contractor's expense and shall be in conformity with all of the requirements of the Contract Documents. Removal and replacement of concrete work shall be done in such a manner as not to impair the appearance or strength of the structure in any way.

I. Cleaning: Upon completion of the work, all forms, equipment, protective coverings and any rubbish resulting therefrom shall be removed from the premises. Finished concrete surfaces shall be left in clean and perfect condition, satisfactory to the Owner. Sweep with an ordinary broom and remove all mortar, concrete droppings, loose dirt, mud, etc.

3.4 FLOOR AND SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

1. After placing slabs, surface shall be leveled to an F_F 15 - F_L 13 tolerance. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an F_F 20 - F_L 17 tolerance.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final troweling operation, free of trowel marks, uniform in texture and appearance and to a F_F35/ F_L30 tolerance (F_L17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.

D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application. A sample panel is required.

E. Liquid Densifier/Sealer: Apply liquid densifier/sealer on exposed interior floors subject to vehicular abrasion and as indicated on the Drawings. Compound shall be mechanically scrubbed into the surface in strict accordance with the directions of the manufacturer and just prior to completion of construction.

3.5 NON-SHRINK GROUT

A. Refer to Structural Drawings for column base plates and other structural grouting requirements.

B. Non-shrink grout shall be mixed only in such quantities as are needed for immediate use. No retempering shall be permitted and materials which have been mixed for a period exceeding 30 minutes shall in no case be used upon any portion of the work.

C. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than ten (10) square feet.

D. For every 1/3 cubic yards of grout placed, grout strength shall be tested with a set of cubes as follows:

1. A set of cubes shall consist of three cubes to be tested seven (7) days, and three (3) cubes to be tested at 28 days.
2. Test cubes shall be made and tested in accordance with ASTM C1107, Section 12.5, with the exception that the grout should be restrained from expansion by a top plate.

3.6 CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. All concrete shall be kept continuously moist and above 50 degrees F for seven days. When high early strength concrete is used this temperature requirement may be lowered to three (3) days.

B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
1. Provide specified curing compound to exposed interior slabs. This curing compound must be dissipating or easily removed in the cleaning process prior to the application of any liquid densifier/ sealer.

3.7 DEFECTIVE WORK

A. Imperfect or damaged work, or any material damaged or determined to be defective before final completion and acceptance of the entire job, shall be satisfactorily replaced at the Contractor's expense and shall be in conformity with all of the requirements of the Contract Documents. Removal and replacement of concrete work shall be done in such a manner as not to impair the appearance or strength of the structure in any way.

3.8 CLEANING

A. Upon completion of the work, all forms, equipment, protective coverings and any rubbish resulting therefrom, shall be removed from the premises. Finished concrete surfaces shall be left in clean and perfect condition, satisfactory to the Owner. Sweep with an ordinary broom and remove all mortar, concrete droppings, loose dirt, mud, etc.

3.9 REPAIR OF DEFECTIVE AREAS

A. With prior approval of the Architect/Engineer, as to method and procedure, all repairs of defective areas shall conform to ACI 301, Section 5.3.7, using the polymer repair mortars and/or epoxy adhesives furnished by The Euclid Chemical Company, Sika Chemical Corp., or Architect approved equal.

3.10 FIELD QUALITY CONTROL AND TESTING

A. Inspection and Testing Laboratory services shall be in accordance with Section 01115, Inspection and Testing Laboratory Services.

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

A. ACI 301 – Specifications for Structural Code for Buildings; American Concrete Institute International; 2005.

B. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007)

C. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

D. ASTM C 171 – Standard Specification for Sheet Materials for Curing Concrete; 2007.

E. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.

1.4 SUBMITTALS

A. See Section 01 33 00 – Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on curing compounds and moisture-retaining sheet, including compatibility of different products and limitations.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302 1R.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver curing materials in manufacturer’s sealed packaging, including application instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Membrane Curing Compound: ASTM C 309 Type 1 – Clear or translucent, Class A

B. Moisture-Retaining Sheet: ASTM C 171.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION-HORIZONTAL SURFACES

A. Cure floor surfaces in accordance with ACI 308R.

3.3 EXECUTION-VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308R.

3.4 PROTECTION

A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 05 11

MASONRY MORTARING AND GROUTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 – Unit Masonry: Installation of mortar and grout

B. Section 04 27 31 – Reinforced Unit Masonry: Installation of mortar and grout.

C. Section 04 72 00 – Cast Stone Masonry: Installation of mortar.

1.3 REFERENCE STANDARDS

A. ASTM C 91 – Standard Specification for Masonry Cement; 2005.

B. ASTM C 94/C 94M – Standard Specification for Ready-Mixed Concrete; 2007.

C. ASTM C 144 – Standard Specification for Aggregate for Masonry Mortar; 2004.

D. ASTM C 270 – Standard Specification for Mortar for Unit Masonry; 2007a.

E. ASTM C 404 – Standard Specification for Aggregates for Masonry Grout; 2007.

F. ASTM C 476 – Standard Specification for Grout for Masonry; 2008.

G. ASTM C 780 – Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2008a.

H. ASTM C 979 – Standard Specification for Pigments for Integrally Colored Concrete; 2005.

I. ASTM C 1019 – Standard Test Method for Sampling and Testing Grout; 2008.

J. ASTM C 1072 – Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2006.

K. ASTM C 1314 – Standard Test Method for Compressive Strength of Masonry Prisms; 2007.

L. ASTM E 518 – Standard Test Methods for Flexural Bond Strength of Masonry; 2003.

M. IMIAWC (HW) – Recommended Practices and Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

1.4 SUBMITTALS

A. See Section 01 33 00 – Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

1.6 FIELD CONDITIONS

A. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).
B. Hot Weather Requirements: Comply with IMIAWC (HW).

PART 2 PRODUCTS

2.1 MATERIALS

A. Masonry Cement: ASTM C 91, types as scheduled in this section.
   1. Colored mortar: Premixed cement as selected by architects.

B. Mortar Aggregate: ASTM C 144.

C. Grout Aggregate: ASTM C 404.

D. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C 979.
   1. Color(s): As selected by architect from manufacturer's full range

E. Water: Clean and potable

2.2 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C 270, Property Specification.
   1. Exterior, loadbearing masonry: Type S.
   2. Exterior, non-loadbearing masonry: Type S.
   3. Interior, loadbearing masonry: Type S.
   4. Interior, non-loadbearing masonry: Type N.
   5. Glass unit masonry: Type S.

B. Colored Mortar: Proportion selected pigments and other ingredients as selected by the architects, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.3 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.
B. Maintain sand uniformly damp immediately before the mixing process.
C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
D. Do not use anti-freeze compounds to lower the freezing point of mortar.
E. If water is lost by evaporation, re-temper only within two hours of mixing.

F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.4 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.5 GROUT MIXING

A. Mix grout in accordance with ASTM C 94/C 94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476 for fine and coarse grout.

2.6 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 40 00.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C 780 recommendations for preconstruction testing.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

C. Grout Mixes: Test grout batches in accordance with ASTM C 1019 procedures
   1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

PART 3 EXECUTION

3.1 PREPARATION

A. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.2 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 48 inches without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.3 GROUTING

A. Perform grouting by means of high-lift technique, except in locations that mandate use of low-lift grouting technique.

B. Low-Lift Grouting:
   2. Limit height of pours to 12 inches
   3. Limit height of masonry to 16 inches above each pour.
   4. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   5. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

C. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
   2. Hollow Masonry: Limit lifts to maximum 8 feet and pours to maximum height of 8 feet.
   3. Place grout for spanning elements in single, continuous pour.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 40 00.

B. Test and evaluate mortar in accordance with ASTM C 780 procedures.
   1, Test with same frequency as specified for masonry units.

C. Test and evaluate grout in accordance with ASTM C 1019 procedures.
   1, Test with same frequency as specified for masonry units

D. Prism Test: Test masonry and mortar panels for compressive strength in accordance with ASTM C 1314, and for flexural bond strength in accordance with ASTM C 1072 or ASTM E 518; perform tests and evaluate results as specified in individual masonry sections.

END OF SECTION

SECTION 04 05 23
MASONRY CAVITY DRAINAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Masonry cavity wall drainage systems.

B. Masonry wall weep vents.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 05 11 - Masonry Mortaring and Grouting.

C. Section 04 20 00 - Unit Masonry.

D. Section 07 27 26 - Fluid-Applied Membrane Air Barriers.

E. Section 07 65 00 - Flexible Flashing.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.

C. Selection Samples: For Cell Vents specified, two complete sets of product representing manufacturer's full range of available colors.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years experience with similar masonry installations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect products from exposure to direct sunlight.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Mortar Net USA Limited, which is located at: 326 Melton Rd. ; Burns Harbor, IN 46304; Toll Free Tel: 800-664-6638; Phone: 219-787-5080; Fax: 219-787-5088; Email: leads@mortarnet.com Web: www.mortarnet.com

B. Heckmann Building Products Inc., 1501 N. 31st Avenue, Melrose Park, IL 60160 - 800-621-4140 or 708-865-2403 FAX: 708-865-2640

   Email:info@heckmannanchors.com

   Website: www.heckmannanchors.com

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 MATERIALS

A. Mortar Collection Device: Mortar Net as manufactured by Mortar Net USA, Ltd., 90 percent open weave mesh, dovetail configuration with continuous bottom strip.
   1. Material and Thickness: Recycled polyester; (one layer) - 2 inches (51 mm) thick.

B. Weep Hole Vent: No. 85; rectangular polypropylene vertical joint vent. Regular: 3/8 inch wide x 2-1/2 inches high x 3-3/8 inches long. Heckmann Products Inc.: www.heckmannanchors.com.
   1. Color: Match mortar color with selection from manufacturer's standard colors.

C. Weepholes: No. 330; clear plastic tube, ¼ inch (6 mm) inside diameter, 5 inches (100 mm) long. Heckmann Products Inc.: www.heckmananchors.com.
   1. Color: Match mortar color with selection from manufacturer's standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Brick Cavity Wall Drainage System: Mortar Net as manufactured by Mortar Net USA, Ltd. Install in strict accordance with manufacturer's instructions and as follows:
   1. Verify installation of flashing and completion of first two courses of masonry.
   2. Extend flashing from the bottom of the Mortar Net to at least 6 inches (152 mm) above the top of the House Net to prevent mortar bridging between the outer wythe and inner wall.
   3. Remove mortar droppings and debris from flashing and weep holes.
   4. Install in cavity directly on flashing, with dovetail profile facing upward. Butt ends together. Compress slightly if necessary.

B. Cell Vents: Install in strict accordance with manufacturer's instructions and as follows:
   1. Clean flashing and weep holes free of mortar droppings and debris.
   2. Align exterior face of insert with exterior plane of mortar.
   3. For head joints taller than height of mesh insert, coordinate installation of mortar above insert to prevent clogging.
   4. Fill head joint with 1/8 inch (3 mm) recess from face of masonry.

3.03 PROTECTION

A. Protect installed products from damage until completion of project.

B. Repair or replace damaged products before covering with construction.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY (CMU BLOCK)

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete masonry units (CMU)

B. Mortar, grout, reinforcement, anchorages, flashing, and accessories shown, specified, or required to complete Work.

1.2 RELATED WORK

A. Section 01 45 23 - Testing and Inspecting Services

B. Section 05 50 0 - Miscellaneous Metals: Steel masonry lintels.

C. All Sections of Work built-in, adjacent to, or applied to unit masonry work.

1.3 REFERENCES

A. ASTM International (ASTM)
1. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron & Steel Hardware
2. A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
3. A615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
4. A706, Standard Specification for Low-Alloy Steel Deformed Bars for Concrete
5. C90, Standard Specification for Loadbearing Concrete Masonry Units
6. C140, Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units
7. C144, Standard Specification for Aggregate for Masonry Mortar
8. C150, Standard Specification for Portland Cement
9. C207, Standard Specification for Hydrated Lime for Masonry Purposes
10. C270, Standard Specification for Mortar for Unit Masonry
11. C332, Standard Specification for Lightweight Aggregates for Insulating Concrete
12. C404, Standard Specification for Aggregates for Masonry Grout
13. C476, Standard Specification for Grout for Masonry
14. C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
15. C780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
16. C979, Standard Specification for Pigments for Integrally Colored Concrete
17. D226, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
18. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
19. E119, Standard Test Methods for Fire Tests of Building Construction and Materials

B. Underwriters' Laboratories, Inc. (UL)

1.4 QUALITY ASSURANCE

A. Where requirements of this Section are in conflict with requirements noted on the Structural Drawings, the Structural Drawings shall take precedence. Refer to Structural Drawings for information on load-bearing CMU walls.

B. Fire Performance Characteristics: Where indicated or required, provide materials and construction, which are identical to assemblies whose fire endurance has been determined by testing in compliance with ASTM E119 by U.L. or other recognized testing and inspection organization or by other means, acceptable to authority having jurisdiction.

C. Single Source Responsibility:
1. For Masonry Units: Obtain masonry units of uniform texture and color, or a uniform blend within the accepted ranges for those characteristics, from one (1) manufacturer for each different product required for each continuous surface or visually related surfaces.
2. For Mortar and Grout Materials: Brands of cementitious materials and admixtures, and the source of supply of sand and aggregates shall remain the same throughout the Work where exposed to view and where not scheduled to receive a subsequently applied finish, i.e. parging, painting, etc., unless directed otherwise in writing by the Architect.
3. Contractor's Responsibility: Contractor performing Work of this Section shall be responsible for coordinating with others performing work which is built-in or adjacent to unit masonry work.

1.5 SUBMITTALS

A. Product Data: Submit schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, and accessories.

B. Samples: Two (2) sets of color chips representing manufacturer's full range of available colors and textures of each exposed face veneer or block for Architect's selection and approval.

C. Sample Panel(s):
1. Do not start masonry until Architect has approved samples.
2. Sample panel shall be 4 feet long by 4 feet high showing selected color range and texture, bonding, joint shape, and quality of workmanship. Include an expansion joint, and any specialty details, such as reveals, soldier courses, etc. Include mock-up of installation of thru-wall flashing at foundation sill and lintel above openings.
3. A separate panel for each type of masonry used is required.
4. Sample panel(s) shall remain at the jobsite until all masonry is completed.
5. Installed materials shall be visible and integrated into adjacent materials.

D. Certification: Submit manufacturer's affidavit that materials used in Project contain no asbestos.

E. Mortar and Grout Mix Designs: Submit two (2) copies of proposed mortar and grout mix designs to Owner's testing laboratory.

1.6 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 – Project Coordination

1.7 TESTS AND INSPECTIONS

A. Materials and installation of masonry shall be subject to testing and inspection by an independent testing laboratory. Such tests and inspections shall not relieve Contractor of responsibilities for providing materials and procedures which comply with Contract Documents. Promptly remove and replace materials which do not comply.

B. Owner will select Inspection and Testing Laboratory and will pay for all Work required by Inspection and Testing Laboratory.

1.8 DELIVERY, STORAGE AND PROTECTION

A. Deliver and store materials in dry protected areas off ground. Keep free of stain or other damage before, during and after installation. Replace any damaged material at no cost to Owner.

B. During freezing weather, protect masonry units with tarpaulins or other suitable material. Keep free of stain or other damage before, during and after installation. Replace damaged material at no cost to Owner.

C. Protect reinforcement and accessories from elements.

1.9 SITE CONDITIONS

A. Cold Weather Protection:
1. No masonry shall be laid when the temperature of the outside air is below 40 degrees F, unless protection measures are employed and pre-approved by the Architect.
2. Protection measures for cold weather erection include maintaining space and masonry unit temperatures of at least 40 degrees F for 48 hours prior to and after erection.

B. Hot Weather Protection:
1. When the mean daily temperature exceeds 100 degrees F or exceeds 90 degrees F with a wind velocity greater than 8 mph, fog spray all newly constructed masonry until damp, at least three (3) times a day until the masonry is three (3) days old.

1.10 BRACING OF MASONRY DURING ERECTION

A. All masonry shall be adequately braced at all times during erection.

1.11 COORDINATION

A. Openings and chases for heating, plumbing, electrical ducts, pipes, and conduits shall be built into masonry walls as required. Provide for installation of bolts, toggles, flashings, beams, anchors, hangers, nailing strips, wall plugs, and frames as required. Consult other trades in advance and make provisions for installation of their work to avoid cutting and patching. Coordinate installation of steel reinforcement for reinforced masonry. Coordinate placement of concrete in masonry beams, lintels, soffits, and pilasters.

B. Contractor performing Work of this Section shall be responsible for and coordinate with work of Section 07160, Dampproofing Above Grade and all Sections of Work built-in, adjacent to, or applied to unit masonry work.

1.12 WARRANTY

A. Warrant the Work specified herein for one (1) year against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials and workmanship.

B. Defects shall include, but not be limited to, the following:
1. Noticeable deterioration of unit or mortar finish.
2. Chalking or dusting excessively.
3. Changing color in irregular fashion.
4. Cracking or spalling.
5. Releasing from substrate.
6. Staining or discoloring, including efflorescence.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Specifications are based on products of manufacturers named within the specifications. Other manufacturers must have a minimum of five (5) years experience manufacturing products equal to those specified and comply with requirements of Division 1 regarding substitutions to be considered.

2.2 MATERIALS

A. Concrete Masonry Units (CMU/Block):
1. Type/Sizes:
   a. Concealed cavity block and interior block, unless otherwise noted: Regular smooth face units with 8 inch x 16 inch face dimensions as shown on drawings or required, 4 inch, 6 inch, and 8 inch depths as indicated on drawings.
   b. Exterior exposed block: **[Regular smooth] [Split]** face units with 8 inch x 16 inch face dimensions as shown on drawings or required, 4 inch, 6 inch, and 8 inch depths as indicated on drawings.
2. Color: Shall be standard or as shown on the drawings.
3. Integral Water Repellant (In exterior exposed CMU): “Dry-Block Block Admixture” integral water repellant admixture as manufacturer by W.R. Grace & Co., or equal.
4. Specification: Comply with ASTM C90 (Class D-2 (2 hr.) and Class B-4 (4 hr.)) block at rated walls)
   a. Grade: Type N, highest standard for typical cavity block and interior use. Type S, for exterior exposed masonry walls.
   b. Aggregate: Lightweight
5. Curing: Rotary kiln process.
6. Provide bullnose units at all outside corners.
7. Provide bond beams, control joints, jambs, lintels (solid bottom), soaps, cap blocks, and fillers to match and compliment block units as shown or required.

B. Flashing and Accessories: Per Architectural Drawings and Specifications

D. Mortar:
1. Materials: (Unless stated otherwise on Structural Drawings)
   a. Portland Cement: ASTM C150, Type 1.
   b. Hydrated Lime: ASTM C207, TYPE “S”, typical. Use TYPE “N” for CMU veneer.
   c. Aggregate: Sand conforming to ASTM C144
   d. Water: Clean and potable
   e. Admixtures For Mortar:
      1) General: Do not use calcium chloride
      2) Concrete Masonry Units: Shall be standard color.
      3) Integral Water Repellant (In mortar of exterior exposed CMU): “Dry- Block Mortar Admixture” integral water repellant admixture as manufacturer by W.R. Grace & Co., or equal. Note: Water repellent block admixture and mortar admixture are not interchangeable.
2. Mix Design: (Proportions by volume) (Unless stated otherwise on Structural Drawings)
   a. Type: ASTM C270, Type “S”
   b. Proportions: 1 part cement, 1/2 part hydrated lime and 4-1/2 parts sand to provide a compressive strength of 1,800 psi in 28 days. Do not use calcium chloride.

E. Grout:
1. Materials: (Unless stated otherwise on Structural Drawings)
   a. Hydrated Lime: ASTM C207, TYPE “S”
   b. Portland Cement: ASTM C150, Type 1.
   c. Water: Clean and potable
   d. Aggregates:
      1) Course aggregate shall conform to ASTM C404.
      2) Fine aggregate shall conform to ASTM C144.
2. Mix Design: (Unless stated otherwise on Structural Drawings)
   a. Comply with ASTM C476 to provide a compressive strength of 3,000 psi in 28 days, unless noted otherwise. Do not use calcium chloride.
      1) Fine Grout: Fine grout conforming to ASTM C476 and consisting of 1 part Portland cement, 0 to 1/10 part lime and 2-1/4 to 3 parts sand by volume.
      2) Course Grout Mix: Course grout conforming to ASTM C476 and consisting of 1 part Portland cement, 0 to 1/10 part lime and 2-1/4 to 3 parts sand, and 1 to 2 parts course aggregate.

F. Reinforcement, Anchors and Tie Systems:
1. General: Reinforcement used in all wythes shall be galvanized after fabrication in accordance with ASTM A153, Class B-2.
2. Approved Manufacturers include the following:
   a. Dur-O-Wal
   b. Heckmann Building Products
   c. Hohmann & Barnard, Inc
   d. Wire-Bond
3. At solid multiple wythe masonry walls and single wythe masonry walls, (Interior partitions) use #9 gauge truss type reinforcing. Pre-fab corners and tees shall be used at all wall corners and intersections; width shall be two (2) inches less than nominal thickness of walls. Dur-O-Wal "Truss" at single wythe; "Trirod" at multiple, or Architect approved equal.

4. At Double Wythe Cavity Walls with Insulation Board: Use Hot-dipped galvanized, #9 gauge truss type with 3/16 inch adjustable pintle wall ties. Width of truss reinforcement shall be 2 inches less than the nominal thickness of wall. 3/16 inch wall tie double eye sections welded at 16 inches o.c. extended as required for insulation thickness. Pre fab corners and tees shall be used at all wall corners and intersections. Dur-O-Wal "Dur-O-Eye", or Architect approved equal.
5. At all Masonry Anchored to Steel Spandrel Beam and Columns: Hot-dipped galvanized, No. 315 Anchor and No. 316 Pintle Tie manufactured by Heckmann Building Products, Inc., or Architect approved equal. Anchors detailed on Structural Drawings supersede.
6. At all Veneer Block Anchored to Light Gauge Steel Framing: Hot-dipped galvanized, No. 75HE Pos-i-Tie System utilizing self-tapping screw for steel studs with 5/8 inch barrel length, and 4 inch triangle wire tie for 2 inch cavity manufactured by Heckmann Building Products, Inc., or Architect approved equal. Anchors detailed on structural drawings supersede. Attachment screws shall be corrosion resistant type as recommended by manufacturer to suit application. Adjust wire tie size as required to conform with cavity depth if other than 2 inch.
7. Control Joint Anchor: Equal to Heckmann Building Products, Inc. No. 352 Anchor.

G. Block Insulation: (As shown or required)
   1. Rigid Core Inserts:
      a. Type: "U" shaped insulation inserts conforming to ASTM C578, replacing Federal Specification (FS) HH-I-524C, Type I , specification for Preformed Cellular Polystyrene Thermal Insulation.
      b. Sizes: As required for 6 inch, 8 inch, 10 inch, and 12 inch blocks as shown or required.
      c. Approved Product/Manufacturer: Korfil Insulation Inserts manufactured by Concrete Block Insulating Systems (CBIS), West Brookfield, MA; (800) 628-8476, or Architect approved equivalent.
   2. Loose Core Fill: Loose perlite or vermiculite insulation conforming to ASTM C332, Standard Specification for Lightweight Aggregates for Lightweight Concrete, such as Zonolite manufactured by Siplast, Irving, TX; (800) 922-8800, or Architect approved equivalent. Loose fill insulation shall be certified asbestos-free.
   3. Foamed-In Place Block Insulation:
      a. Type: Two (2) component system consisting of amino-plast resin and a catalyst foaming agent surfactant.
      b. Features:
         1) Designed to completely fill irregular or hard-to-reach spaces.
         2) Can be installed in both new and existing concrete masonry unit construction.
         3) Excellent energy and sound insulation values.
         4) No settling or expansion after installation.
         5) Superior fire and safety performance.
         6) No CFC's or HFC's.
         7) Safe for the environment.
         8) Approved Products/Manufacturers: "Core-Fill 500" manufactured by Tailored Chemical Products, Inc., Hickory, NC; (828) 322-6512, Polymaster R-501 Foam Insulation manufactured by Polymaster of Houston, (713) 856-6318.or Architect approved equivalent.
   4. Sand Fill: Clean, dry sand of type recommended to suit application.

H. Miscellaneous Materials: (As shown or required)

1. Reinforcing Steel: ASTM A615, Grade 60.
2. Forms: Form grade plywood with wood studs and wales as required.
3. Shores: Patented shores of design and manufacture sufficient to safely support imposed loads.
4. Premolded Filler: Fibrous mastic strips containing 35 percent to 50 percent asphaltic impregnation, ASTM D1751.
5. Cleaner: "Deox" chemical cleaner manufactured by National Chemsearch, or "Sure Klean" manufactured by ProSoCo, Inc., or Architect approved equal.
6. Flashing Cement: "Nervaplast" cold setting mastic manufactured by Nervastral, Inc., or Architect approved equal.
7. Building Felt: No. 15 asphalt saturated felt, ASTM D226.
8. Control Joints: "Regular Rapid Control Joint" preformed gasket manufactured by Dur-O-Wal, Inc., or Architect approved equal.
9. Dovetail Anchors: 16 gauge galvanized dovetail corrugated masonry anchor, 1 inch x 3-1/2 inch manufactured by AA Wire Products Co., Heckman Building Products, Inc., Dur-O-Wal, Inc., Hohmann & Barnard, Inc., Masonry Reinforcing Corporation of America, or Architect approved equal.
10. Steel Shapes and Plates: As shown on drawings and specified in Section 05500, Miscellaneous Metals.
11. Headed Stud Anchor: Welded by full-fusion process as furnished by TRW Nelson Stud Welding Division, or Architect approved equal.
12. Bolts: ASTM A307. Furnish with carbon steel washers.
13. Deformed Bar Anchors: Welded by full-fusion process as furnished by TRW Nelson Stud Welding Division, or Architect approved equal.
14. Reinforcing Bars to be Welded: ASTM A706.
15. Cavity Drainage Protection: 2 inch thick by 10 inch high by 5 feet long recycled polyester/ polyethylene mesh, trapezoidal-shaped, continuous at foundation, at heads above openings, and shelf angles as indicated on drawings. Provide Mortar Net™ manufactured by Mortar Net USA, Ltd., Gary, IN; (800) 664-6638, or Architect approved equal.
16. Masonry Color: Iron oxide pigment conforming to ASTM C979 in color(s) selected by Architect, shall be inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, and free of fillers and extenders, as manufactured by ChemSystems, Inc., Davis Colors, Solomon Grind-Chem Service, Inc., or Architect approved equal.

2.3 MASONRY STRENGTH

A. Ultimate compressive strength of masonry as required by design and determined by prism tests shall not be less than 1,800 psi, unless stated otherwise in Structural Drawings.

PART 3 - EXECUTION

3.1 FORMS AND SHORES

A. Provide forms and shores sufficiently strong and rigid as required to support soffits, beams, and lintels during construction.

B. Build forms to conform to shape, line, and dimension of masonry members as detailed, substantial and sufficiently tight to prevent leakage of mortar, grout or concrete. Properly brace or tie together so as to maintain position and shape.

3.2 PREPARATION OF MATERIALS

A. Concrete Masonry Units:
   1. Where cutting is required, masonry shall be cut with a sharp masonry saw.
   2. Ensure concrete masonry units to receive sand fill are ready for filling and cutouts are protected from material spillage.

B. Mortar and Grout:
   1. Use suitable containers for material measurement. Measuring sand by the shovel is not acceptable.
   2. Thoroughly machine mix a minimum of five (5) minutes after all materials are in mixer.
   3. Consistency will completely fill all spaces intended to receive grout.
   4. Use within 2-1/2 hours of initial mixing.
   5. Mortar or grout shall not be used if curing has progressed to yield a stiff consistency.

C. Reinforcement:
   1. Reinforcement shall be free from loose rust and other coatings that would reduce the bond.
   2. Cut accurately to length and bend by such methods as will prevent injury to the material.
   3. Straighten out kinks or bends.

D. Membrane Flashing:
   1. Locations: Install in exterior walls to divert moisture within walls to exterior surfaces. Install flashing over heads of openings, under sills of openings, as cap flashing at exterior masonry, around perimeter of building as base flashing at all exterior cavity walls and other locations indicated on the drawings or required.
   2. Bed Joints: Coordinate work with Division 4, Masonry. Install flashings between two (2) thin layers of masonry mortar without increasing thickness of mortar joint. Keep outer edge of flashing material back from face of masonry.
   3. Adjacent Work: Protect work by masking, covering, or other precautionary methods. Remove protection when no longer necessary.

3.3 INSTALLATION

A. General:
   1. Do not use chipped or cracked concrete masonry units (CMU) where exposed to view.
   2. Use masonry saws to cut and fit exposed units.
   3. Exposed masonry at exterior corners shall be solid units.
   4. Clean surface of masonry smooth and free from projections which might puncture or otherwise damage flashing material.
   5. Place through-wall flashing as described below.
   6. Lay masonry units plumb, true to line, and with level courses accurately spaced within allowable tolerances.
   7. Do not furrow bed joints.
   8. Stop off horizontal run by racking back in each course; toothing is not permitted.
   9. Adjust units to final position while mortar is soft and plastic.
   10. If units are displaced after mortar has stiffened, remove, clean joints and units and re-lay with fresh motor.
   11. When joining fresh masonry to set or partially set masonry:
      a. Remove loose masonry units and mortar
      b. Clean and lightly wet exposed surface of set masonry prior to laying fresh mortar.

B. Metal Door Frames: Fill jamb frames solid with mortar. Build in anchors.

C. Lintels and Bond Beams: Provide reinforced unit type, except where steel lintels are shown. Use reinforcing bars as shown on the drawings. Completely fill in lintel block and bond beams with grout. Provide 8 inch bearing at end of lintels.

D. Corners: Connect corners with No. 9 galvanized wire or corrugated tie using one tie for each 4 inches of nominal wall thickness.

E. Partition Tops: Allow space at top of horizontal spanning walls for compressible joint back-up and sealant as specified in Sealant section. Anchor top of walls to deck or structure.

F. Mortar Beds:
1. Place mortar in a manner which will result in the development of adequate bond between the masonry and the reinforcement.
2. Lay units with full mortar coverage on horizontal and vertical joints in all courses.
3. Provide sufficient mortar on ends of masonry unit to fill head joints.
4. Rock closures into place with head joints thrown against two adjacent masonry units in place.
5. Do not pound corners or jambs to fit stretcher units after setting in place.
6. Where adjustment to corners or jambs must be made after mortar has started to set, remove mortar and replace with fresh mortar.

G. Mortar Joints and Patterns:
1. Lay CMU in running one-half (1/2) bond pattern, unless noted otherwise.
2. Provide flush joints where concealed from view and where dampproofing is scheduled.
3. Provide standard concave tooled joint where masonry is exposed to view for CMU, typically.
4. All mortar joints to be of consistent size.
5. All horizontal joints shall be concave tooled joint at face of units, unless noted otherwise.

H. Reinforcement, Anchor and Tie Systems:
1. General:
   a. Completely embedded in mortar or grout.
   b. All reinforcement consisting of bars or wire 1/4 inch or less in diameter embedded in the horizontal mortar joints shall have no less than 5/8 inch mortar coverage from the exposed face.
   c. Veneer anchors at exterior sheathed covered metal stud exterior walls shall be attached on outside face of sheathing using cadmium plated sheet metal screws. Spacing shall be same as stud spacing o.c. horizontally and 16 inches o.c. vertically.
   d. At intersection of all perpendicular masonry walls provide two (2) vertical rows of ladder type reinforcing at 16 inches o.c. vertically.
   e. Weld veneer anchors to structural steel in accordance with manufacturer's recommendations. Touch-up steel shop paint and galvanized coating on anchor with proper touch-up paint to match damaged coating in accordance with manufacturer's recommendations.
   f. In cavity walls with CMU back-up, embed truss type horizontal reinforcement with integral adjustable pintle wall ties every 16 inches o.c. vertically.
   g. Splices in reinforcement: Splices may be made only at such points and in such manner that the structural strength of the member will not be

reduced. Lapped splices shall be eight (8) inches. Welded or mechanical connection shall develop the strength of the reinforcement.

h. Corrugated strap ties shall not be used as veneer anchors at exterior or where subject to moisture. Their use in interior, dry conditions are acceptable.

i. Place joint reinforcement in the first two (2) bed joints above and the first two (2) bed joints below masonry openings. Extend extra reinforcing two (2) feet beyond jambs.

j. Provide masonry ties at floor and roof decks as indicated.

I. Membrane Flashing: Per Architectural Drawings and Specifications

J. Laying Masonry: Lay units plumb, level, and true to line with full head and bed joints. Butter ends of masonry with sufficient mortar to fill head joints. Do not furrow bed joints. Slope top of bed joint toward center of wall to minimize amount of mortar forced into grout space. Remove mortar, protruding from joints into grout space, before pouring grout.

K. Reinforcing Bars:

1. Hold vertical bars in position at top and bottom and at intervals not exceeding four 4 feet-0 inches with a minimum clearance of 1/4 inch from masonry and not less than one (1) bar diameter between bars.
2. When a foundation dowel is not in alignment with a vertical block cell or pilaster, slope it not more than one (1) horizontal in six (6) vertical to bring it into proper alignment before grouting.
3. Place horizontal reinforcing bars in continuous masonry courses, consisting of bond-beam or trough block units, and solidly grout in place.
4. Use straight reinforcing bars except for bends around corners and where bends or hooks are detailed on plans.
5. Lap reinforcing steel 40 bar diameters minimum where spliced and wire together.

L. Grouting: Where detailed place grout in reinforced masonry beams, walls, columns, and pilasters. All cells and spaces containing reinforcing bars shall be filled with grout. Wherever possible grouting shall be done from inside face of masonry. Exercise extreme care to prevent grout from staining face of masonry. Immediately remove any spilled grout from face and top of masonry.

1. Prior to grouting clean space so that all spaces to be filled with grout do not contain mortar projections greater than 1/2 inch, mortar droppings or other foreign material. Grout shall be placed so all spaces designated to be grouted shall be filled with grout and grout shall be confined to those specific spaces.
2. Grout materials and water content shall be controlled to provide adequate fluidity for placement, without segregation of constituents and shall be mixed thoroughly.
3. Between grout pours a horizontal construction joint shall be formed by stopping all wythes at the same elevation and with grout stopping a minimum of 1-1/2 inches below a mortar joint, except at top of wall. Where bond beams occur, stop grout pour a minimum of 1/2 inch below top of masonry.
4. Reinforcement shall be placed prior to grouting. Bolts shall be accurately set with templates or by approved equivalent means and held in place to prevent movement.
5. Segregation of grout materials and damage to masonry shall be avoided during the grouting process. Adequately brace masonry to prevent displacement or cracking during grouting operations.
6. Grout shall be consolidated by mechanical vibrator during placing, before loss of plasticity, in a manner to fill grout space. Grout pours greater than 12 inches shall be reconsolidated by mechanical vibration to minimize voids due to water

loss. Grout pours 12 inches or less in height shall be mechanically vibrated, or puddled.

7. Grout shall not be handled nor pumped utilizing aluminum equipment.
8. Size and height limitations of grout space or cell shall be as follows:

GROUT TYPE	GROUT POUR MAX. HEIGHT (FEET)	LEAST CLEAR DIMENSIONS		CLEANOUTS REQUIRED
		Width of Grout Space (In.)	CMU Cell Dim. Dims. (In. x In.)	
Fine	1	3/4	1-1/2 x 2	No
Fine	5	1-1/2	1-1/2 x 2	No
Fine	4	1-1/2	1-1/2 x 3	Yes
Coarse	1	1-1/2	1-1/2 x 3	No
Coarse	5	2	2-1/2 x 3	No
Coarse	4	2	3 x 3	Yes

   a. Clear dimension is the cell or grout space width less mortar projections.
   b. Grout space width shall be increased by the horizontal projection of the diameters of horizontal bars within the cross section of the grout space.
9. Place grout in lifts not exceeding 4 feet-0 inches.

M. Concreting: Supervise placing of concrete in cores of masonry beams and lintels and over masonry soffits where structural concrete is detailed. Report discrepancies or procedures which may adversely affect performance of masonry work.

N. Weepholes:
1. Provide weepholes above all thru-wall flashings where weepholes occur at the base of the wall. The mason shall coordinate the location of the thru-wall flashings with the location of the sidewalks on the civil engineering drawings. Both weepholes and thru-wall flashings shall be above the first course of block above the sidewalks. Pay particular attention to areas near exterior doors.
2. Ensure cavity drainage protection is properly installed.
3. Leave head joint free and clean of mortar. Provide a temporary strip of rope at each weep to be removed upon completion of panel.
4. Spacing: 24 inches on center for block, unless shown otherwise.
5. Keep weepholes and area above flashing free of mortar droppings.
6. Coordinate weep holes to be located above sidewalks and paving.

O. Sealant Joints:
1. Allow for sealant joints around outside perimeters of exterior doors, window frames and other wall openings.
2. Uniform depth: 3/4 inch.
3. Uniform width: As shown on the drawings but not less than 1/4 inch.
4. Provide sample for Architect's approval.
5. Refers to drawing for locations and details of accent joints.

P. Movement Joints (Expansion Joints and Control Joints):
1. Locate expansion and control joints as shown on drawings, or if not shown, comply with the following:
   a. General:

1) Vertical expansion joints shall be placed in the veneer wythe and control joints shall be placed in the concrete masonry wythe, although they do not necessarily have to be aligned.
2) Mortar and joint reinforcement shall not bridge movement joints.
3) Mortar joints which stop at the expansion joint cavity shall be struck flush with the masonry unit, producing a continuous flat surface for the sealant to adhere to.

b. Vertical Expansion Joints:
1) Locate expansion joints on long straight walls without openings maximum 25 feet-0 inches.
2) Locate expansion joints at the corner of walls perpendicular to one another. In instances, where the joint is not desired at the corner, the expansion joint shall be located within 10 feet-0 inches of the corner in either wall, but not necessarily both. The spacing of expansion joints around a corner shall not exceed the spacing of expansion joints in a straight wall. For example, if the spacing between expansion joints on a straight wall is 25 feet-0 inches, then the spacing of expansion joints around a corner could be 10 feet-0 inches on one side of the corner and 15 feet-0 inches on the other side. Joint reinforcement may be added around wall corners to provide added tensile strength to the corner, but joint reinforcement shall not bridge the expansion joint.

c. Offsets and Setbacks:
1) Locate expansion joints at 10 feet-0 inches maximum on one side of the offset or setback. The spacing of expansion joints around an offset or setback shall not exceed the spacing of expansion joints in a straight wall. See expansion joints at corners of perpendicular walls to one another above for example of spacing.

d. Openings (Doors and Windows):
1) Locate vertical expansion joints along the edge or jamb of the opening of windows and doors. Single opening windows and doors under 6 feet-0 inches in width shall have expansion joint on one (1) side of the edge or jamb of the opening as determined by the Architect, unless shown otherwise on drawings. Windows and doors 6 feet-0 inches and over in width shall have expansion joints on both sides of the edge or jamb of the opening.
2) Where masonry above an opening is supported by shelf angles attached to the structure, a vertical expansion joint shall be located alongside the opening, continuing through the horizontal support.
3) Where masonry above the opening is supported by loose lintels (unattached to the structure), special detailing and construction is required. If the expansion joint runs along side the opening, the loose steel lintel shall be allowed to expand independently of the masonry. To accomplish this, form a slip plane with flashing located above and below the angle. A backer rod and sealant shall be installed in front of the toe of the angle, and space shall be left at the end of the angle. Thus, a pocket will be formed which will allow movement of the steel angle within the masonry work. If the joint cannot be built in this manner, then the vertical expansion joint shall not be located alongside the opening, but

rather, with Architect's prior approval, the joint shall be located halfway between the openings.

e. Intersections and Junctions:
   1. Locate expansion joints at intersections of masonry walls and walls which serve different functions. If the masonry is not required to be bonded at the intersection, an expansion joint shall be incorporated. Walls which intersect at other than right angles are also vulnerable to cracking at the intersection.
   2. Locate expansion joint to separate adjacent walls of different heights to avoid differential movement, especially if the difference is very large.

f. Parapets:
   1. All vertical expansion joints shall be carried through the parapets.
   2. Additional expansion joints shall be halfway between those running full height, unless the parapet is reinforced. These additional expansion joints shall continue down to a horizontal expansion joint, or continue to the base of the wall.

g. Horizontal Expansion Joints:
   1. Locate horizontal expansion joints at shelf angles supporting block masonry.

h. Control Joints:
   1. Locate CMU control joints directly over concrete slab control joints.
   2. Whenever possible, lay out CMU so that control joint will coincide with CMU module (25 feet-0 inch maximum spacing between control joints), unless noted otherwise on drawings.
   3. Locate control joints at structural columns to isolate movement from continuing or intersecting walls and columns.
   4. Install premolded control joints with backer rod and sealant in accordance with manufacturer's instructions.

Q. Block Insulation: (As shown or required)
   1. Rigid Core Inserts: Fill concrete masonry unit cells completely with insulation in accordance with manufacturer's instructions.
   2. Loose Core Fill: Fill concrete masonry unit cells shown or required completely with loose core fill. Ensure concrete masonry units to receive loose core fill are ready for filling and cutouts are protected from material spillage. Place signs on filled walls stating "Do Not Cut Openings or Drill In This Wall" once fill is placed.
   3. Foamed-In Place Block Insulation: Make sure concrete masonry units to receive foamed in place block insulation are ready for drilling and filling. Drill holes and fill concrete masonry unit cells completely with insulation in accordance with manufacturer's instructions. Plug holes with cement mortar and leave surface smooth in accordance with manufacturer's instructions.
   4. Sand Fill: Fill concrete masonry unit cells shown or required completely with sand. Ensure concrete masonry units to receive sand fill are ready for filling and cutouts are protected from material spillage. Place signs on filled walls stating "Do Not Cut Openings or Drill In This Wall" once fill is placed.

3.4 ALLOWABLE TOLERANCES

A. Maximum Variation from Plumb:
   1. In lines and surfaces of columns, walls and at rises:
      a. 1/4 inch in 10 feet (1:480)
      b. 3/8 inch in 20 feet (maximum)

c. 1/2 inch in 40 feet (1:960)

2. For external corners, expansion joints and other conspicuous lines:
   a. 1/4 inch in 20 feet (maximum)
   b. 1/2 inch in 40 feet (1:960)

B. Maximum variation from level:
1. 1/4 inch in any bay or 20 feet
2. 1/2 inch in 40 feet (1:960)

3.5 REMOVAL OF FORMS AND SHORES

A. Do not remove shores and forms under reinforced masonry beams, lintels, and soffits until members have hardened sufficiently to carry their own weight and other super imposed loads. Providing that sufficient curing has taken place, leave forms and shores in place as follows:
1. Beam and lintels: Minimum ten (10) days.

B. Allow 16 hours to elapse after completion of masonry columns and walls before placing floor or roof construction loads on them. Allow an additional 48 hours before applying concentrated loads such as trusses, girders, and beams.

3.6 REPAIRING, POINTING AND CLEANING

A. All holes in exposed masonry shall be pointed, and defective joints shall be cut out and re-pointed with mortar.

B. All exposed unglazed masonry shall be thoroughly cleaned using water and stiff brushes. If stiff brushes and water do not suffice surface of unglazed masonry, on which no green efflorescence appears, shall be thoroughly wetted with clean water and scrubbed with a solution of not more than one (1) part hydrochloric (muriatic) acid to nine (9) parts water or other cleaning agent approved by Architect, followed immediately by a thorough rinsing with clear water. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 20 square feet, in a location approved by Architect. No further cleaning work may proceed until the sample area has been approved by Architect, after which, the same cleaning materials and method shall be used on remaining wall area. If masonry is cleaned with an acid solution all sash, metal lintels and other corrodible parts shall be thoroughly protected. Green efflorescence shall be removed in accordance with block manufacturer's recommendations.

C. All surfaces of glazed units, if any, shall be washed with soap powder and warm water, applied with a scrubbing brush and then rinsed thoroughly with clear water. Metal cleaning tools and brushes or abrasive powders shall not be used. When necessary, ceramic glazed units may be scrubbed with a solution of no more than one (1) part hydrochloric acid to 25 parts clean water.

3.7 REPAIR OR REPLACEMENT OF DAMAGED WORK

A. Imperfect or damaged work, or any material damaged or determined to be defective before final completion and acceptance of the entire job, shall be satisfactorily replaced at Contractor's expense and in conformity with all requirements of drawings and specifications. Removal and replacement of masonry work shall be performed in such a manner as not to impair the appearance or strength of the structure in any way.

3.8 CLEAN-UP AND PROTECTION

A. Clean up all debris caused by work of this Section, keeping the area clean and neat at all times.

B. Cover all unfinished work at night against the elements with plastic sheeting, building paper, heavy canvas or other material approved by Architect to prevent water from entering cavities.

C. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

3.9 FIELD QUALITY CONTROL AND TESTING

A. Inspection and Testing Laboratory services shall be in accordance with Section 01115, Inspection and Testing Laboratory Services.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.
B. Clay Facing Brick.
C. Mortar and Grout.
D. Reinforcement and Anchorage.
E. Flashings.
F. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 05 11 - Masonry Mortaring and Grouting.
B. Section 06 10 00 - Rough Carpentry: Nailing strips built into masonry.
C. Section 07 21 00 - Thermal Insulation: Insulation for cavity spaces.
D. Section 07 65 00 - Flexible Flashing: Through-wall masonry flashings.
E. Section 07 92 03 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures; American Concrete Institute International; 2009.
B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
D. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2009b.
E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a.
F. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2009.
G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2011.
H. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2006.
I. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2011.
J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.
K. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2010.
L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2007.
M. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2010.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.06 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar and accessories and structural backup in mock-up.

B. Locate where directed.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 BRICK UNITS

A. Manufacturers:
   1. Hanson Brick; www.hansonbrick.com.
   2. Substitutions: See section 01 60 00 - Product requirements.

B. Facing Brick: ASTM C216, Type FBS, Grade SW.
   1. Color to be selected by ERO Architects from manufacturers colors.
   2. Texture as indicated on drawings.
   3. Actual size: 2 1/4" x 3 5/8" x 7 5/8".
   4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
   5. Compressive strength: measured in accordance with ASTM C 67.

2.02 MORTAR AND GROUT MATERIALS

A. Mortar and grout: As specified in Section 04 05 11.

B. Hydrated Lime: ASTM C207, Type S.

C. Grout Aggregate: ASTM C404.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
   3. WIRE-BOND: www.wirebond.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420) deformed billet bars; uncoated.

C. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
   1. Provide pre-maufactured corners and tees.
   2. Manufacturers:
      a. Masonry Reinforcing Corporation of America; Product "Truss Type Series 300": www.wirebond.com
      b. Substitutions: See Section 01 60 00 - Products Requirements.

D. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

E. Adjustable Reinforcement System with Adjustable Pintle Tie.
   1. Truss-Type Horizontal Joint Reinforcement with Adjustable Pintle Tie for Concrete Masonry Unit Walls: #170 Truss Adjustable Eye-Wire System by Hohmann & Barnard, Inc.. Width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
      a. Reinforcing: Extra Heavy (0.187 inch (4.8 mm) side rods by 0.148 inch (3.8 mm) cross rods and boxes).
      b. Eyes and Pintles: 0.187 inch (4.8 mm) diameter wire.

c. Eyelet Loop Crimped Projection: Factory adjusted to fit cavity insulation thickness requirements. Pintle shall be designed to mechanically secure insulation in place.
d. Cross Rod Spacing: Truss type cross rods butt-welded to side rods at each contact point 16 inches (406 mm) on center and projecting eyelet loop flush-welded at four points.
e. Wire Material: Steel, ASTM A 82, hot-dip galvanized after fabrication in accordance with ASTM A 153, Class B2.
f. Rigid Insulation Retainer: Loop-Lok Washer; multi-polymer plastic clip-type retainer for rigid board insulation; attaches to loop wires on horizontal joint reinforcement.
g. Substitutions: See Section 01 60 00 - Product Requirements

F. Rigid Steel Ties: "Z" bent steel shape (Series 3000Z), 2" wide x 8" long with 2" right angle bends at each end x 1/4" thick, hot dip galvanized to ASTM A 153/A 153M, Class B2.
1. Manufactures:
a. Masonry Reinforcing Corporation of America; www.wirebond.com
b. Substitutions: See Section 01 60 00 - Product Requirements

G. Dovetail Anchor: Sheet Metal; Hot Dip Galvanized after fabrication in accordance with ASTM A153 / A153M-B2
1. Dovetail Slot: #1304 Dovetail Slot - 22 Gauge. Standard dimensions of 1" x 10' length.
2. Dovetail Corrugated Tie: 12 Gauge thickness. Length: embed a minimum of 1.5" into the bed joint, with a minimum mortar cover of 5/8" to outside face of the wall.

H. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
3. Vertical adjustment: Not less than 3-1/2 inches.

2.04 FLASHINGS

A. Flashing Materials: Flexible Flashing, as specified in Section 07 65 00.

2.05 ACCESSORIES

A. Preformed Control Joints: ASTM D200 2 AA 805, Durometer hardness of 80. Rubber material. Provide with corner and tee accessories, fused joints.
1. Manufacturers:
a. Dur-O-Wal: www.dur-o-wal.com.
b. WIRE-BOND: www.wirebond.com.
; Product "CJ2902".
c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Weeps: Polyethylene tubing.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners, except for units laid in stack bond.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.06 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

3.07 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.08 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.11 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend flashings to within 1/4 inch of exterior face of masonry.

C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.12 GROUTED COMPONENTS

A. Reinforce bond beams with 2, No. 4 bars, 1 inch from bottom web.

B. Lap splices minimum 24 bar diameters.

C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

D. Place and consolidate grout fill without displacing reinforcing.

3.13 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joint in accordance with Section 07 92 03 for sealant performance.

D. Form expansion joint as detailed.

3.14 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.15 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.16 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 PARGING

A. Dampen masonry walls prior to parging.

B. Scarify each parging coat to ensure full bond to subsequent coat.

C. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot.

3.18 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140 for conformance to requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C 780, testing with same frequency as masonry samples.

3.19 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.20 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 27 23

THROUGH-WALL FLASHING SYSTEM

PART 1 GENERAL

1.01 GENERAL

A. Contractor shall review American Concrete Institute 530.1 mandatory specification checklist for additional requirements necessary for specific project.

B. Flashing system shall be provided and installed by a qualified waterproofing contractor.

C. Contractor shall provide a photo manifest of through-wall installation, including all starts, stops, and transitions in plane.

D. It is the intent of this specification that the new work will provide a watertight facility (restricted to the location where work is to be performed). The attached specifications describe the minimum acceptable standards of construction and finish.

E. Contractor shall water test all through-wall flashings once veneer is twelve inches (12”) above installed flashing. Coordinate test with Architect and Consultant.

F. Manufacturer of cloak flashing shall have a representative inspect the installed work a minimum of two times per week. The representative shall not be the installer.

G. All vertical flashing to be installed full height of the vertical surface.

H. Refer to Spec Section 08 40 00 for aluminum window coordination.

I. The design intent is to have windows installed, flashed and water tested prior to veneer installation.

1.02 QUALITY ASSURANCE

A. At a scheduled pre-construction meeting with all trades, contractor shall review flashing for the project and how the flashing shall be sequenced with the following: below grade waterproofing, air and vapor system, window installation, sealant installation, relief angles and roofing.

1.03 SUBMITTALS

A. Shop Drawings: Contractor shall provide from the manufacturer a review of the flashing design for the project and location of preformed shapes on reduced floor plan.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be a minimum of four inches (4") off the substrate, and the tarpaulin tied off with rope.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle and store material in such a manner as to avoid damage.

E. Protect materials against damage by construction traffic.

F. Storage: All materials should be stored under cover to avoid site damage. During cool weather construction, store materials inside at 50º F or higher.

G. The proper storage of materials is the sole responsibility of the contractor and damaged materials shall be discarded, removed from the project site, and replaced prior to application.

1.05 SITE CONDITIONS

A. Job Condition Requirements: Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The contractor shall follow local, state, and federal regulations, safety standards, and codes. When a conflict exists, use the stricter document.

B. Protection of Work and Property:

1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations shall be fulfilled by the contractor as part of his proposal.
2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds shall be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Cleaning and Disposal of Materials:
1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. At completion, all work areas shall be left clean and all contractor's equipment and materials removed from the site.
3. Debris shall be deposited at an approved disposal site.

1.06 WARRANTY

A. Flashing Manufacturer: Project shall be installed in such a manner that the flashing material manufacturer will furnish a written ten (10) year materials warranty from the date of substantial completion of the completed project.

PART 2 PRODUCTS

2.01 BUILT-IN FLASHING MEMBRANE (ELVALOY® SHEET)

A. The built-in flashing membrane shall be 40 mil flexible sheet material, consisting of a blend of elastomeric and thermal plastic polymers, incorporating DuPontä Elvaloy®. The membrane shall be reinforced with synthetic fibers, calendered into sheet form, rolled and cut to width.

B. Cloaks shall be pre-formed, three dimensional flexible units used for detail corners, level changes, stop ends, and special applications.
1. Physical Properties

Elongation	175%	ASTM D412
Tensile Strength	650 psi	ASTM D412
Tear Strength	280 psi	ASTM D624
Low Temperature Flexibility	-25º F Pass	ASTM D146
Water Absorption	Less than 0.1%	ASTM D471

C. Cloak color shall be as selected by Architect and/or shall match mortar color. Reference manufacturer's list of colors for selection.

2.02 RELATED MATERIALS FOR BUILT-IN FLASHING MEMBRANE

A. Flashing Membrane Adhesive: Flashing adhesive exceeds the requirements of TTS00230C Type II, Class B, ASTM C 92094. The product shall be terra cotta (dull red) in color.
1. Physical Properties

Hardness Shore A	24 ± 3	ASTM C 661
Shear Strength	75 psi	ASTM D 1002

Tack Free Time	25 minutes	ASTM C 679
Slump (sag)	Zero slump	ASTM C 697
Shrinkage	No measurable shrinkage after 14 days	
Low Temperature Flexibility	-20° F pass 1/4 inch mandrel	
Service Temperature	-40° F to 200° F continuous service	
Shelf Life	One year	

2.03 SURFACE-ADHERED WITH DRIP FLASHING MEMBRANE (ELVALOY® SHEET)

A. Surface-adhered with drip membrane shall be a composite 40 mil membrane consisting of 25 mils of elastomeric/thermal plastic membrane incorporating DuPontä Elvaloy® and 15 mils of SBS asphaltic adhesive. The membrane shall be reinforced with synthetic fibers, calendered into sheet form, rolled and cut to standard widths.

B. Standard Sheet Dimensions: Thickness: 40 mil

Roll length: 75 ft

Roll widths: 12, 18, 24, 36 in

C. Cloaks shall be pre-formed, three dimensional flexible units used for detail corners, level changes, stop ends, and special applications.

1. Physical Properties

Elongation	225%	ASTM D412
Tensile Strength	875 psi	ASTM D412
Tear Strength	270 psi	ASTM D624
Low Temperature Flexibility	-25º F Pass	ASTM D146
Water Absorption	Less than 0.1%	ASTM D471

2.04 RELATED MATERIALS FOR SURFACE ADHERED FLASHING MEMBRANE

A. Asphalt Primer: Shall be a two-sided, self-adhering tape used to seal the top of cloaks against the back-up wythe. Adhesive may be used as an alternative.

B. Substrate Primer:

1. Physical Properties

Solids by Weight:	68%	
Viscosity	758 cps	
Weight per Gallon	9.3 lbs.	
Elongation	>656% no Breakage, Exceeded Travel of Instron	ASTM D 2370
Tensile Strength	85.1 psi	ASTM D 2370
pH	10	
Hardness Shore A	59	
Peel Strength	Aluminum No Fail at 4.60 pli	
Concrete No Fail at 3.86 pli		

C. Mastic: Shall be used at all laps and joints, and top terminations.

2.05 WALL DRAINAGE SYSTEM

A. Collection device shall be a dovetail shaped material to place in the cavity of brick masonry walls for collecting mortar droppings above the level of the weep holes and flashing. The 90% open weave construction material shall be High Density Polyethylene (HDPE) mesh for thickness of 0.4 - 1.0 inch, or recycled polyester mesh for 2.0 inch thickness.

B. Material shall not oxidize, rot, promote mold or fungus, or react with other common building materials such as mortar, cement, asphalt, modified bitumen, PVC, copper, or galvanized metal; shall be Mortar Net, or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions for compliance with requirements for installation tolerances and other specific conditions.

3.02 GENERAL

A. Laying Masonry Walls: Use an inverted lintel CMU or fully grouted hollow CMU as a base for flashing at sills, floor joints, and other similar conditions.

B. Preparation: All sharp protrusions and mortar droppings must be removed from the substrate, and the surface must be clean and dry.

C. Where brick work occurs above the roof elevation, provide solid protection of the existing roof system until work is complete.

D. Flashing shall be fully supported when crossing the cavity except at sill and coping locations.

E. Flashing shall be fully adhered around all wall penetrations prior to veneer installation.

3.03 INSTALLATION OF BUILT-IN FLASHING MEMBRANE

A. Flashing membrane and cloaks shall be installed in a bed of fresh mortar and should extend through the outer wythe a minimum of one-fourth inch (1/4") and left exposed. Flashing membrane is UV resistant.

B. Weep holes shall be provided immediately above all flashing at 24-inch centers. A minimum of two weeps shall be installed above any wall opening.

C. All joints in the flashing membrane shall be lapped a minimum of four inches (4") using flashing membrane adhesive.

D. Flashing membrane shall be installed six inches (6") above finished grade level.

E. Cloaks and end dams shall be installed at all window and door heads and sills.

F. Vertical flashing at wall openings shall extend into the wall opening one inch (1"). The door/window frame shall be installed with the flashing extending into the frame.

G. Cleaning: Flashing membrane shall not be damaged by cavity cleaning after installation. Precautions to be taken during subsequent work are:
   1. Use of cavity battens to prevent mortar droppings;
   2. Removal of droppings before they harden;
   3. Never use implements such as steel rods for cleaning the cavity; and
   4. Inspection of cavity flashing for damage as the work proceeds.

3.04 INSTALLATION OF SURFACE-ADHERED FLASHING WITH DRIP MEMBRANE

A. Priming: All flashing substrates shall be primed. Flashing primer shall be applied with a brush, roller or sprayed. Coverage is approximately 400 square feet per U.S. gallon (3.78L). Drying time may vary depending on temperature, humidity, and air movement; drying time should be approximately 45 minutes.

B. Flashing System Installation: Starting at a corner, mount cloak to substrate flashing adhesive. Cut surface adhered membrane into workable sections (8'-10'). Remove the release sheet and adhere the membrane to the inner leaf of construction lapping the membrane onto the cloak four inches (4"). Use firm hand pressure and a steel roller to totally adhere membrane in place. Extend membrane completely through the outer leaf and leave it exposed one-fourth inch (1/4") minimum. The surface-adhered membrane is UV resistant. Apply a bead of flashing mastic to all top termination edges.

C. Termination Bar: The surface-adhered membrane shall be installed using a termination bar for additional attachment to the inner leaf (optional).

D. Weep holes shall be provided immediately above all flashing at 24-inch centers. A minimum of two baffle weeps shall be installed above any wall opening.

E. Flashing membrane shall be installed six inches (6") above finished grade level.

F. Stop end cloaks shall be installed at all windows, door heads, sills, and through-wall starts, stops, steps, etc.

G. Enveloped vertical flashing at wall openings shall extend onto the window unit one inch (1"). The door/window frame shall be installed with the flashing extending onto the back of the frame.

H. Enveloped vertical flashing shall be installed at all abutments of dissimilar exterior wall treatments: inside and outside nineties (90°), etc.

I. Cleaning: Flashing membrane shall not be damaged by cavity cleaning after installation. Precautions to be taken during subsequent work are:
   1. Use of cavity battens to prevent mortar droppings;
   2. Removal of droppings before they harden;
   3. Never use implements such as steel rods for cleaning the cavity; and
   4. Inspection of cavity flashing for damage as the work proceeds.

3.05 INSTALLATION OF WALL DRAINAGE SYSTEM

A. Collection device shall be placed vertically on top of the flashing inside the wall cavity where it shall catch and permanently suspend mortar droppings above the level of the weep holes and flashing. The dovetail shape shall prevent mortar droppings from forming a continuous dam and shall allow water and air to rapidly and easily move through the material to the weeps.

3.06 FLASHING MEMBRANE ADHESIVE

A. Application:
   1. Flashing adhesive shall be applied to clean, dry and relatively smooth surfaces.
   2. When joint two (2) pieces of flashing membrane, or joining flashing membrane to Cloaks:
   3. Apply two (2) one-fourth inch (1/4") beads of adhesive approximately one-half inch (1/2") and one and one-half inch (1-1/2"), respectively, from the edge of the bottom membrane along the entire width of the bottom membrane. Overlap the top membrane over the bottom membrane two inches (2") and roll lap with steel hand roller, causing excess to extrude the entire length of the overlap.
   4. Do not remove excess adhesive.

B. Safety, Storage and Handling: Keep container tightly closed when not in use. Store at room temperature. Clean up tools and hands with waterless hand cleaner.

3.07 SUBSTRATE PRIMER

A. Surface Preparation: Areas to be primed should be dry.

B. Application: Substrate primer may be applied using a soft roller or brush. It can be removed from masonry with soapy water while wet and a solvent-based cleaner if dry (mineral spirits or citrus cleaner).

C. Coverage: Depending on the condition of the surface, coverage may vary from as little as 150 square feet to 200 square feet per gallon.

D. Caution:
   1. Substrate primer should not be applied when temperatures are below 40° F or when rain is imminent.
   2. Keep substrate primer from freezing.
   3. During hot weather, the product should be stored in a cool shaded area.
   4. Do not thin this product.
   5. Curing rates will vary depending on the ambient temperature relative humidity, wind speed, sky condition and the proper rate of application. Generally speaking, Substrate primer will dry within 15 to 30 minutes when applied at 70° F or above. At 50° F, on a cloudy day, cure time may be extended to as much as one hour.
   6. Check several places on primed area for dryness prior to proceeding with the flashing application.

END OF SECTION

SECTION 04 27 31

REINFORCED UNIT MASONRY

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete Block.

B. Mortar and Grout.

C. Reinforcement and Anchorage.

D. Flashings.

E. Lintels.

F. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 04 05 11 – Masonry Mortaring and Grouting.

B. Section 05 50 00 – Metal Fabrications: Loose steel lintels.

C. Section 06 10 00 – Rough Carpentry: Nailing strips built into masonry.

D. Section 06 10 54 – Wood Blocking and Curbing: Nailing strips built into masonry.

E. Section 07 90 05 – Joint Sealers and Sealants: Backing rod and sealant at control and expansion joints.

F. Section 04 20 00 – Unit Masonry: Commercial and Structural Block.

1.3 REFERENCE STANDARDS

A. ACI 530/ASCE 5/TMS 402 – Building Code Requirements for Masonry Structures; American Concrete Institute International; 2008.

B. ACI 530.1/ASCE 6/TMS 602 – Specification For Masonry Structures; American Concrete Institute International; 2008.

C. ASTM A 82/A 82M – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.

D. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Glavannealed) by the Hot-Dip Process; 2009.

E. ASTM C 91 – Standard Specification for Masonry Cement; 2005.

F. ASTM C 270 – Standard Specification for Mortar for Unit Masonry; 2007a.

G. ASTM C 476 – Standard Specification for Grout for Masonry; 2008.

1.4 SUBMITTALS

A. See Section 01 33 00 – Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry unit by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standards units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners.

2.2 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Section 04 05 11 – Mortaring and Grouting.

2.3 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohman & Barnard, Inc.: www.h-b.com.
   3. Masonry Reinforcing Corporation of America: www.wirebond.com
   4. Substitutions: See Section 01 25 13 – Product Requirements.

2.4 FLASHINGS

A. Metal Flashing Materials: Per Architectural Specs.

2.5 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

2.6 LINTELS

2.7 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 45 23.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Clean reinforcement of loose rust.

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

A. Establish lines, levels, and coursing indicated. Protect form displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units.

3.4 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar as work progresses.

E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.5 REINFORCEMENT AND ANCHORAGE

A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.

B. Wall Ties: Install wall ties at locations indicated, spaced at not more than 24 inches on center horizontally and 16 inches on center vertically, unless otherwise indicated on drawings.

C. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.
   1. Bond Beams: At bond beams or other locations for horizontally reinforced masonry, provide special masonry unit or saw to accommodate reinforcement.

3.6 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashing full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashing.

3.7 GROUTING

A. Use either high-lift or low-lift grouting techniques, at's option, subject to other limitations of contract documents.

B. Low-Lift Grouting:
   1. Limit height of pours to 12 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

C. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secure before beginning pours.
   2. Place grout for spanning elements in single, continuous pour.

3.8 CONTROL AND EXPANSION JOINTS

A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

B. Size control joint in accordance with Section 07 90 05 for sealant performance.

3.9 TOLERANCES

A. Maximum Variation from Plumb: ¼ inch per story non-cumulative; ½ inch in two stories or more.

B. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

C. Maximum Variation from Cross Sectional Thickness of Walls: ¼ inch,

3.10 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Use non-metallic tools in cleaning operations.

3.11 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural cast stone.

B. Units required are:
   1. Exterior wall units, sills.

1.02 RELATED REQUIREMENTS

A. Section 04 05 11 - Masonry Mortaring and Grouting: Mortar for setting cast stone.

B. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.

C. Section 07 90 05 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

1.03 REFERENCE STANDARDS

A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.

C. ASTM C33 - Standard Specification for Concrete Aggregates; 2011.

D. ASTM C150 - Standard Specification for Portland Cement; 2011.

E. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2010.

F. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2010a.

G. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2010b.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

C. Product Data: Test results of cast stone components made previously by the manufacturer.

D. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.

E. Mortar Color Selection Samples.

F. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm with a minimum of 5 years of experience in producing cast stone of the types required for project and:

B. Mock-Up: Provide full size cast stone components for installation in mock-up of exterior wall.
   1. Remove mock-up not incorporated into the work and dispose of debris.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

B. Number each piece individually to match shop drawings and schedule.

C. Store cast stone components and installation materials in accordance with manufacturer's instructions.

D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

F. Store mortar materials where contamination can be avoided.

G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.01 ARCHITECTURAL CAST STONE

A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
   1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
   2. Freeze-Thaw Resistance: Demonstrated by field experience.
   3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
   4. Color: Match to be selected from Manufacturers standard colors.
   5. Remove cement film from exposed surfaces before packaging for shipment.

B. Shapes: Provide shapes indicated on drawings.
   1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
   2. Unless otherwise indicated on drawings, provide:
      a. Wash or slope of 1:12 on exterior horizontal surfaces.
      b. Drips on projecting components, wherever possible.
      c. Raised fillets at back of sills and at ends to be built in.

C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
   1. Pieces More than 12 inches Wide: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

2.02 MATERIALS

A. Portland Cement: ASTM C150.
   1. For Units: Type I or II, gray.
   2. For Mortar: Type I or II, except Type III may be used in cold weather.

B. Coarse Aggregate: ASTM C33, except for gradation; granite, quartz, or limestone.

C. Fine Aggregate: ASTM C33, except for gradation; natural or manufactured sands.

D. Admixtures: ASTM C494/C494M.

E. Water: Potable.

F. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized or epoxy coated.

G. Steel Welded Wire Reinforcement: ASTM A185/A185M, galvanized or epoxy coated.

H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.

I. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.

J. Mortar: Portland cement-lime, as specified in Section 04 05 11 .

K. Sealant: As specified in Section 07 90 05.

L. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine construction to receive cast stone components. Notify ERO Architects if construction is not acceptable.

B. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.

B. Mechanically anchor cast stone units indicated; set remainder in mortar.

C. Setting:
1. Drench cast stone components with clear, running water immediately before installation.
2. Set units in a full bed of mortar unless otherwise indicated.
3. Fill vertical joints with mortar.
4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

D. Joints: Make all joints 3/8 inch, except as otherwise detailed.
1. Rake mortar joints 3/4 inch for pointing.
2. Remove excess mortar from face of stone before pointing joints.
3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
4. Leave the following joints open for sealant:
   a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
   b. Joints in projecting units.
   c. Joints between rigidly anchored units, including soffits, panels, and column covers.
   d. Joints below lugged sills and stair treads.
   e. Joints below ledge and relieving angles.
   f. Joints labeled "expansion joint".

E. Sealant Joints: Install sealants as specified in Section 07 90 05.

F. Installation Tolerances:
1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

G. Repairs: Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
2. Repair methods and results subject to ERO Architects 's approval.

3.03 CLEANING

A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
1. Wet surfaces with water before applying cleaner.
2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
3. Remove cleaner promptly by rinsing thoroughly with clear water.
4. Do not use acidic cleaners.

3.04 PROTECTION

A. Protect completed work from damage.

B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Labor, materials, services, equipment, and appliances required in connection with or incidental to furnishing, fabricating, delivering, and erecting structural steel complete, as described in this Section, shown on Drawings, or reasonably implied therefrom, including, but not limited to:
1. Structural steel columns, girders, beams, and angles
2. Angle frames for openings in floors and roofs
3. Steel plates and miscellaneous deck support angles
4. Connections and component parts
5. Qualification of welders employed on the Project
6. Galvanizing of items
7. Shop prime coat painting and field touch-up painting
8. Grouting of base plates
9. Temporary bracing of construction
10. Fabrication/erection inspection and testing

B. Extent of structural steel work is shown on the Structural Drawings, including schedules, notes and details to show sizes and locations of members, typical connections and types of steel required.

C. Include all supplementary parts and members necessary to complete the structural steel work, regardless of whether such parts and members are definitely shown or specified, and furnish all such gussets, plates, bolts, nuts, washers, welds, etc. as may be required for the proper assembly of all items. Include miscellaneous deck support angles as required for the proper support of metal floor deck around columns, gussets, openings and obstructions, and proper support of metal roof deck around openings, obstructions, and where required.

1.2 RELATED REQUIREMENTS

A. Section 01 45 23 - Testing and Inspecting Services

1.3 RELATED WORK

A. Section 03 30 00 - Cast-In-Place Concrete: Installation of anchor bolts

B. Section 04 20 00 - Unit Masonry: Furnishing masonry anchors to be attached to structural steel.

C. Section 05 21 00 - Open Web Steel Joists and Joist Girders

D. Section 05 31 00 - Steel Deck

E. Section 05 40 00 - Light Gauge Steel Framing

F. Section 05 50 00 - Miscellaneous Metals

G. Section 07 81 00 - Sprayed Fireproofing

H. Section 09 91 00 - Painting and Staining: Finish painting of exposed structural steel.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. A 6, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
2. A 36, Standard Specification for Carbon Structural Steel
3. A 53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
4. A 108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
5. A 123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6. A 153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
7. A 307, Standard Specification for Carbon Steel Bolts and Studs 6000 psi Tensile
8. A 325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
9. A 490, Standard Specification for Structural Bolts, Steel, Heat-Treated, 150 ksi (1035 Mpa) Tensile Strength
10. A 500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
11. A 578, Standard Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications
12. A653, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanealled) by the Hot-Dip Process
13. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
14. A897, Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on each surface
15. A 992, Standard Specification for Structural Steel Shapes

B. American Institute for Steel Construction (AISC)
1. Code of Standard Practice for Steel Buildings and Bridges
2. Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings, latest edition
3. Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts, approved by the Research Council on Structural Connections of the Engineering Foundation
4. Specification for Architecturally Exposed Structural Steel
5. Structural Welding Guide, AWS D1.1

C. American National Standards Institute (ANSI)
1. Standards

D. American Welding Society (AWS)
1. D1.1 Structural Welding Code

E. Corps of Engineers (CE)
1. CRD-C 621

F. Industrial Fasteners Institute (IFI)

1. Handbook on Bolt, Nut, and Rivet Standards

H. Steel Structures Painting Council (SSPC)
   1. Painting Manual, Volume 1, Good Painting Practice
   2. Painting Manual, Volume 2, Systems Specifications

1.5 QUALITY ASSURANCE

A. All standards referenced in this Section shall apply, as applicable to the work, unless noted otherwise. In case of conflict between the Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between the Contract Documents and the Building Code, the more stringent requirement shall govern.

B. Contractor shall furnish fabrication/erection inspection and testing of all welds in accordance with AWS D1.1, Chapter 6. Submit records of inspections and tests to Owner's testing laboratory for their review.

C. Testing Laboratory Services for Verification of Quality: Refer to Section 01 45 23, Testing and Inspecting Services.

D. All materials, fabrication procedures and field are subject to verification inspection and testing by the Owner's testing laboratory, in both shop and field. Such inspections and tests will not relieve the Contractor of his responsibility for providing materials and fabrication procedures in compliance with specified requirements. Owner reserves the right to use ultrasonic or radiographic inspection to verify the adequacy of all welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1. Promptly remove and replace materials or fabricated components which do not comply.

E. Qualifications for Welding Work: Contractor shall be responsible for qualifying welding operators employed on the Project in accordance with AWS Standard Qualification Procedure. Provide certification to Owner's testing laboratory that welder's have satisfactorily passed AWS qualification tests in the previous 12 months. Retesting and recertification of welders, if required, is the Contractor's responsibility.

F. Qualifications for Welding Procedures: Contractor shall provide the testing laboratory with welding procedures which are to be used in executing this work. Welding procedures shall be qualified prior to use in accordance with AWS D1.1, Part B.

G. Comply with provisions of referenced codes, specifications, and standards, in addition to the Building Code.

H. Fabricator's Qualifications:
   1. Company specializing in the fabrication of structural steel for buildings with minimum of five (5) years experience and currently certified by AISC or IAS Quality Certification Program.

1.6 DESIGN

A. Connections: Shall be designed in accordance with the requirements on the Structural Drawings.

B. Fabricator shall be responsible for all errors of detailing, fabrications, and for correct fitting of structural steel members.

1.7 SUBMITTALS

A. Product Data: Submit producer's or manufacturer's specifications and installation instructions, including laboratory test reports and other data, to show compliance with Specifications for the following products:
   1. Structural steel primer and touch-up paint.
   2. Shrinkage-resistant grout.

B. Mill Certificates: Submit manufacturer's mill analysis, for Architect's record, showing compliance with Specifications for the following products:
   1. Structural steel (each type)
   2. High-strength bolts (each type), including nuts and washers.

C. Shop Drawings:
   1. Submit design calculations for the connections designed by the Contractor, prior to or with the shop drawings. Calculations shall bear the seal of a Registered Professional Engineer, licensed in the State of Texas. Shop drawings containing connections for which calculations have not been received will be returned unchecked as an incomplete submittal. Design Calculations will be retained for the Architect's file, and will not be approved or returned. Design calculations shall include the following:
      a. All structural steel beam connections not specifically detailed on the Structural Drawings shall be designed by the Contractor, under the direct supervision of a Registered Professional Engineer, licensed in the State of Texas. Connections shall be designed to resist the forces specified on the Structural Drawings and shall be shown in detail on the shop drawings.
      b. Wind Brace Connections: Calculations shall be given for each different wind brace connection used and detailed on the shop drawings. Each connection calculation shall identify the location or locations for which the connection applies by indicating the following:
         1) the wind brace mark(s) from the Structural Drawings;
         2) the piece mark(s) from the shop drawings;
         3) the member size, and
         4) the design loading(s)
   2. Submit shop drawings prepared under the supervision of a Registered Professional Engineer, licensed in the State of Texas, including complete details and schedules for fabrication and shop assembly of members, erection plans, details, procedures, and diagrams showing sequence of erection. Include details of cuts, connections, camber holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Shop drawings shall not be produced by using reproductions of Contract Documents.
      a. Structural steel members for which shop drawings have not been reviewed shall not be fabricated. Architect's review shall cover general locations, spacings, and details of design. Omission from shop drawings of any materials required by the Contract Documents shall not relieve the Contractor of his responsibility for furnishing and installing such materials, even though such shop drawings may have been reviewed and returned.
      b. Substitutions: Submit substitutions of sections or modifications of details, or both, and the reasons therefore, along with shop drawings for Architect's approval. Submitted substitutions must be clearly identified

and noted as such. Approved substitutions, modifications, and necessary changes in related portions of the work shall be coordinated by the fabricator and shall be accomplished at no additional expense to the Owner.

D. Setting Drawings and Templates: Submit setting drawings, templates, and directions for installation of anchor bolts and other anchorages installed by other trades.

E. Certifications:
1. Submit evidence of current AISC or IAS plant certification. Refer Fabricator's Qualifications under Quality Control.
2. Submit welder's certification to Owner's testing laboratory. Refer Qualifications for Welding Work under Quality Control.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time so as to not delay that work.

B. Deliver packaged materials in the manufacturer's original unopened packaging., store and handle steel joists in accordance with SJI recommendations. Protect packaged materials from corrosion and deterioration.

C. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other means of support. Protect steel members from corrosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed at no additional expense to Owner.

E. Support cambered members during shipment and handling in a manner which will not result in loss of camber.

1.9 PROJECT CONDITIONS

A. Coordinate erection of structural steel with work of other trades.

B. Do not install columns which have anchor bolts in concrete, until concrete members have attained their 28 day compressive strength.

1.10 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 – Project Coordination.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Specifications are based on the named product(s) and manufacturer(s). Except where specifically stated as no substitutions, other products must be by a manufacturer having a minimum of five (5) years experience manufacturing product(s) meeting or exceeding

the specifications, comply with requirements of this Section, and Division 1 requirements for substitutions in order to be considered.

2.2 MATERIALS (As shown or required)

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and application of surface finishes.

B. Steel:
1. Wide Flange (W) Shapes and Tees: ASTM A 992 (50 ksi yield).
2. Other Rolled Shapes, Plates, and Bars: ASTM A 36 (36 ksi yield).
3. Cold Formed Steel Tubing: ASTM A 500, Grade B (46,000 psi yield).
4. Steel Pipe: ASTM A 501, Type E or S, Grade B.

C. Bolts, Nuts, and Washers:
1. Bolts: Anchor bolts and erection bolts shall conform to ASTM A 307 Grade A, and to the requirements for regular hexagon bolts and nuts of ANSI B18.2.1 and ANSI B18.2.2.
2. High-strength bolts for connections shall conform to ASTM A 325 or ASTM A 490. Dimensions of bolt heads and nuts shall conform to requirements for heavy hexagon nuts of ANSI B18.2.1 and ANSI B18.2.2.
3. Washers: Circular washers shall be flat and smooth, shall conform to requirements of Type A washers in ANSI B23.1. Beveled washers for "S" shapes and channels shall be square or rectangular, shall taper in thickness, and shall be smooth. Washers for use with high-strength bolts shall be hardened.
4. Tension Control Bolts: May, at Contractor's option, be used in lieu of conventional high-strength bolts. Bolts shall be furnished by one (1) of the following:
   a. LeJeune Bolt Company, Lakeville, Minnesota
   b. Lohr Structural Fasteners, Inc., P. O. Box 1387, Humble, Texas.
5. Drilled Anchor Bolts: Shall be one (1) of the following (No substitutions):
   a. Wej-it Bolt, Wej-it Corporation, Tulsa, Oklahoma
   b. Kwik Bolt, Hilti Fastening Systems, Tulsa, Oklahoma
   c. Trubolt, Ramset Fastening Systems, Paris, Kentucky

D. Welding Electrodes: Shall conform to the requirements and specifications of AWS. Use E70 electrodes. For high-strength, low-alloy steel, provide electrodes, welding rods, and filler metals equal in strength and compatible in appearance with parent metal joined.

E. Shear Studs: Shall be shear connectors with proper ferrules and accessories, especially designed to create composite deck action between concrete deck and the supporting beam. Steel for studs shall conform to ASTM A108, Grades 1015-1020, with a minimum tensile strength of 60,000 psi. Studs shall be of uniform diameter, heads shall be concentric and normal to shaft and the weld end shall be chamfered, welds shall be solid flux.

F. Primer and Touch-Up Paint:
1. For Standard Shop Coat: Red oxide primer, meeting the requirements of SSPC-Paint 25. Refer to items below which shall not receive paint/primer. Zinc Chromate not permitted.
2. For Architecturally Exposed Steel Members: First coat Tnemec-Zinc 90-97 and second coat Tnemec Series 66, Hi-Build Epoxoline; or PPG No. 97-670 Zinc

Primer with second coat of PPG No. 97-130 HB Epoxy; or Architect approved equal; in color selected by Architect.

3. For Field Touch-Up: Same paint as specified for shop primer coat.
4. Galvanizing: When galvanized steel is required, conform to the following:
   a. Steel: Provide zinc-coating to conform to ASTM A 123.
   b. Threaded Products: Provide zinc-coating to conform to ASTM A 153, Class C.
   c. Steel Sheet: Provide zinc-coating to conform to ASTM A 897.

G. Galvanizing Repair Paint: ZRC Cold Galvanizing Compound or Galvilite manufactured by ZRC Worldwide, Marshfield, MA; Galvax Zinc-rich Cold Galvanizing Coating manufactured by Alvin Products, Inc., Lawerence, MA; or paint complying with military specification MILP-21035A, Type I or II. Apply repair paint in accordance with ASTM A780.

H. Slide Bearings: Reinforced teflon, factory pre-bonded to steel plates with initial static coefficient of friction not exceeding 0.06 at the interface, over a working stress range of 500 to 2000 psi. Bearing shall be one (1) of the following:
1. “Fluorogold” slide bearings manufactured by the Fluorocarbon Company, Pine Brook, New Jersey.
2. “Con-Slide” slide bearings manufactured by Con-Serv, Inc. East Hampton, New Jersey.

I. Shrinkage-Resistant Grout:
1. Type: Premixed, nonshrink, nonmetallic grout, ASTM C1107.
2. Applicable Standards: Corps of Engineers CRD-C 621, with the following exceptions:
   a. Provide a maximum initial set time of 1 hour at 73.4F (+ 5F) and 50% RH.
   b. Minimum compressive strength at 28 days shall be 8,000 psi when placed at fluid consistency.
   c. Expansion shall not be formed by gas liberation.
3. Approved Manufacturers: Specifications are based on first named manufacturer. Other approved manufacturers must meet or exceed this standard.
   a. "Supreme", Gifford-Hill & Company, Inc., Dallas, Texas 75247 (214) 258-7000.
   b. "Masterflow 713", Master Builders Division of Martin Marietta, Cleveland, Ohio 44122 (216) 831-5500.
   c. "Saureisen F-100", Sauereisen Cements Co., Pittsburgh, Pennsylvania 15238 (412) 963-0303.

2.3 FABRICATION

A. Shop Fabrication and Assembly:
1. Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
2. Provide camber in members where indicated. Specified camber applies as at jobsite, just prior to erection, lying down flat so that member weight has no effect. Contractor shall take necessary precautions to prevent or compensate for camber loss during shipment. Measured camber in members up to 50 feet-0 inches long shall be within a tolerance of minus 1/2 inch to plus zero from the amount specified. For members greater than 50 feet-0 inches long, both positive and negative tolerance may increase 1/8 inch for every 10 feet-0 inches of length

in excess of 50 feet-0 inches. Members with a field measured camber outside of the specified tolerance shall be returned to the shop.

3. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
4. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
5. Splicing of structural steel members is prohibited without prior approval of Architect. Any member having a splice not shown or detailed on approved shop drawings will be rejected.
6. Plates shall be free of gross internal discontinuities such as ruptures and delaminations. Plates shall comply with ASTM A 578, Level 1.
7. Mill Tolerances: Comply with ASTM A 6.
8. Fabrication Tolerances: Comply with AISC Code of Standard Practice.

B. Connections:

1. Weld or bolt shop connections as indicated on the Drawings.
2. Bolt field connections, except where welded connections or other connections are indicated. Provide specified threaded fasteners for all principle bolted connections. Holes for bolted connections shall be drilled or punched at right angles to member. The slope of surfaces under the bolt head and nut shall not exceed 1:20. Provide beveled washers where slopes exceed 1:20. Bolt holes shall have a diameter not greater than 1/16 inch larger than the nominal bolt diameter. Do not flame cut holes or enlarge holes by burning. Provide washers over all slotted holes in an outer ply.
3. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC, “Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts”, approved by the Research Council on Structural Connections of the Engineering Foundation.
4. Welded Construction: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axis without warp. Welds not specified shall be continuous fillet welds designed to develop the full strength of member. No combination of bolts and welds shall be used for stress transmission at the same face of any connections.
5. Clean completed welds prior to inspection. Slag shall be removed from all completed welds and the weld and adjacent base metal shall be cleaned by brushing or other suitable means. Tightly adherent splatter remaining after the cleaning operation is acceptable unless its removal is required for the purpose of nondestructive testing.
6. For high-strength, low-alloy steels, follow welding procedures recommended by steel producer for exposed and concealed connections.
7. Base Plates: Hole sizes for anchor bolts may be oversized to facilitate erection as follows:
   a. Bolts 3/4 inch to 7/8 inch Diameter: 5/16 inch oversize
   b. Bolts 1 inch to 2 inches Diameter: 1/2 inch oversize
   c. Bolts over 2 inches Diameter: 1 inch oversize

   Use oversize or plate washers under nut at all oversized holes in base plates. Washers must be large enough to cover the entire hole. Washer thickness shall be at least 1/8 of bolt diameter.

C. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, shaped as shown, to beams and girders in composite construction which do not support metal deck. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.
   1. Installation of Shear Connectors: Shear studs shall be automatically end welded in the shop in accordance with Article 31 of the AWS Structural Welding Code and the specifications of the shear stud manufacturer. After installation, each ceramic ferrule shall be removed prior to placement of concrete. Adequate welding power must be available for studs being welded.
   2. All areas to which studs are to be attached shall be cleaned of all rust, oil, grease, and paint. When the mill scale is sufficiently thick to cause difficulty in obtaining proper welds, it shall be removed by grinding or sand blasting.

D. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

E. Galvanized (Zinc-Coating): All structural steel pieces, exposed to weather or moisture, in permanent contact with soil, or accessible to salt intrusion shall be hot dipped galvanized in accordance with ASTM A123, including, but not limited, to the following:
   1. Exterior exposed steel columns and beams.
   2. Exterior non-conditioned exposed steel under cover.
   3. Masonry shelf angles.
   4. Exterior exposed railings.
   5. Miscellaneous structural metals placed in concrete.
   6. Items shown on Drawings or required.

F. Architecturally Exposed Structural Steel: All exposed structural steel shall be straight and true. Select or straighten members to meet permissible variations of ASTM A6, subject to tolerances of AISC Code of Standard Practice, Chapter 10. Exposed surfaces shall be smooth, free of embedded scale, trademarks, roll imperfection marks, and other irregularities. Fill depressions of whatever kind with weld metal of the same composition as the parent metal. Grind welds and raised marks smooth and flush with adjacent surfaces.

2.4 SHOP PAINTING

A. General: Shop paint structural steel, those members or portions of members except as follows:
   1. to receive a galvanized coating,
   2. to be embedded in concrete or mortar,
   3. surfaces which are to be welded,
   4. to receive sprayed-on fireproofing, and
   5. specifically noted as not shop prime painted

B. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, splatter, and slag or flux deposits. Clean steel in accordance with SSPC recommendations as follows:
   1. For exposed steel in conditioned spaces: SP-3, "Power Tool Cleaning".
   2. For exterior exposed steel: SP-6, "Commercial Blast Cleaning".

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and a rate to provide following dry film thickness. Use painting methods which result in full coverage of joints, corners, edges, and exposed surfaces.
   1. For Standard Shop Coat: Apply specified primer to 2.0 mils.
   2. For Architecturally Exposed Steel Members: Apply first coat specified primer to 3.5 mils and second coat specified primer to 4 to 6 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erector must examine areas and conditions under which structural steel work is to be installed, and notify Contractor of conditions detrimental to proper and timely completion of work.

3.2 ERECTION

A. General: Comply with AISC Specifications and Code of Standard Practice, and as herein specified.

B. Temporary Shoring and Bracing:
   1. Provide adequate shoring and bracing to safely withstand all loads to which the structure may be subjected during the construction process, including wind loads, dead loads, construction material, and equipment loads. Such bracing shall remain in place as long as required for safety.
   2. As the erection progresses, make a sufficient number of permanent welded or bolted connections to withstand erection stresses and maintain stability.
   3. The design of temporary shoring and bracing shall be the responsibility of the Contractor.

C. Temporary Planking: Provide temporary planking and platforms, as necessary, to effectively complete the work.

D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work. Furnish templates and other devices necessary for presetting bolts and other anchors in accurate locations. Refer to Section 03300, Cast-In-Place Concrete for anchor bolt installation requirements in concrete, and Section 04200, Unit Masonry for anchor bolt installation requirements in masonry.

E. Field Assembly:
   1. Set structural frames accurately to the lines and elevations indicated.
   2. Align and adjust various members forming a part of a complete frame or structure before permanently fastening members together.
   3. Clean bearing surfaces and other surfaces before assembly which will be in a permanent contact, before assembly.
   4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   5. Level and plumb individual members to structure within tolerances defined by AISC Code for Standard Practice, unless closer tolerances are required for proper fitting of adjoining or enclosing materials, in which case the most stringent shall apply.

6. Set horizontal members with their natural camber (or specified camber) up.
7. Splice members only where indicated and accepted on final shop drawing.
8. Where parts cannot be assembled or fitted properly, as a result in errors in fabrication or of deformation due to handling or transportation, such condition shall be immediately reported to the Architect, along with proposed method of correction. The straightening of bends or warps shall be performed by approved methods. Bent or damaged heat-treated parts will be rejected.
9. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts and weld connection continuously.
10. Do not use gas-cutting torches in the field for correcting fabrication errors in the structural framing, except on secondary members, which are not under stress. Finish gas-cut sections equal to a sheared appearance.

F. Erection Bolts:
1. On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.
2. On non-exposed welded construction, erection bolts shall be tightened securely and left in place, or if removed, the holes shall be filled with plug welds.

G. Bolted Connections:
1. High-strength bolts shall be installed in accordance with AISC, “Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts”.
2. ASTM A 307 bolts and high-strength (ASTM A 325 and ASTM A 490) bolts noted to be “snug-tight” shall be tightened using a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench, bringing the plies into snug contact.
3. Bolted parts shall fit solidly together when assembled. All joint surfaces shall be free of burrs, dirt and other foreign material that would prevent solid seating of the parts.
4. Hardened washers shall be placed over slotted holes in an outer ply. Hardened beveled washers shall be used where outer face of bolted parts has a slope greater than 1:20 with respect to bolt axis.

H. Field Welding:
1. Comply with AWS D1.1 and AISC Specifications for Structural Steel Buildings. Pay particular attention to surface preparation, preheating, sequence, and continuity of welds.
2. Where heavy shapes are to be welded, comply with all special requirements contained in the AISC Specifications and AWS D1.1.
3. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

I. Unfair Holes:
1. Do not enlarge holes in members, by burning or by use of drift pins, except in secondary bracing members.
2. Ream holes that require enlarging to admit bolts.

J. Gas Cutting:
1. Do not use gas cutting torches in field for correcting fabrication errors in structural framing

2. Cutting will be permitted only on secondary members which are not under stress, as acceptable to the Architect.
3. Finish gas-cut sections equal to a sheared appearance when permitted.

K. Setting Bases and Bearing Plates:
1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing.
2. Set loose and attached base plates and bearing plates for structural members on wedges, or other adjustable devices.
3. Tighten the anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the base or bearing plate prior to placing grout.
4. Mix and place grout in accordance with the manufacturer's instructions.
5. Place grout solidly between bearing surfaces and bases or plates to ensure that no voids remain.
6. Finish exposed grout surfaces.
7. Protect installed materials, and allow grout to cure in accordance with manufacturer's instructions.

L. Field Touch-Up Painting:
1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint.
2. Apply paint to exposed areas with same materials as used for shop painting.
3. Apply by brush or spray, to provide a minimum dry film thickness of 2.5 mils for each coat.

3.3 CLEANING

A. Clean up all debris caused by the Work of this Section, keeping the area clean and neat at all times.

END OF SECTION

SECTION 05 21 00

OPEN WEB STEEL JOISTS AND JOIST GIRDERS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Engineering, labor, materials, and equipment required in connection with or incidental to the furnishing, manufacturing, and erection of steel joists, as described in this Section, shown on Drawings, or reasonably implied there from, including, but not limited to:
   1. Open web steel joists and joist girders
   2. Bridging
   3. Bearing plates
   4. Ceiling extensions
   5. Side wall anchors
   6. Extended ends
   7. Connections
   8. Fabrication inspection and testing.

1.2 RELATED REQUIREMENTS

A. Section 01 45 23 – Testing and Inspecting Services

1.3 RELATED WORK

A. Section 03 30 00 - Cast-In-Place Concrete: Installation of anchorage when bearing on concrete.

B. Section 04 20 00 - Unit Masonry: Installation of anchorage when bearing on masonry.

C. Section 05 12 00 - Structural Steel

D. Section 05 31 00 - Steel Deck

E. Section 05 50 00 - Miscellaneous Metals

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)
   1. A 36, Standard Specification for Carbon Structural Steel
   2. A 307, Standard Specification for Carbon Steel Bolts and Studs 6000 psi Tensile
   3. A 325, Standard Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength
   4. A 490, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi (1035 Mpa) Tensile Strength

B. American Institute of Steel Construction (AISC)
   1. Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts

C. American Welding Society (AWS)
   1. D1.1, Structural Welding Code

D. Steel Joist Institute (SJI), Standard specifications for Open Web Steel Joists
   1. Standard Specifications, Load Tables and Weight Tables
   2. Recommended Code of Standard Practice

E. Steel Structures Painting Council (SSPC)

1. Painting Manual, Volume 1, Good Painting Practice
2. Painting Manual, Volume 2, Systems Specifications

1.5 QUALITY ASSURANCE

A. Joists fabrication, as applicable, shall comply with Steel Joist Institute (SJI) for:
   1. K Series Open Web Steel Joists
   2. LH-Series Longspan Steel Joists
   3. DLH-Series Deep Longspan Steel Joists

B. Manufacturer's Qualifications:
   1. Approved manufacturer as specified in Paragraph 2.1.
   2. Manufacturer shall visually inspect connection welds and shall have a program for regular sampling and testing of connection welds.
   3. Manufacturer shall have a program for establishing shop weld procedures and for qualifying welding operators in accordance with AWS qualification requirements and procedures.

C. Welder's Qualifications:
   1. Contractor shall be responsible for qualifying welding operators employed on the Project in accordance with AWS qualification requirements and procedures and such welder's shall have satisfactorily passed AWS qualification tests in the previous 12 months. Re-testing and re-certification of welders, if required, is the Contractor's responsibility.
   2. All welding, both shop and field shall be performed by welders AWS qualified in the types of welds required for joist construction.

D. Inspection and Testing:
   1. Inspect joists in accordance with SJI Specifications.
   2. All fabrication and erection of joists and connections to supporting members will be subject to verification inspection and testing by an independent testing laboratory, both in the plant and at the jobsite. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. Promptly remove and replace materials or fabricated components, which do not comply. Refer to Section 01 45 23, Testing and Inspecting Services.
   3. If required, perform performance tests in accordance with SJI procedures and recommendations.

1.6 SUBMITTALS

A. Product Data:
   1. Manufacturer's specifications for each type of joist and accessories.
   2. Certified mill tests indicating material compliance with ASTM and SJI Specifications.
   3. Design verification tests evidencing compliance with SJI Specifications regarding joist capacity and member strength.
   4. Manufacturer's installation instructions and procedures. Include details of joints, attachments, and clearances.

B. Shop Drawings:
   1. Design calculations for all joists which the standard load tables are not applicable, prior or with the shop drawings. Calculations shall bear the seal of a Registered Professional Engineer, licensed in the State of Texas. Shop drawings submitted without corresponding calculations will be returned unchecked as an incomplete submittal. Calculations will be retained for the Architect's file, and will not be approved or returned.
   2. Detailed shop drawings indicating dimensioned setting plans, mark, number, type, location and spacing of joists and bridging, connection details, camber, coatings, chord sizes, material properties, and uplift capacity.

3. Provide templates or location drawings for installation of anchor bolts and metal bearing plates.
4. Submit certificate of compliance with SJI “Specifications”

C. Welder’s Certificates: Submit certificates of welder’s employed on the Project who have satisfactorily passed AWS qualification tests in the previous 12 months to Owner’s testing laboratory.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle steel joists in accordance with SJI recommendations.

B. Handle and store joists in a manner to keep joists clean, avoid deforming members and avoid excessive stresses.

1.8 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 – Project Coordination.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Company with membership in SJI, specializing in the fabrication of steel joists of the type specified for this Project with a minimum of five (5) years experience, and complying with specified Quality Assurance requirements.

2.2 MATERIALS

A. Comply with the following requirements:
1. Steel Accessories: ASTM A 36 for steel bearing plates, bridging, wall anchors, etc.
2. Bolts:
   a. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.
   b. High-Strength Threaded Fasteners: ASTM A 325 or A 490, heavy hexagon structural bolts with nuts and hardened washers.
3. Welding Electrodes: SJI and AWS Standards for the types of steel to be welded.
4. Steel Joists: SJI Standards.
5. Shop Primer and Field Touch-Up Paint: Red oxide primer, meeting the requirements of SSPC-Paint 15.
6. Bituminous Coating: Type recommended by manufacturer to suit application of separating joist metal from cementitious materials and dissimilar metals.

2.3 FABRICATION

A. General: Design and fabricate steel joists in accordance with SJI Standards. Contractor alone shall be responsible for errors in fabrication and for correct fitting of joists.

B. Where the applicable loading or span configuration is other than uniformly loaded simple span condition, as covered by the SJI Standard Load Tables, the joist manufacturer shall design the joist for the specific condition shown on the drawings or required, and all temporary construction loading. Deflection of cantilever joists shall be limited to 1/500 of the cantilever length. Design and fabricate steel joists for a maximum deflection of 1/360 of the clear span under the design live load.

C. Seats of roof joists shall be designed to resist lateral load, applied perpendicular to the joist at the top of the seat, equal to 30 percent of the maximum end reaction tabulated in the SJI Standard Load Tables.

D. Joints: Join members by welding in a manner that will produce finished connection of ultimate strength equal to twice the design strength required by the standard load tables. Shop splices may occur in chord or web members. Members containing a butt weld splice

shall develop an ultimate tensile force of at least 57,000 psi times the full design area of the chord or web, as verified by tests.

E. Holes:
   1. Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
   2. Holes in any member shall not be made or enlarged by burning, nor will burning of unfair holes in shop or field be permitted.

F. Accessories: Provide all necessary sag rods, bridging, extended bottom chords and top chords, side wall anchors, wall connectors, headers, and ceiling extensions.
   1. Bridging:
      a. Provide horizontal or diagonal type bridging for joists, complying with SJI Specifications.
      b. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
   2. Extended Ends: Provide extended ends for top chord or bottom chord of joists where indicated. Extension members shall be designed as cantilever beams with their reactions carried back at least to the first panel point of the joist.
   3. End Anchorages: Provide end anchorages including bearing plates, to secure joists to adjacent construction, complying with SJI Specifications, unless indicated otherwise.
   4. Header Units: Provide header units to support tail joists at openings in floor or roof system not framed with steel shapes.
   5. Ceiling Extensions: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless indicated otherwise.

G. Joists shall be provided with positive camber of the magnitude recommended by SJI for the various spans.

H. Welds: Shall meet the following criteria for acceptance:
   1. Prior to inspection, weld slag shall be removed.
   2. Cracks are not acceptable and shall be repaired.
   3. Thorough fusion shall exist between weld and base metal, determined by visual inspection.
   4. Unfilled weld craters shall not be included in the design length of the weld.
   5. Undercut shall not exceed 1/16 inch provided it is oriented parallel to the principal stress.
   6. The sum of surface (piping) porosity diameters shall not exceed 1/16 inch in any one (1) inch of design weld length.
   7. Weld spatter that does not interfere with paint coverage is acceptable.

I. Shop Painting:
   1. Preparation: Remove loose mill scale, heavy rust, and other foreign materials from fabricated joists and accessories.
   2. Apply one (1) shop coat of specified primer paint to joists and accessories by spraying, dipping, or other method to achieve minimum 1.5 mil dry film thickness.

PART 3 - EXECUTION

3.1 PREPARATION

A. Furnish anchor bolts, bearing plates, and other devices, which are to be built into other work, i.e. steel, concrete, and masonry. Provide unfinished threaded fasteners for anchor bolts, with nuts and washers, unless indicated otherwise.

B. Examine supporting work to which joists are to be secured. Do not start placement of joists until supporting work is in place, secured, and ready to receive joists. Notify Contractor of conditions detrimental to proper and timely completion of work.

3.2 ERECTION

A. Handling erecting, and securing steel joists shall be performed by a qualified erector in accordance with SJI Specifications, final shop drawings, and as specified herein.

B. Placing Joists:
1. Set joists to lines, levels, and spacing as indicated.
2. Provide bearing plates as indicated or required to carry out structural requirements.
3. Minimum bearings and anchorage shall conform to referenced SJI Standards and Drawings as related to the particular type of support.
4. Provide adequate temporary bracing and erection connections to assure safety and stability during erection and until permanent connections are completed.
5. Adjust and align in accurate locations and spacing before permanently fastening.
6. Bridging shall conform to referenced SJI standards and information on the drawings. Provide and install extra bridging, where indicated, in addition to minimum SJI requirements. Locate bridging lines where indicated, or if not indicated equally space within SJI limitations. Where “open web” joist lengths are 40 feet or longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines. Install bridging simultaneously with joist erection. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
7. Joists shall be permanently fastened to supports and all bridging and anchorage completely installed before any construction loads are placed on joists.

C. Fastening Joists:
1. Field weld joists to supporting steel framework in accordance with AWS and SJI standards and recommendations for type of joists used. Coordinate welding sequence and procedure with placing of joists.
2. Secure joists supported on masonry or concrete bearing surfaces by bedding in mortar and anchoring to masonry or concrete construction in accordance with SJI standards and recommendations for type of joists used. Coat joist surfaces in contact with mortar, masonry, concrete, or aluminum using bituminous coating.
3. Bolt joists to supporting steel framework in accordance with SJI standards and recommendations for type of joists used.
    a. Provide unfinished threaded fasteners for bolted connections, except where high-strength bolted connections or welded connections are shown.
    b. Provide high-strength threaded fasteners for bolted connections of steel joists to steel columns, at other locations where shown, installed in accordance with AISC recommendations using ASTM A 325 or A 490 bolts.

D. Field Touch-Up:
1. After erection, immediately touch up field welds and other damaged areas, including scratches, in shop coat as erection proceeds. Use same material as shop coat.

E. Remove shop tags prior to completion of the Project.

3.3 NOTIFICATION

A. Notify Architect and Testing laboratory after all structural steel welds are completed.

END OF SECTION

SECTION 05 31 00

STEEL DECK

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Labor, services, materials, supplies, equipment, tools, transportation, and facilities required in connection with or incidental to metal roof decking, as described in this Section, shown on Drawings, or reasonably implied therefrom, including, but not limited to:
   1. Metal decking
   2. Cutting openings 18 inches and smaller in any dimension.
   3. Reinforcing plates, roof sump pans, edge and joint closures, pour stops, and related accessories, as shown or required.

B. The Work of this Section is governed by Section 05 12 00, Structural Steel, except where more stringent requirements are contained herein or on the Structural Drawings.

1.2 RELATED REQUIREMENTS

A. Section 01 45 23 – Testing and Inspecting Services

1.3 RELATED WORK

A. Section 03 30 00 - Cast-In-Place Concrete

B. Section 05 12 00 - Structural Steel

C. Section 05 21 00 - Open Web Steel Joists and Steel Girders

D. Section 05 50 00 - Miscellaneous Metals

E. Section 07 81 00 - Applied Fireproofing

1.4 REFERENCES

A. American Iron and Steel Institute (AISI)
   1. Specifications for the Design of Cold Formed Steel Structural Members

B. ASTM International (ASTM)
   1. A36, Standard Specification for Carbon Structural Steel
   2. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
   3. A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process
   4. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
   5. A924, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
   6. A1008, Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural High-Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable

C. American Welding Society (AWS)
   1. D1.1, Structural Welding Code-Steel

2. D1.3, Structural Welding Code-Sheet Steel

D. FM Global (FM)
1. Approval Guide

E. Steel Deck Institute (SDI)
1. Design Manual for Composite Decks, Form Decks, and Roof Decks
2. Standards

F. Underwriters' Laboratory (UL)
1. Fire Resistance Directory
2. Building Materials Directory
3. Listing and Rating

1.5 QUALITY ASSURANCE

A. Where requirements of this Section are in conflict with requirements noted on the Contract Drawings, or the Building Code, the most stringent requirement shall govern.

B. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

C. Comply with provisions of referenced codes, specifications, and standards, in addition to the Building Code.

D. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code-Steel and AWS D1.3 Structural Welding Code-Sheet Steel.
1. Qualify welding processes and welding operators in accordance with AWS Standard Qualification Procedure. Provide certification to Owner's testing laboratory that welder's have satisfactorily passed AWS qualification tests in the previous 12 months. Retesting and recertification of welders, if required, is the Contractor's responsibility.

E. Labels, Listings, and Ratings:
1. Provide metal deck units, which are listed and conform, to UL "Fire Resistance Directory" with each deck bearing the UL label and marking for specific system detailed. Provide units and construction, which are found in the UL "Building Materials Directory" and conform to UL Uplift Class 90 construction.
2. Provide metal deck units, which have been evaluated by FM and are listed in their "Approval Guide" for Class l fire rated construction.
3. Other tests, listings, and ratings may be used, provided that they are approved by the authorities having jurisdiction and that they were performed by a testing agency approved by the authorities having jurisdiction.
4. Install and anchor roof deck units to resist gross uplift loading of 45 pounds per square foot.
5. Design and fabricate deck for maximum deflection of L/240 of the clear span under the total uniform dead and live load indicated.

1.6 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each type of deck specified or shown. Include cross-sectional and material properties, wind uplift resistance, and diaphragm strength.

B. Certification:

1. Manufacturer's certificate of product compliance with Construction Documents.
2. Manufacturer's certificate of compliance with standards and requirements of authorities having jurisdiction.
3. Welder's certification to Owner's testing laboratory. Refer to Qualification of Field Welding under Quality Assurance.
4. Roof Installation Acceptance Certification: Assist Architect and Owner in preparation and submittal, as may be required in connection with fire, windstorm, and extended coverage insurance.

C. Shop Drawings: Detailed drawings showing type of deck, complete layout, attachment details, closures, edge strips, supplementary framing, and all other accessories. Show supporting members, splices, lap lengths, openings, and deck dimensions on layout. Indicate deck gauge, coating, swaging, and type of side lap. Show attachment using standard AWS welding symbols and weld washer requirements. Show method of installing hangers, flashing and accessories, including reinforcement at openings.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle, and erect steel deck and accessories so as not to damage or deform. Failure to wire brush and paint rusted areas immediately upon detection shall be cause for rejection. Stack deck, stored at site before erection, on platforms or pallets and cover with tarpaulins or other suitable covering to provide weathertight enclosure, while affording proper air circulation. Do not use deck for storage or as a working platform until sheets have been securely fastened in position. Do not damage or overload during entire construction period. Deck damaged in shipping, unloading, or erection is cause for rejection.

1.8 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 – Project Coordination.

1.9 INSPECTION

A. Welded decking in place is subject to inspection and testing by the Owner's testing laboratory. Expense of removing and replacing of portions of decking for testing purposes will be borne by the Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work at no additional expense to Owner. Refer to Section 01 45 23, Testing and Inspecting Services.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers listed who produce products equivalent to those specified are approved for use on the Project. Other manufacturers must have a minimum of five (5) years experience manufacturing products equivalent to those specified and comply with Division 1 requirements for substitutions to be considered.

1. Metal Deck:
   a. Bowman Metal Deck, Division Cyclops Corporation
   b. Epic Metals Corporation
   c. H. H. Robertson
   d. Mac-Fab Products
   e. Omega Metal Building Products, Inc.

f. Roll Form Products
g. United Steel Deck, Inc.
h. Vulcraft, Nucor Corporation
i. Wheeling Corrugating Company

2.2 MATERIALS (As shown)

A. Steel for Deck Units in Exposed Conditions (Galvanized Metal): ASTM A446 Grade A, Structural Quality (unless indicated otherwise on the Structural General Notes); ASTM A525, G-90 zinc coating.

B. Steel for Deck Units in Conditioned Spaces (Painted Metal): ASTM A1008, with minimum yield strength of 33 ksi, shop primed with gray or white baked on, lead and chromate free rust inhibitive primer complying with performance requirements of FS TT-P-664.

C. Miscellaneous Steel Shapes: ASTM A36.

D. Shear Stud Connectors: Headed stud type, ASTM A108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications.

E. Sheet Metal Accessories: ASTM A526, commercial quality, ASTM A525, G-90 zinc coating.

F. Galvanizing: ASTM A924 with a minimum coating class of G60 as defined in ASTM A653.

G. Galvanizing Repair Paint: ZRC cold galvanizing compound or Galvilite manufactured by ZRC Worldwide, Marshfield, MA; Galvax Zinc-rich Cold Galvanizing Coating manufactured by Alvin Products, Inc., Lawerence, MA; or paint complying with military specification MILP-21035A, Type I or II. Apply repair paint in accordance with ASTM A780.

H. Shop Paint: Manufacturer's baked-on rust inhibitive paint, for application to metal surfaces which have been chemically cleaned and phosphate chemical treated, except for decks to receive application of spray-applied fireproofing shall be free of primer and paint.

I. Welding Rods: Shall conform to AWS "Specification for Iron and Steel Arc-Weld Electrodes". Use E70 electrodes.

J. Screws: Shall be self-drilling "TEKS" screws of size indicated on Drawings, manufactured by Illinois Tool Works, Inc., Buildex Division.

2.3 FABRICATION

A. Metal Deck Units, General: Form deck units in lengths to span minimum three (3) supports, with flush telescoped or nested 2 inch laps at ends and interlocking or nested sidelaps, and conforming to SDI Specifications.

B. Roof Deck Units: 20 gauge, 1-1/2 inch deep Type "B" steel deck, with minimum Section Modulus of 0.18 or as shown on Structural Drawings.

C. Floor Deck Units:
1. Fabricate deck units with embossing or raised pattern to provide mechanical bond with concrete slabs.

2. Fabricate open-beam deck units of flutted sections of metal gauge, depth, and width shown on Structural Drawings.

D. Metal Cover Plates:
1. Fabricate metal cover plates for end-abutting floor deck units of not less than same gauge material as decking.
2. Form to match contour of deck units and approximately six (6) inches wide.
3. Fabricate 20 gauge steel plates at vents and other openings in deck, unless indicated otherwise.

E. Metal Closure Strips:
1. Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 18 gauge sheet metal.
2. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine supporting work to which decking is to be secured. Do not start placement of decking until supporting work is in place, secured, and ready to receive decking. Notify Contractor of conditions detrimental to proper and timely completion of work.

B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

3.2 ERECTION

A. General:
1. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently secured. Place units so as to maintain required number of units shown on shop drawings and to prevent stretching or contracting of sidelaps.
2. Cut and neatly fit deck units and accessories around other work projecting through or adjacent to decking as shown or required.
3. Provide reinforcing for openings 18 inches or smaller in any direction. Openings larger than 18 inches are required to be framed openings.
4. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
5. Deck units shall be installed continuous over three (3) or more spans. Adjust to final position with accurately aligned side laps and ends bearing on structural members. On joist framing, ensure the appropriate end lap occurs over a top chord angle of the joist for proper anchorage.
6. Install accessories in accordance with manufacturer's instructions and SDI Standards.
7. Do not use deck units for storage or working platforms until permanently secured.
8. Do not hang ceilings, lights, ducts, pipes, conduit, equipment, and miscellaneous items directly from metal decks, without approval of Architect.
9. Provide metal joint covers at abutting ends and changes in direction.
10. Provide roof sump pans over openings in roof deck.
11. Provide metal closure strips at open uncovered ends and edges of roof deck.

3.3 CONNECTIONS

A. Size, spacing, and location of welds and side lap connections shall be as indicated on the Structural Drawings.

B. Welding sequence and procedure shall be coordinated with the placing of units, and shall be shown on the shop drawings prior to proceeding with work.

C. Weld deck units to structural supports, with end laps of minimum 2 inches occurring over supports in accordance with manufacturer's instructions, AWS and SDI Standards.

D. Weld metal fillers, sump pans, and closure pieces to the deck.

E. Deck metal surrounding welds shall be completely intact after welding. Blow holes will be cause for rejection of work. Weld metal shall penetrate all plies of deck material at end laps and side joints and fuse to supporting steel.

F. Weld shear connectors to supports through decking units in accordance with manufacturer's instructions and AWS Standards.

G. Mechanically fasten side laps of adjacent deck units in accordance with manufacturer's instructions and SDI Standards.

H. Weld closure strips into position to provide a complete decking installation in accordance with manufacturer's instructions and AWS Standards.

3.4 FIELD TOUCH-UP PAINTING

A. After erection, scarred areas on both sides of the deck, including welds, weld scars, bruises, and rust spots, shall be wire brushed and touch-up painted.
   1. Touch-Up on Painted Deck: Same material specified for shop paint.
   2. Touch-Up on Galvanized Deck: Specified galvanized repair paint.

3.5 WORKMANSHIP

A. Piecing and patching deck shall be avoided. Do not install deck units, which are kinked, bent, torn, rusted, or significantly damaged in any way.

B. Improper nesting along sides or ends shall not be permitted. Swaged ends, if used, must be placed on the correct side of non-swaged ends, so that the units nest tightly.

C. Plan and lay out units so that there is adequate contact bearing at all perimeter supports. Check frequently for squareness at intermediate strips, so as to assure proper fitting and connection of the last strip adjacent to walls, parapets, eaves, and ridges. Where a rib occurs at an exterior side support, carefully bend the rib down to bear flat on the support and weld as specified.

D. Deck units having excessive penetrations shall be removed and replaced or have additional support angles installed.

E. Install all necessary accessories and provide a finished surface suitable for the application of insulation and roofing. Deck units or installation deemed by the Architect to be unsatisfactory shall be immediately removed and replaced or otherwise corrected, as directed by the Architect, at no additional expense to the Owner.

3.6 CLEANING

A. Clean up all debris caused by the Work of this Section, keeping the area clean and neat at all times.

END OF SECTION

SECTION 05 50 00

MISCELLANEOUS METALS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Miscellaneous metal items and their related components, which are not necessarily individually described, shall be furnished and installed in accordance with the intent of the drawings and specifications and as required to complete the work.

B. The Work of this Section is governed by Section 05 12 00, Structural Steel, except where more stringent requirements are contained herein or on the Structural Drawings. If a conflict exists, notations on the Structural Drawings take precedence.

1.2 REFERENCES

A. Conform to the following reference standards as applicable to the work:
1. American Institute of Steel Construction (AISC), Code of Standard Practice for Steel Buildings and Bridges, latest edition.
2. American Institute of Steel Construction (AISC), Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings, latest edition.
3. American Iron and Steel Institute (AISI)
4. ASTM International (ASTM)
    a. A36, Standard Specification for Carbon Structural Steel
    b. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
    c. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
    d. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
    e. A307, Standard Specification for Carbon Steel Bolts and Studs 60,000 psi Tensile Strength
    f. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
    g. B210, Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
    h. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
5. American Welding Society (AWS)
    a. D1.1 Structural Welding Code
6. Steel Structures Painting Council (SSPC)
    a. Painting Manual, Volume 1, Good Painting Practice
    b. Painting Manual, Volume 2, Systems Specifications
7. National Ornamental & Miscellaneous Metals Association (NOMMA)
    a. Guideline 1 – Joint Finishes.

1.3 SUBMITTALS

A. Shop Drawings:
1. For off-the-shelf items: Show all layouts, sizes, methods of construction and installation, including sizes and types of all fastening devices.

2. For custom fabricated items: Submit design calculations for the materials and their connections designed by the Contractor, prior to or with the shop drawings. Calculations shall bear the seal of a Registered Professional Engineer, licensed in the State of Texas. Shop drawings containing connections for which calculations have not been received will be returned unchecked as an incomplete submittal. Design Calculations will be retained for the Architect's file, and will not be approved or returned.

B. Samples: As noted.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. As scope and performance documents, the Drawings and Specifications do not necessarily indicate or describe all the work required for the performance and completion of the Work. Contracts will be let on the basis of such documents with the understanding that the Contractor shall furnish and install the items required for proper completion of the Work without adjustment to price or schedule. Work shall be of sound, quality construction and the Contractor shall be solely responsible for the inclusions of adequate labor and materials to cover the proper and timely fabrication and installation of the miscellaneous metal items indicated, described, or implied.

B. As a performance specification, the criteria for the solution of structurally sound miscellaneous metal items indicated on the Drawings or specified herein are the sole purpose of defining the design intent and performance requirements. The details shown are intended to emphasize the acceptable profiles and performance requirements for this Project. To avoid any misunderstanding or lack of interpretation, the Contractor is hereby advised that the responsibility for the miscellaneous metal items are totally his and that designs and resolutions proposed in the Contractor's shop drawings, structural calculations, and related documentation shall be demonstrated throughout the Work and warranty period specified or required.

C. Design proposal submissions which follow exactly the details indicated on the Drawings, will not relieve the Contractor of his responsibility for the design, fabrication, erection, or performance of the Work of this Section.

D. In the event of a controversy over the design, the decision of the Architect will take precedence.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel: Comply with ASTM A36.

B. Welding:
1. Comply with American Welding Society (AWS) Code.
2. Comply with National Ornamental & Miscellaneous Metals Association (NOMMA Guideline 1: Joint Finishes) for joint finishes in the following locations:
   a. Finish #1: Interior handrails and guardrails
   b. Finish #2: Typical ornamental metals exposed to view, interior and exterior, except as indicated above. (canopies, exterior railings and guardrails, non-accessible sculptural fabricated metal, etc.)
   c. Finish #3: Miscellaneous metals exposed interior non-public spaces, and exterior miscellaneous metals, except as indicated above. (ladders, bollards, etc.)

d. Concealed welding: no requirement, unless otherwise indicated or required for safety or conformance with requirements of other portions of the work.

C. Bolts:
1. Comply with ASTM A307.
2. Size: 3/4 inch, unless otherwise noted.

D. Anchors:
1. Expansion bolts:
   a. 1/4 inch or less, Rawl Calk-Ins or Arrow Series 4000.
   b. Greater than 1/4 inch: Rawl Multi-Calks. Top shall be 1/2 inch below concrete surface.
2. Molly screw anchors:
   a. In walls 1/16 inch to 5/8 inch thick, use "S" length
   b. In walls 5/8 inch to 1/4 inch thick, use "L" length
   c. In walls 1-1/4 inch to 1-3/4 inch thick, use "XL": length.
3. Nelson stud anchors:
   a. Comply with ASTM A108.
   b. Concrete Embed: Headed, low carbon steel, non-threaded, galvanized, standard ferrule as required

E. Shop Priming:
1. Shop coat any ungalvanized ferrous metal with primer, except for those to receive application of spray-applied fireproofing shall be free of primer and paint.
2. Clean iron and metal to be primed of scale, dirt and dust by steel scrapers, wire brushers or sandblasting. Remove oil and grease with petroleum naphtha.
3. Thoroughly work paint into all joints by brush. Overall application of brush or spray coat of red oxide primer in accordance with SSPC - Paint 25.
4. Give any painted built-in portions one field coat of primer on all abraded parts after installation.

F. Galvanized Metal:
1. Comply with ASTM A123.
2. General: Galvanize all steel sections which are fully or partially exposed to weather, regardless if they are scheduled to receive a finish coat of paint or not.
3. Galvanized items to be painted shall be primed as outlined in Painting and Staining Section.
4. Hot-dip galvanized after fabrication.
5. Silicone protective coating shall not be used at galvanized items scheduled to receive paint.
6. Galvanizing Repair Paint: ZRC cold galvanizing compound or Galvilite manufactured by ZRC Worldwide, Marshfield, MA; Galvax Zinc-rich Cold Galvanizing Coating manufactured by Alvin Products, Inc., Lawerence, MA; or paint complying with military specification MILP-21035A, Type I or II. Apply repair paint in accordance with ASTM A780.

G. Stainless Steel:
1. General: Comply with ASTM Standards as applicable to the work.
2. Type: Type 302 or 304 as applicable to the work.
3. Finish:
   a. Concealed: No. 2D finish
   b. Exposed: No. 4, unless noted otherwise.

H. Aluminum:

1. General: Comply with ASTM Standards as applicable to work.
2. Type: 6061 or 6063 as applicable to work.
3. Finish:
   a. Concealed: Mill finish
   b. Exposed: Mill finish, or Anodized or Kynar 500 or Hylar 5000 finish a specified in color selected by Architect from manufacturer's standard colors.

2.2 MISCELLANEOUS METAL ITEMS

A. The following is a list of the principal miscellaneous metal items to be furnished under this Section. This list is offered only as a guide and Contractor shall thoroughly check drawings for other miscellaneous metals. All items exposed to the exterior shall be hot-dip galvanized after fabrication.

1. Guard Post (Bollards): Provide 6.625 inch O.D. Schedule 40 hot-dip galvanized steel pipe guard post (bollards) as detailed on the drawings. Fill with 2,500 PSI concrete after installation and round off concrete top. Place in concrete footing as detailed on drawings. Galvanize pipe after fabrication. Paint as directed by Architect in accordance with Section 09900.
2. Removable Guard Post (Bollards): Provide 5.047 inch I.D. Schedule 40 hot-dip galvanized steel pipe sleeve with 1-1/2 inch by 1-1/2 inch by 1/4 inch by 2 inch steel angle with 1/2 inch diameter hole for lock welded to pipe as detailed on the drawings. Plug bottom of pipe to keep from filling with concrete from footing. Place in concrete footing as detailed on drawings. Provide 4.50 inch O.D. Schedule 40 hot-dip galvanized steel pipe insert with 1-1/2 inch by 1-1/2 inch by 1/4 inch by 2 inch steel angle with 1/2 inch diameter hole for lock welded to pipe as detailed on the drawings. Fill smaller diameter pipe with 2,500 PSI concrete after installation and round off concrete top. Hot-dip galvanize all components after fabrication. Paint as directed by Architect in accordance with Section 09900.
3. Sign Posts:
   a. Accessible Parking Sign Posts: 2 inch by 12 inch galvanized steel tube with integral welded galvanized post cap, painted in color selected by Architect.
      1) Post Anchor Bolts: Two (2) galvanized 1/2 inch by 6-1/8 inch Nelson stud anchor bolts welded to steel tube front and back.
   b. Signs: Refer to Section 10426, Graphics.
4. Handrails and Brackets:
   a. Steel Pipe Handrails and Brackets: Furnish and install 1-1/2 inch O.D. Schedule 40 steel pipe rails for outdoor stairs and ramps, unless noted otherwise. Brackets shall be wall type. Include all other components required for finished installation. All work shall comply with local codes and Texas Accessibility Standards (TAS). Hot dip galvanized all components after fabrication.
   b. Aluminum Handrails and Brackets: Furnish and install 1-1/2 inch O.D. aluminum pipe rails for indoor stairs and ramps, unless noted otherwise. Brackets shall be wall type. Include all other components required for finished installation. All work shall comply with local codes and Texas Accessibility Standards (TAS).
5. Steel Ladders: Fabricate from 2-1/2 inch by 3/8 inch flat bar steel stringer with 3/4 inch steel rod rungs let into stringers, welded and ground smooth. Provide all angle supports and anchoring devices for bolting to wall, floor, or structure as required. Hot-dip galvanize after fabrication.
6. Steel Ships Ladders: Fabricate from steel shapes as shown, weld joints and grind smooth. Provide cages where shown. Hot-dip galvanize after fabrication.

Masonry Anchors (At steel columns): Fabricate from 5/16 inch dia. steel, galvanized after fabrication; field weld to columns, space not more then 24 inches o.c. vertically to coincide with horizontal mortar joint elevations. Refer to Structural Drawings.

7. Loose Lintels: Fabricate from steel shapes as shown on drawings, weld joints and grind smooth. Hot-dip galvanize after fabrication.
8. Frame Supports: Construct above ceiling frame supports for aluminum entrances and storefronts, hollow metal frames of channels and/or tubes, with all anchorage devices as detailed or required.
9. Below and Above-Ceiling Supports: Construct of UNISTRUT members or as approved by Architect to size and shaped detailed. All work shall be accurate to 1/8 inch plus or minus. Provide supports complete with fastenings to structure for overhead equipment.
10. Shelf Angles for Masonry: Sizes and shapes as detailed. Use specified galvanized steel for angles on exterior walls. Paint exposed surfaces in accordance with section 09900.
11. Access Doors: Provide one (1) 2 feet-0 inches by 2 feet-0 inches at each restroom plumbing chase wall. If not shown on drawings, locate as indicted by Architect's field representative. Approved Manufacturers: Bar-Co., Cesco Products, J. L. Industries, Karp Associates, Milcor Inc., Nystrom Inc., and The Williams Brothers Corp. Provide painted finish.
12. Foot Scrapers: Fabricate from steel shapes as shown on drawings, weld joints and grind smooth. Hot dip galvanize after fabrication.
13. Condenser Water Pump Base Plate: Fabricate from steel plate with holes for anchor bolts as shown on drawings or required. Hot dip galvanize after fabrication. Provide stainless steel anchor bolts of size, type, and finish as shown or recommended by fabricator to suit application.
14. Stair Safety Nosings:
    a. American Safety Tread Co.
        1) Provide Model 24 at all concrete stairs (concrete risers and treads - not steel pan stairs).
        2) Provide Model 9311 at steel pan stairs to receive a paver tile finish.
        3) Provide Model 8511 at sloped riser - steel pan stairs with a sealed concrete finish.
    b. Additional approved manufacturers:
        1) Balco/Metalines
        2) Safe T Metal Co.
        3) Schluter Systems
        4) Wooster Products, Inc.
15. Conduit Trenches, Frames and Covers:
    a. Trench Pan: Heavy Metal Form Pan with 12 inch interior trench width dimension and four (4) inch depth.
    b. Trench: Type EXTC-B with Type R Cover with recess design to accept vinyl composition tile. Cover shall be set 1/8 inch above concrete floor so that the finished top is flush with the finished VCT floor.
    c. Locations: As shown on drawings.
    d. Acceptable Manufacturer: McKinley Iron Works, Fort Worth, Texas; (800) 792-2273, or Architect approved equal.
16. Sidewalk Trench Covers and Frames: Provide trench covers and frames at sidewalks where shown on drawings or required. Approved Product/Manufacturers: Type TGLB-10 as manufactured by McKinley Iron Works, Fort Worth, Texas; (800) 792-2273; Barrycraft Pedestrian-Handicap/Bicycle Trench Grating B-PED-A2 as manufactured by Barry Pattern & Foundry Company, Inc. Birmingham, Alabama (800) 524-1809; or Architect approved equal.
17. Cast Iron Downspout Boots: Provide cast iron downspout boots conforming to Type DS4 as manufactured by McKinley Iron Works, Inc., Fort Worth, TX; (800)

792-2273, or Architect approved equal. Provide downspout boots with standard rust inhibitive primer. Paint downspout boots in the field to match the color of downspouts as selected by Architect in accordance with Section 09900.

18. Bicycle Racks: Provide and install (3) Single entry bicycle racks. Design Basis for bicycle racks is Porter model number 00391-000. Bicycle Racks shall consist of unitized welded spreader frame constructed from galvanized steel. The unit is approximately 10'-6" long by 3'-6" wide and each shall be constructed to hold (10) bicycles. All hardware and labor shall be provided to anchor the units to the concrete sidewalk as depicted in the drawings.
19. Decorative Aluminum Guardrail and Handrail System:
    a. Panels: All panels are pre-designed 30 inch square aluminum modules with design as indicated on drawings. Powder coated finish shall be as selected by Architect from manufacturer's available colors.
    b. Posts: Standard aluminum post shall be two (2) inches by three (3) inches. Corner post application shall use a three (3) inch square section or, if not a 90 degree corner application, two (2) posts shall be used either side of the corner. Posts shall be mounted to the structure by welding the internal steel supporting structure to an embedded steel plate. Post finish shall be powder coated in color selected by Architect from manufacturer's available colors.
    c. Handrail: 1-1/2 inch O.D. aluminum pipe in satin, non-directional finish.
    d. Location: Second Floor and stairs as indicated on the drawings.
    e. Approved Product/Manufacturer: Design Basis for Panel Railing System as manufactured by Livers Bronze Company, Kansas City, MO (816) 300-2828;
    Architectural Metal Crafts, Houston, TX (281) 449-1881; Big D Metalworks, Dallas, TX (800) 299-9767; Sterling Dula, Austin, TX (512) 794-8617; York Metal Fabricators, Inc., Oklahoma City, OK (405) 528-7495; or Architect approved equal; refer to Division 1 for substitutions process.
24. Field Fabricated Ornamental Railing:
    a. Panels: 2 feet-6 inches by 2 feet-6 inches, steel, paint, match design configuration and intermediate panel component sizes similar to Livers Bronze Style No. 18.
    b. Posts: As shown on drawings, steel, paint.
    c. Corner Posts: As shown on drawings, steel, paint.
    d. Cap Rail:
        1) Style: 3-1/2 inch O.D. Rail Cap.
        2) Metal: Extruded aluminum, clear anodized.
    e. Side Rail: 1-1/2-inch diameter extruded aluminum handrail and bracket as specified above.
    f. Finish:
        1) Paint Color: As selected by Architect from manufacturer's available colors in accordance with Section 09900, Painting
15. Catwalk Structure: Fabricate from steel shapes as shown on drawings. Fabricate floor from standard metal bar grating with rectangular bearing bars and cross bars of size and spaced as required and recommended by NAAMM. Cross bars shall be welded or fused to bearing bars. Ends of grating shall be banded at supports. Weld grating to supports at bearing bars and banded ends. Align all bars in adjacent panels. Provide attachments and all catwalk accessories and miscellaneous supports as indicated. Weld all joints and grind smooth. Shop prime paint and field paint under Section 09900.

a. Stage Area: Provide catwalk accessories and miscellaneous supports as indicated. Refer to Architectural, Structural, and Stage Theater Drawings.

16. Aluminum Column Covers:
    a. Covers shall be extruded aluminum, .145 thickness with clear anodized finish, fabricated in two vertically divided sections attached with demountable interlock assembly.
    b. Fasteners: concealed.
    c. Manufacturer to provide support structures
    d. Locations: as shown on drawings.
    e. Basis of Design: Series 2000 by Pittconn Industries, Riverdale, MD; (800) 637-7638; or Architect approved equal.

B. Other Miscellaneous Items: Miscellaneous metal items and their related components are not necessarily individually described. Miscellaneous items not described shall be furnished and installed in accordance with the intent of the drawings and specifications and as required to complete the work.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Separate all dissimilar metals.

B. Welded Joint Finishes: Where welding is exposed to view, welds shall be executed neatly then ground smooth. Pits and blemishes are not acceptable. Provide joints as stated above in accordance with NOMMA Guideline 1.

C. For manufactured items, adhere to printed manufacturer's installation instructions.

D. Refer to painting section for items that are to receive paint.

END OF SECTION

SECTION 05 51 33.23

ALTERNATING TREAD STEEL STAIRS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Fabricate and Install metal alternating tread stair assemblies in accordance with the requirements set forth in this section.

B. (Note: Terminology used for the component covered by this specification varies among the codes or standards that address the component. This specification uses the term alternating tread stair. MasterFormat 2004 uses the term alternating tread ladder. The International Building Code (IBC) and NFPA-101 (Life Safety Code) use the term alternating tread device.)

1.02 ADDITIONAL WORK INCLUDED IN THIS SECTION

A. Field measurements of alternating tread stair installation sites and verification of vertical distance between floors.

1.03 WORK SPECIFICALLY EXCLUDED IN THIS SECTION

A. The items in this section are not to be included in the metal stair contractor's work:

B. A. Temporary shoring or bracing.
1. Demolition and removal of existing work.
2. Clean up of site prior to installation.
3. Concrete supports or other concrete work
4. Cutting; preparation of pockets; setting of plates, inserts, adapters, or other hardware of built in items.
5. Placement of wire mesh and re-bar for concrete fill
6. Temporary lights or electricity.
7. Temporary safety rails.
8. Protection after erection.
9. Wood trim or moldings, for treads or stringers.
10. Rubber treads or carpets.
11. Slip resistant concrete treatments.
12. Field painting other than touch up of damaged surfaces.
13. Final surface cleaning, passivation, or application of surface protectant after installation.

1.04 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Crossover and Landing platforms used with alternating tread stairs are addressed in Section 05 51 36.

1.05 SUMMARY:

A. Provide all material, labor, equipment and services and perform all operations necessary or required for the work of this section, in accordance with the Drawings and Specifications, and including fabrication and installation of alternating tread steel stairs.

B. Related work specified elsewhere includes but is not limited to:
1. Conventional Metal Stairs in another Division 5 section
2. Metal Fabrications in another Division 5 section
3. Crossover and Landing platforms used with alternating tread stairs are addressed in Section 05 51 36.
4. Painting in Division 9

1.06 REFERENCES

A. American Institute of Steel Construction (AISC)
1. Manual of Steel Construction
2. Code of Standard Practice

B. American Iron and Steel Institute
1. Type 304 Stainless Steel (UNS S30400)

2. Type 1010 Stainless Steel (UNS G10100)

C. American Society for Testing and Materials (ASTM)
   1. ASTM A108-99 Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
   2. ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

D. ASTM A193/A193M-03 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

E. ASTM A240/A240M-03b

F. Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications ASTM A269-04 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

G. ASTM A276-03 Standard Specification for Stainless Steel Bars and Shapes

H. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

I. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

J. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.

K. ASTM A554-03 - Standard Specification for Welded Stainless Steel Mechanical Tubing

L. ASTM A563-00 - Standard Specification for Carbon and Alloy Steel Nuts.

M. ASTM A569/A569M-91a - Standard Specification for Steel, Carbon (.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality (superseded by A1011)

N. ASTM A780-01 - Standard Practice for Repair of Damaged and Un-coated Areas of Hot-Dip Galvanized Coatings

O. ASTM A786/A786M-00b Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates

P. ASTM A1011/A1011M-03 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

Q. ASTM F844-00 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use

R. National Association of Architectural Metal Manufacturers (NAAMM)
   1. NAAMM STANDARD AMP 510-92 Metal Stairs Manual 5th Edition

S. Society of Automotive Engineers
   1. SAE J403 Chemical Compositions of SAE Carbon Steels
   2. SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners

1.07 PERFORMANCE REQUIREMENTS:

A. Alternating Tread Stair Treads: shall be capable of withstanding a single concentrated 1000 pound load without permanent deformation; or 100 pounds per square foot or 300 pounds on an area of 4 square inches without exceeding the allowable working stress of the material.

B. Alternating Tread Stair Guard/Handrail: shall be capable of withstanding a single concentrated load of 200 pounds or a uniform load of 50 pounds per linear foot applied in any direction at any point on the rail without exceeding the allowable working stress of the material.

C. Alternating Tread Stair Stringers: shall be capable of withstanding a single concentrated load of 1000 pounds at any point on the stair without permanent deformation; or a uniform live loading of 100 pounds per square foot applied in a downward direction to all tread surfaces or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material.

1.08 CONSTRUCTION REQUIREMENTS:

A. Landings, Treads, and Mounting Base: shall be stamped and formed from single piece material. Stock shapes, hand forming, or welded remnants shall not be permitted. All stamped parts shall have integrally formed rigidizing bends and shall be spot welded to stringers of like material.

B. Welds: shall be a minimum of 6 welds per tread, and 12 welds each on the landing and mounting base. Each weld shall be quality controlled and be capable of withstanding a minimum of 2800 lbs. in shear.

C. Pedestrian Surfaces: shall be punched through with upset non-skid openings.

D. Riser Spacing: shall be equally spaced to within 3/16" for adjacent risers and to within 3/8" for any two non-adjacent risers on a stair.

E. Guards and Handrails: shall be contoured for body guidance and underarm support and shall be attached to the outside stringers and landings by bolting.

F. Landing Reinforcement: shall be with 1/4" steel angle notched and punched and factory welded to the landing at the points of a guard or handrail attachment.

G. Rubber Foot Divider: shall be affixed to the central portion of the landing. A rubber bumper strip shall be attached or will be provided for field attaching to the central stringer.

1.09 DIMENSIONS:

A. Alternating Tread Stair Angle: 56 or 68 degrees from horizontal as specified in the drawings.

B. Vertical Drop: the change in elevation, as shown in the drawings, between the upper finished floor surface where the top landing will be attached and the lower finished floor surface where the base of the alternating tread stair will be secured.

1.10 SUBMITTALS:

A. Dimensional Prints: shall be submitted for approval prior to fabrication.

1.11 DELIVERY STORAGE AND HANDLING

A. Reference: AISC Code of Standard Practice, sections 6 & 7
   1. Deliver materials to the job-site in good condition and properly protected against damage to finished surfaces.
   2. Store material in a location and manner to avoid damage. Do not stack components. Lay out components on firm foundation material such that bending can not occur.
   3. Store metal components in a clean dry location, away from uncured concrete, cement, or masonry products, acids, oxidizers, rain water, or any other chemical or substance that might damage the material or finish.
   4. Plan work and storage locations to keep on-site handling to a minimum.
   5. Exercise particular care to avoid damage to material finishes or unprotected surfaces when handling.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER:

A. Lapeyre Stair, Inc.

5117 Toler St.

Harahan, LA. 70123;

1-(800)-535-7631 or

1-(504)-570-6209.

B. Substitutions will be considered. Refer to Specification Section 01 25 00 Substitution Procedures.

2.02 2.2 MATERIALS:

A. Carbon Steel:
   1. Treads: 13 Gauge AISI 1010/15 HRPO per ASTM A569 / A1011 grade 36 (or higher).
   2. Landing & Foot Stampings: 11 Gauge AISI 1010/15 per ASTM A569 / A1011 grade 36 (or higher).
   3. Top Landing Support Clips: L2 x 2 x ¼" x 4" lg. with 5/8" F round holes and 5/8" x 1" slot holes, ASTM A569/A1011 grade 36 (or higher)
   4. Stringers:
      a. 2" x 1 3/4" x 11 Gauge U section; AISI 1010/15 per ASTM A569/A1011 grade 36 (or higher) for 56 degree stairs under 10 vertical feet and for 68 degree stairs under 12 vertical feet.

b. 3" x 1 3/4" x 11 Gauge U section; AISI 1010/15 per ASTM A569/A1011 grade 36 or higher for 56 degree stairs over 10 vertical feet and for 68 degree stairs over 12 vertical feet.
c. Handrails: 1 1/2" OD x 0.095" AISI 1010/15 CS per ASTM A569/A1011 cold drawn, fully annealed tube per ASTM A513 grade 1008 or higher As-welded tubing or ASTM A500 Grade B.

B. Stainless Steel:
1. Treads: 13 Gauge AISI 304 SS
2. Landing & Foot Stampings: 11 Gauge AISI 304 SS
3. Stringers:
a. 2" x 1 3/4" x 11 Gauge U section; AISI 304 SS for 56 degree stairs under 10 vertical feet and for 68 degree stairs under 12 vertical feet.
b. 3" x 1 3/4" x 11 Gauge U section; AISI 304 SS 56 degree for stairs over 10 vertical feet and for 68 degree stairs over 12 vertical feet.
c. Handrails: 1 1/2" OD x 0.065" 304 SS cold drawn, fully annealed tube per ASTM A269 seamless or ASTM A554 welded.

C. Fasteners
1. Bolts: handrail to stringer; Hex Head SAE J429 Grade 5, ½" F x 13 TPI
2. Landing to structure; Carriage Head A307 or Hex Head SAE J429 Grade 5, ½" F x 13 TPI
3. Nuts: ASTM A563 Grade 0
4. Washers ASTM F844

D. Miscellaneous Material:
1. Rubber Spine: Hollow neoprene
2. Rubber Foot Divider: Solid neoprene

2.03 2.3 FINISHES:

A. Carbon Steel:
1. Gray Primer: Epoxy Powder Coat or
2. Safety Yellow Paint: Polyester TGIC* Powder Coat or
3. Iron Gray: TGIC*
4. Typical RAL selections: Polyester Powder Coat
5. Hot-Dip Galvanized: per ASTM A123

B. Triglycidyl Isocyanurate
1. Stainless Steel:
2. Natural finish

2.04 FABRICATION:

A. General: Fabricate alternating tread steel stairs to conform with performance and construction requirements, and in accordance with approved shop drawings or dimensional prints. Fabricate and shop-assemble to greatest extent possible.

B. Carbon Steel: gas metal arc welded with treads spot welded to stringers and bolt-on handrails with included bolts using the specified materials.

C. Stainless Steel: gas tungsten arc welded and/or gas metal arc welded with treads spot welded to stringers and bolt-on handrails with included bolts using the specified materials.

PART 3 EXECUTION:

3.01 PREPARATIONS:

A. Coordination: Coordinate start and installation of steel alternating tread stair with all other related and adjacent work. Installation shall not start until the construction has progressed to the point that weather conditions and remaining construction operations will not damage alternating tread stair installation.

B. Verification: Verify that dimensions and angle are correct and that substrate is in proper condition for alternating tread stair installation. Do not proceed with installation until all necessary corrections have been made.

3.02 INSTALLATION:

A. If bumper has not been installed at the factory, install the bumper in accordance with the manufacturer's instructions (peel and stick).

B. Prepare mounting holes.

C. Position alternating tread stair with top tread at same elevation as upper finished floor or roof surface.

D. Secure alternating tread stair with not less than 2 bolts or studs at top and with not less than 2 at bottom of stair.

E. Touch up with matching paint any chipped or abraded damage to factory finish or

F. Touch up any damage to galvanized surfaces using galvanized repair paint in accordance with ASTM A780.

3.03 CLEAN-UP:

A. Leave work area clean and free of debris.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-structural dimension lumber framing.
B. Rough opening framing for doors, windows, and roof openings.
C. Roof-mounted curbs.
D. Roofing nailers.
E. Preservative treated wood materials.
F. Fire retardant treated wood materials.
G. Miscellaneous framing and sheathing.
H. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 01 16 00 - Volatile Organic Compound (VOC) Content Limits.
B. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
C. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2009.
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010
D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2010a.
E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2009a.
F. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010b.
H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2010.
I. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2010.
J. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc; 2009.
K. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.
L. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. LEED Submittals: Submit applicable LEED Submittal Form for each different product made of sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, as well as locally-sourced wood, as specified in Section 01 35 15.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

B. Lumber fabricated from old growth timber is not permitted.

C. Provide sustainably harvested wood; see Section 01 60 00 for requirements.

D. Provide wood harvested within a 500 mile radius of the project site; see Section 01 60 00 for requirements for locally-sourced products.

E. Lumber salvaged from deconstruction or demolition of existing buildings or structures is permitted in lieu of sustainably harvested lumber provided it is clean, denailed, and free of paint and finish materials, and other contamination; identify source; see Section 01 60 00 for requirements for reused products.

F. Lumber fabricated from recovered timber (abandoned in transit) is permitted in lieu of sustainably harvested lumber, unless otherwise noted, provided it meets the specified requirements for new lumber and is free of contamination; identify source.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 STRUCTURAL COMPOSITE LUMBER

A. At contractor's option, structural composite lumber may be substituted for concealed dimension lumber and timbers.

B. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Hoover Treated Wood Products, Inc: www.frtw.com.
      c. Osmose, Inc; Product FirePro: www.osmose.com.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame

spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat rough carpentry items as indicated .
   c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Chemical Specialties, Inc: www.treatedwood.com.
      c. Osmose, Inc; Product MicroPro: www.osmose.com.
   2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.
      c. Treat lumber in contact with roofing, flashing, or waterproofing.
      d. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

E. Specifically, provide the following non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Towel and bath accessories.
   6. Wall-mounted door stops.
   7. Chalkboards and marker boards.
   8. Wall paneling and trim.
   9. Joints of rigid wall coverings that occur between studs.

3.03 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.04 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 74 19.
   1. Comply with applicable regulations.

2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 16 43
GYPSUM SHEATHING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Fiberglass-mat faced, moisture resistant gypsum sheathing.

B. Related Sections:
1. Section 04 05 19.16 - Masonry Anchors.
2. Section 05 41 00 - Structural Metal Stud Framing.
3. Section 06 10 00 Rough Carpentry.
4. Section 09 21 16 - Gypsum Board Assemblies.
5. Section 07 21 16 - Thermal Insulation.
6. Section 07 27 26 - Fluid-Applied Membrane Air Barriers.
7. Section 08 12 13 - Hollow Metal Frames.
8. Section 08 43 13 - Aluminum-Framed Storefronts.

1.02 REFERENCES

A. ASTM International (ASTM):
1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
6. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
7. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

1.03 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.04 WARRANTY

A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay).
1. Manufacturer's Warranty:
a. Five years against manufacturing defects.
b. Ten years against manufacturing defects when used as a substrate in architecturally specified EIFS.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Georgia-Pacific Gypsum LLC:
1. Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Gold.

2.02 MATERIALS

A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:
1. Thickness: 1/2 inch.
2. Width: 4 feet.
3. Length: 8 feet.
4. Weight: 1900 pounds per M square feet.
5. Edges: Square.
6. Surfacing: Coated fiberglass mat on face, back, and long edges.
7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
9. Humidified Deflection (ASTM C1177): Not more than 1/4 inch.

a. Permeance (ASTM E96): 23 perms.
b. R-Value (ASTM C518): 0.56.
c. Acceptable Products:
    1) 1/2 inch DensGlass Gold, Georgia-Pacific Gypsum.

2.03 ACCESSORIES

A. Screws: ASTM C1002, corrosion resistant treated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
    1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

3.02 INSTALLATION

A. General: In accordance with ASTM C1280 and the manufacturer's recommendations.
    1. Manufacturer's Recommendations:
        a. Current “Product Catalog”, Georgia-Pacific Gypsum.

3.03 PROTECTION

A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.

END OF SECTION

SECTION 07 01 50
DETAIL DRAWINGS/ROOF PLANS

1.01 DETAIL DRAWINGS

A. The enclosed details for this project are intended primarily to present the proper installation of the membranes used for waterproofing at flashings, perimeter closures, roof projections, etc. Specific underlying construction configurations, such as walls, nailers, wood backing, structural steel, etc., which may currently be in place may or may not be accurately depicted on the attached details. Unless specifically called out in the accompanying written specifications, or where a detail is noted "AS DRAWN", and/or proper roofing and construction practices are not being followed, underlying construction configurations are to remain unchanged from those in place on the building prior to this reroofing.

1.02 ROOF PLANS

A. Any drawings supplied are for reference purposes only. Dimensions, penetrations, curbs, etc. must be field verified. Those shown are typical but may not be all inclusive, and contractor shall be responsible for the correctness of same. Any existing insulation thickness, deck type or other details shown on the drawings shall be subject to contractor confirmation.

END OF SECTION

SECTION 07 21 13
BOARD INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and
   1. Supplementary Conditions and Division-1 Specification Sections, apply to this Section.

1.02 SUBMITTALS

A. Manufacturer's product literature, including specified physical properties.

B. Installation instructions.

C. Certification that product complies with specification requirements and is suitable for the use indicated.

D. Manufacturer's Thermal Performance Warranty.

1.03 QUALITY ASSURANCE

A. Cavity Wall Insulation shall not be produced with, or contain, any of the
   1. United States EPA regulated CFC compounds listed in the Montreal
   2. Protocol of the United Nations Environmental Program.

1.04 PRODUCT HANDLING

A. Protect insulation from physical damage.

B. Comply with manufacturer's recommendations for handling, storage and protection.

C. Handle boards carefully so corners are not broken off or boards otherwise damaged.

1.05 WARRANTY

A. Provide written warranty that the actual thermal resistance of the extruded polystyrene foam insulation will not vary by more than 10% from its published thermal resistance.

B. Warranty period is 15 years after date insulation is purchased.

PART 2 PRODUCTS

2.01 EXTRUDED POLYSTYRENE BOARD INSULATION

A. Material Properties:
   1. Rigid closed-cell extruded polystyrene thermal board insulation.
   2. Comply with ASTM C 578-95, Type X, density 1.35 lb/cu. ft. min., compressive strength 15 psi (ASTM D 1621-94).
   3. Thermal resistance: 5-year aged R-values of 5.4 and 5.0 min. oF-ft2-h/Btu2/inch at 40oF and 75oF respectively (ASTM C 518-91).
   4. Water absorption: Max. 0.1% by volume (ASTM C 272-91(96).
   5. Surface Burning Characteristics:
      a. Flame Spread: 5.
      b. Smoke Developed: 165.

B. Board Thickness:
   1. Thickness: 2" (R-10).

C. Acceptable manufacturer's product: The Dow Chemical Company
   1. The Dow Chemical Company - STYROFOAM™ Brand CAVITYMATE™ Plus Extruded Polystyrene Foam Insulation.

2.02 ADHESIVE

A. Adhesive: type recommended by insulation manufacturer.

B. Acceptable manufacturer's products:
   1. ChemRex, Inc. "Contech Brands PL300 Foam Board Adhesive".
   2. ChemRex, Inc. "Contech Brands Premium Foam Based Adhesive".

3. Dacar Products, Inc. "Foamgrab PS".

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

A. Verify that masonry joints are struck flush and that other conditions are satisfactory for proper installation.

B. Remove concrete fins and mortar projections that interfere with placement of insulation boards.

3.02 INSTALLATION

A. Apply 2 diameter daubs of adhesive spaced approximately 12” o.c. both ways on inside face of insulation board.

B. Butter all edges of insulation board with adhesive to provide continuous vapor barrier.

C. Fit insulation between wall ties and other obstructions with joints staggered and edges butted tightly.

D. Press units firmly against inside wythe of masonry or other construction.

E. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 24" o.c. both ways.

F. Make insulation continuous. Fill all voids.

3.03 CLEAN-UP

A. Remove and dispose of excess insulation, wrappings and other waste materials.

END OF SECTION

SECTION 07 21 16
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermal insulation in interior walls.

1.02 RELATED SECTIONS

A. Section 07 55 54 - Thermoplastic Protected Membrane Roofing: Roof insulation.

B. Section 23 07 13 - Duct Insulation: Duct liner and duct wrap.

C. Section 23 07 16 - HVAC Equipment Insulation: Insulation on mechanical equipment.

1.03 REFERENCES

A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2000.

B. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 1998.

C. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2000a.

D. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 1998.

E. ASTM C 764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation; 1999.

F. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation; 2000.

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2000a.

H. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; 2000.

I. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 1999.

J. NAIMA - Recommendations for Installation in Residential and Other Light-Frame Construction - Fiber Glass Building Insulation; North American Insulation Manufacturers Association; 1999.

K. NAIMA - Recommendations for Installation in Residential and Other Light-Frame Construction - Fiber Glass Loose Fill Insulation; North American Insulation Manufacturers Association; 1997.

L. TAPPI T 803 - Puncture Resistance of Container Board; TAPPI; 1999.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Submit manufacturer's literature describing the products to be used, showing compliance with specified requirements; include installation instructions.

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

B. Label insulation packages to include material name, production date and/or product code.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Knauf Insulation, which is located at: One Knauf Dr. ; Shelbyville, IN 46176; Toll Free Tel: 800-825-4434; Fax: 317-398-3675; Email: bob.gardner@knaufinsulation.com <mailto:bob.gardner@knaufinsulation.com >; Web: www.knaufinsulation.us.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 APPLICATIONS/SCOPE

A. Above Exterior Soffits: Batt type.
   1. R-Value: 30.

B. Interior Partitions Indicated: Batt type.

2.03 MATERIALS

A. Insulation (Refer to Wall Types for Size) -Un-Faced Batt Insulation: EcoBatt Glasswool thermal insulation complying with ASTM C 665, Type II, Class C; insulation exclusive of facing non-combustible when tested in accordance with ASTM E 136; extra wide stapling flanges.
   1. R-value as indicated when tested in accordance with ASTM C 518.
   2. Size: Maximum sizes available, to avoid jointing to greatest extent possible.
   3. Width for Metal Framing Application: Same as framing center to center dimension.
   4. VOC Emission: Low VOC emission certified by GreenGuard Environmental Institute for Children and Schools.

B. Accessory Materials and Fasteners: Provide all materials required for complete and proper installation of insulation, whether specified or not.

C. Separate Air Barriers: As specified in Section 07 27 26.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this section will be installed.

B. Verify that adjacent materials are dry and ready to receive insulation.

C. Verify mechanical and electrical services within walls have been tested and inspected.

D. Notify Architect in writing of conditions detrimental to performance of work in this section.

E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION - BATTS, BLANKETS, AND BOARDS

A. Install in accordance with NAIMA "Recommendations for Installation in Residential and Other Light-Frame Construction - Fiber Glass Building Insulation" and manufacturer's instructions.

B. Between Metal Studs, Rafters, and Joists: Friction fit insulation between framing members after cover material has been installed on one side of the cavity.
   1. Unfaced Insulation: In applications without a cover material and where framing depth is larger than insulation thickness, use wire or metal straps to hold insulation in place.
   2. Faced Insulation: Tape attachment flanges to face of metal framing prior to applying interior finish.
   3. Wall Heights Over 8 Feet (2440 mm) and Ceilings: Provide supplementary support to hold insulation in place until finish surface is applied.

C. Maintain vapor retarder integrity by tightly abutting adjacent insulation.

D. Repair punctures or tears in vapor retarder facing by taping. Follow tape manufacturer's application recommendations.

E. Do not leave kraft or standard foil facings exposed.

3.03 PROTECTION

A. Protect insulation from damage and from becoming wet before, during and after installation.

END OF SECTION

SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied, vapor permeable weather barrier membrane. (DuPont™ Tyvek® Fluid Applied WB System.)

B. Joint Tape.

C. Flashing: (See also Section 07 65 26 Flexible Flashing System)
   1. Vapor Permeable Elastomeric Flashing. (DuPont™ Tyvek® Fluid Applied Flashing and Joint Compound or DuPont™ Tyvek® Fluid Applied Flashing - Brush Grade, as manufactured by DuPont™)
   2. Flexible Flashing.(DuPont™ FlexWrap™NF)
   3. Sheet Flashing. (DuPont™ StraightFlash™)

D. Joint Compound. (DuPont™ Tyvek® Fluid Applied Flashing and Joint Compound, trowel grade)

E. Sealant. (DuPont™ Sealant for Tyvek® Fluid Applied Systems)

F. Primers for flexible flashing and sheet flashing.

1.02 REFERENCES

A. ASTM International
   1. ASTM C 1250 - Standard Test Method for Nonvolatile Content of Cold Liquid-Applied Elastomeric Waterproofing Membranes.
   2. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
   3. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
   4. ASTM D 4541 - Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
   5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   6. ASTM E 96 - Test Method for Water Vapor Transmission of Materials
   7. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.
   8. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylight, Doors and Curtain Walls by Uniform Static Air Pressure Differences.
   9. ASTM E 779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
   10. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors.
   11. ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
   12. ASTM E 1186 - Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
   13. ASTM E 1677 - Specification for Air Retarder Material or System for Framed Building Walls.
   14. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials
   15. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
   16. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

B. AATCC - American Association of Textile Chemists & Colorists
   1. Test Method 127 Water Resistance: Hydrostatic Pressure Test.

C. TAPPI
   1. Test Method T-460; Air Resistance of Paper (Gurley Hill Method).

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's current technical literature for each component.

B. Quality Assurance Submittals:
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
   2. Manufacturer Instructions: Provide manufacturer's written installation instructions.

3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier system installation.

C. Closeout Submittals:
1. Refer to Section 01 78 00 Closeout Submittals and Section 01 70 00.
2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.04 QUALITY ASSURANCE

A. Qualifications:
1. Installer shall have experience with installation of commercial fluid-applied weather barrier assemblies under similar conditions.
2. Installer shall be trained and certified for installation by manufacturer.

B. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.

C. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

D. Mock-up:
1. Install mock-up using approved weather barrier system including membrane, flashing, joint and detailing compound and related weather barrier accessories according to weather barrier manufacturer's current printed instructions and recommendations.
a. Mock-up size: 10 feet by 10 feet.
b. Mock-up Substrate: Match wall assembly construction, including window opening.
c. Mock-up may [not] remain as part of the work.
d. Contact manufacturer's designated representative prior to weather barrier system installation, to perform required mock-up visual inspection and analysis as required for warranty.

E. Pre-installation Meeting
1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, certified installer, Owner's Representative, and weather barrier manufacturer's designated field representative.
2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier system materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store weather barrier materials as recommended by manufacturer.

1.06 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier system with installation of windows, doors, louvers and flashings to provide a weather-tight barrier system.

B. Schedule installation of exterior cladding within nine months of weather barrier system installation.

1.07 WARRANTY

A. Limited Warranty
1. Manufacturer's warranty for weather barrier for a period of ten (10) years from date of Purchase.
2. Pre-installation meeting and jobsite observations by weather barrier manufacturer for warranty are required.
3. Warranty Areas: [Describe specific areas of work protected and areas of work excluded as required by project conditions].

PART 2 PRODUCTS

2.01 WEATHER BARRIER

A. Manufacturer: DuPont Building Innovations; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE

B. Description: A single-component, low VOC, 25 mil thick synthetic polymer fluid-applied product with superior elasticity and flexibility providing resistance to air flow, bulk water and wind driven rain yet allows moisture vapor to escape.

C. Basis of Design: DuPont™ Tyvek® Fluid Applied WB System; including DuPont™ Tyvek® Fluid Applied WB, DuPont™ Tyvek® Fluid Applied Flashing and Joint Compound, DuPont™ Tyvek® Fluid Applied Flashing - Brush Grade and DuPont™ Sealant for Tyvek® Fluid Applied Systems.

D. Performance Characteristics:
1. Air Penetration: 0.0002 cfm/ft2 at 75 Pa, when tested in accordance with ASTM
2. E 2178. Type I per ASTM E 1677 and ? 0.01 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E 2357.
3. Water Vapor Transmission: 25 perms, when tested in accordance with ASTM
4. E 96, Method B at 25 mils DFT (Dry Film Thickness).
5. Water Penetration Resistance: Greater than 1000 cm when tested in accordance with AATCC Test Method 127. No leakage at 15 psf when tested in accordance with ASTM E 331.
6. Air Resistance: Air infiltration greater than 10,000 seconds per 100cc, when tested in accordance with TAPPI Test Method T-460.
7. Tensile Strength: Minimum 169 lbs/in2, when tested in accordance with ASTM
8. D 412.
9. Estimated Elongation: 420% in accordance with ASTM D 412.
10. Hardness: Passes at a Shore A hardness of 71, when tested in accordance with ASTM D 2240.
11. Surface Burning Characteristics: Class A, when tested in accordance with ASTM
12. E 84. Flame Spread: 25, Smoke Developed: 25.
13. Accelerated Weathering: 9 month exposure of membrane to ultraviolet light (UV) in accordance with ASTM G 155.
14. Volatile Organic Content (VOC): Less than 2% when measured in accordance with ASTM C 1250.
15. Adhesion Strength (Concrete): Greater than 33 psi when measured in accordance with ASTM D 4541.

2.02 ACCESSORIES

A. Joint Tape: Self-adhered fiberglass mesh tape as recommended by weather barrier manufacturer.

B. Flashing:
1. Flexible flashing with butyl adhesive layer.
   a. Product: DuPont™ FlexWrap™ NF.
2. Sheet flashing with butyl adhesive layer.
   a. Product: DuPont™ StraightFlash™.

C. Joint Compound: Fluid-applied, vapor permeable, elastomeric flashing material; trowel applied.
1. Product: DuPont™ Tyvek® Fluid Applied Flashing and Joint Compound.

D. Sealant: Elastomeric; non-vapor permeable sealant; compatible with weather barrier.
1. Product: DuPont™ Sealant for Tyvek® Fluid Applied Systems.

E. Primers for flexible flashing and sheet flashing:
1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
2. Products:
   a. 3M High Strength 90
   b. Denso Butyl Spray
   c. (Specifier Note: SIA product meets California VOC requirements.)
   d. SIA 655
   e. Permagrip 105
   f. ITW TACC Sta' Put SPH

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 PREPARATION

A. Complete surface preparation, priming, flashing and detailing of openings, cracks, and material transitions prior to beginning installation of fluid-applied weather barrier system.

B. Surfaces shall be clean and free of frost, oil, grease, mold and efflorescence prior to application of fluid-applied weather barrier system.

3.03 INSTALLATION - DETAILING

A. (Specifier Note: Either option for preparation of corners is acceptable to manufacturer, select one and delete the other.)

B. Corners: Apply primer to outside and inside corners, extend 2 inches on each side of corner. Center sheet flashing over corner and press firmly in place per manufacturer's recommendations. Apply ½ inch fillet bead of joint compound applied to full-height of inside corners.

C. Joint treatment:
   1. Sheathing:
      a. Joints shall be prepared per manufacturer's approved joint treatment details.
      b. Apply joint tape as recommended by fluid-applied weather barrier manufacturer.
         1) No joint treatment required for joints up to 1/16 inch.
         2) Joints 1/16 to 1/4 inch: Joint compound applied to form a 1 inch width on each side of sheathing joint; smooth joint compound across sheathing joint. Thickness shall be 15 to 25 mils.
         3) Joints 1/16 to 1/2 inch: Apply joint tape to bridge both sides of joint equally. Apply joint compound and trowel smooth embedding joint compound uniformly into joint tape to form a 1 inch width on each side of sheathing joint at a consistent thickness of 15 to 25 mils.
         4) Joints 1/2 to 1 inch: Apply sheet flashing primer above and below sheathing joint. Center sheet flashing over sheathing joint and press firmly in place per manufacturer's recommendations.
         5) Non-movement joints in masonry and transitions to columns and beams:
            (a) Joints 1/4 inch wide or less: Apply joint compound a minimum of 2 inches wide by 60 mils thick to each side of joint or crack.
            (b) (Specifier Note: Either option for preparation of joints is acceptable to manufacturer, select one and delete the other.)
            (c) Joints 1/4 to 1/2 inch: [Apply joint tape to joint, then apply joint compound to joint 2 inches wide by 60 mils thick.] or [Apply primer 2 inches on each side of joint. Center sheet flashing over joint and press firmly in place per manufacturer's recommendations.]

D. Apply joint compound to cladding anchors prior to installation of weather barrier membrane per manufacturer's instructions.

E. Apply joint compound around penetrations in exterior walls forming a fillet bead minimum ½ inch onto each surface.

F. Installation - Vapor permeable elastomeric flashing at openings:
   1. At jambs and head of rough opening: Apply 25 mil thickness of flashing to full depth of opening and 2 inches outside face of opening.
   2. At sills: Apply primer to substrates as recommended by manufacturer. Cut sheet flashing to fit directly between jambs of opening. Install sheet flashing to full width of sill opening and down onto outside face of opening a minimum of 6 inches. Cover sheet flashing with 25 mil thickness of vapor permeable elastomeric flashing per fluid-applied weather barrier manufacturer's instructions.
   3. OR

G. Installation - Flexible flashing at openings:
   1. Prime substrates as recommended by self-adhered sheet membrane flashing manufacturer. Cut sheet membrane flashing a minimum of 12 inches longer than length of sill rough opening.
   2. Cover horizontal sill by aligning sheet membrane edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure sheet membrane tightly into corners by working in along the sill before adhering up the jambs.
   3. Fan sheet membrane at bottom corners onto face of wall. Firmly press in place.

4. Apply 9-inch wide strips of sheet membrane at jambs. Align sheet membrane with interior edge of jamb framing. Start sheet membrane at head of opening and lap sheet membrane at sill.
5. Install sheet membrane at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
6. Coordinate flashing with fluid-applied weather barrier and window installation.

H. Allow Flashing, Joint Compound and Sealant to cure for minimum 24 hours before coating with Fluid-applied Weather Barrier.

3.04 INSTALLATION - FLUID-APPLIED WEATHER BARRIER

A. Install fluid-applied weather barrier prior to installation of windows, doors, and louvers.

B. Mask and protect any adjacent finished surfaces from fluid-applied weather barrier material.

C. Install fluid-applied weather barrier over exterior face of required exterior wall substrates in accordance with weather barrier manufacturer recommendations and instructions.

D. (Specifier Note: Pressure-rolling is the preferred method of application of weather barrier. When using spray applied application, weather barrier must be backrolled.)

E. Install fluid-applied weather barrier by [pressure-rolling method] [or] [spray and backrolling method] to achieve 25 mils providing a consistent and uniform thickness.

F. Repair any voids, holidays, or non-uniform installations or damage by other trades to proper mil thickness prior to installation of final cladding assemblies.

3.05 FIELD QUALITY CONTROL

A. Notify weather barrier manufacturer's designated representative to obtain [required] periodic observations of weather barrier system installation.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections as required in Contract Documents.

C. Inspections: Weather barrier materials, accessories, and installation are subject to inspection for compliance with performance requirements.

D. Tests: As determined by Owner's testing agency from among the following tests:
1. Quantitative Air-Leakage Testing: Weather barrier assemblies will be tested for air leakage according to ASTM E 783.
2. Qualitative Air-Leakage Testing: Weather barrier assemblies will be tested for air leakage according to ASTM E 779.
3. Qualitative Water-Leakage Testing: Weather barrier assemblies will be tested for water leakage according to ASTM E 1105.
4. Qualitative Air-Leakage Testing: Weather barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186.

E. Weather barriers assemblies will be considered defective upon failure of inspections and specific project testing required.
1. Apply additional fluid-applied weather barrier material, in accordance with manufacturer's instructions, where inspection results indicate insufficient thickness, voids, skips, pinholes or other defects as recommended by weather barrier manufacturer.
2. Remove and replace deficient weather barrier system components for retesting as specified above.

F. Repair damage to weather barriers caused by destructive testing; follow manufacturer's written instructions.

3.06 PROTECTION AND CLEANING

A. Protect weather barrier from contact with incompatible materials and sealants not approved per weather barrier manufacturers recommendation.

B. Protect installed weather barrier system from damage during construction prior to cladding installation.
1. If damaged or exposed to UV beyond nine (9) months, clean and prepare surfaces and install additional, full-thickness, fluid-applied weather barrier application in accordance with weather barrier manufacturer's instructions.

C. Remove masking materials and adjacent protection after weather barrier installation.

END OF SECTION

SECTION 07 42 13
METAL SOFFIT PANELS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Preformed, prefinished soffit panels.
   2. Fasteners.
   3. Underlayment.

B. Related Sections
   1. Section 05 12 00 - Structural Steel Framing
   2. Section 05 31 00 - Steel Decking
   3. Section 0792 03 - Silicone Joint Sealants

1.02 REFERENCES

A. Aluminum Association (AA)
   1. AA-C22-A41: Clear Coatings
   2. AA-C22-A42: Integral Color Coatings
   3. AA-C22-A44: Color In Process

B. American Society for Testing and Materials (ASTM)
   1. ASTM A167: Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
   2. ASTM A653: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanized) by the Hot-Dip Process
   3. UC-500
   4. ASTM B137: Test Method for Measurement of Coating Mass Per Unit Area of Anodically Coated Aluminum
   5. ASTM B209: Specification for Aluminum and Aluminum-Alloy Sheet and Plate
   6. ASTM B370: Specification for Copper Sheet and Strip for Building Construction
   7. ASTM D226: Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

C. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
   1. Architectural Sheet Metal Manual

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01330:
   1. Product Data: Manufacturer's product literature for the roofing specified.
   2. Shop Drawings: Indicate thickness and dimension of parts, flashing and anchoring methods, and detail and location of joints; including joints necessary to accommodate thermal movement.
   3. Samples
      a. 2 samples of each type of panel assembly, 12 inch by 12 inch minimum.
      b. 6 samples of each finish in color or colors selected, 3 inch by 5 inch minimum.
   4. Affidavit certifying that the material meets the requirements specified.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of 5 years experience in manufacturing metal panels similar to those specified.

B. Installer Qualifications: Acceptable to panel manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project site in manufacturer's original crating, properly labeled for identification and installation purposes. Store materials in accordance with panel manufacturer's recommendations. Handle materials carefully to avoid damage to panels and finishes.

B. C-500

1.06 WARRANTY

A. The Contractor shall warrant the materials to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be

extended by paint manufacturer's standard multi-year warranty. The warranty shall be in writing and shall be signed by the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Firestone Metal Products

B. Other manufacturers seeking approval of their products must comply with requirements of the Instructions to Bidders (AIA Document A701), Paragraph 3.3 prior to bidding.

C. Other manufacturers seeking approval of their products must comply with requirements of Section 01 60 00 during construction.

2.02 PANEL TYPE

A. UNA-CLAD UC-500 Flush Seam Panels, roll formed aluminum soffit panels.

2.03 PANEL MATERIALS AND FABRICATION

A. Aluminum Panels: ASTM B209, Aluminum Association specification sheet 5005-H34 for anodized finish.
   1. Thickness: 0.040 inch.

2.04 ACCESSORIES

A. Fasteners: Concealed, non-corrosive, 5/8 inch self-tapping sheet metal screws for securing to metal substrate.

B. Underlayments
   1. Non-asphaltic fiberglass-based underlayment meeting ASTM D146, D1922 and D4869.
   2. Waterproof Membrane: ASTM D1970, self-adhering rubberized sheet membrane.

2.05 FINISHES

A. Coil-Coated Fluorocarbon Resin

B. Color: Selected by ERO Architects from manufacturer's standard colors.

C. Number of Coats: 3-coat min., dependent on color selection.
   1. Provide factory applied strippable plastic film for protection during fabrication and installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which materials are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Surfaces to receive panels shall be even, smooth, sound, clean, dry, free of ice and snow, and free from defects.

3.02 PREPARATION

A. Obtain field measurements prior to completion of manufacturing and finishing. When field measurements are not possible, provide method of installation that will allow minor adjustment in the field.

3.03 INSTALLATION

A. Install panel system plumb, level and true, in accordance with manufacturer's instructions, final shop drawings, and SMACNA Architectural Sheet Metal manual and standard practices.

B. Install starter and edge strips before underlayment is installed.

C. Install underlayment over entire substrate to receive panel system, in shingle fashion, lapping ends and edges 6 inches minimum.

D. Completed system shall be free from overbending, deforming, stretching. distortion, waves, and buckles.

E. Note to Specifier: A certain amount of waviness called 'oil canning' is inherent in any product manufactured from coiled sheet material. The amount of 'oil canning' can vary due to several factors: uneven substrates, the width of the panel, weather conditions, etc. Minor 'oil canning' of a panel does not affect its structural integrity and is not sufficient cause for rejection.

3.04 ADJUSTING AND CLEANING

A. Repair panels with minor damage.

B. Remove panels damaged beyond repair and replace with new panels to match adjacent undamaged panels.

C. Clean exposed panel surfaces promptly after installation in accordance with recommendations of panel and coating manufacturers.

D. Remove protective film immediately after installation.

END OF SECTION

SECTION 07 54 19

FULLY ADHERED MULTI-PLY ROOF SYSTEM

PART 1 GENERAL

1.01 AREAS COVERED

A. Low Slope Roof Areas

1.02 INSTALLER QUALIFICATIONS

A. Roofing Installer must be:
   1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.
   2. Currently in good standing with the manufacturer.

B. It shall remain each Contractor's responsibility to determine his current status with the manufacturer's certification plan.

1.03 QUALITY ASSURANCE

A. Applicator/Installer:
   1. Acceptable to roof material manufacturer for the manufacturer's warranty requirements.
   2. Five (5) years successful experience on projects similar in size and scope.
   3. Experienced in the type of roofing work required.
   4. Successfully completed previous projects warranted by the manufacturer.

B. Testing Laboratory Services: Test results shall meet or exceed established standards.

C. Underwriters Laboratory (Roofing Covering): Class A fire hazard classification.

D. Comply with governing local, state, and federal regulations, safety standards, and codes.

E. Manufacturer Qualifications:
   1. A qualified manufacturer that has been UL Listed and has FM Approvals for membrane roofing system similar to that used in this project for a minimum of fifteen (15) years.
   2. The roofing membrane manufacturer shall be defined as a company which makes the primary roofing membrane and flashing membrane in its own factories from raw materials. No “Private Label” material, in which one company’s name goes on a product manufactured by others, is acceptable for this project.

F. Manufacturer’s Inspection Reports: Beginning with the commencement of the roofing system installation for the project and continuing through the completion of the roofing system installation and all its associated components, the Roofing System Manufacturer or their appointed representative will provide written inspection reports as follows and this shall be confirmed in writing by the manufacturer and made part of the roofing submittals.
   1. Keep the Architect / Owner informed as to the progress, status, and quality of work as observed.
   2. Provide jobsite major phase inspections twice each week throughout the installation of the roofing system and its associated components.
   3. Provide detailed weekly reports to the Architect, Owner, Contractor, and Subcontractor along with digital photographs of work in progress. These reports and photographs shall be descriptive of actual work in progress and be presented in a written format with color photographs.
   4. Report to the Architect / Owner in writing any refusal or failure of the Contractor to correct unacceptable practices or conditions called to the Contractor’s attention.
   5. Confirming, after completion of the project and based on manufacturer’s observations and with the plans and specifications or the manufacturer’s installation requirements for warranty other than those that may have been previously reported or approved.
   6. The roof system manufacturer shall, perform annual inspections of the roof system at no additional cost to the owner. These inspections shall include a written report with photographs for presentation to the Owner. Inspections are to be scheduled and coordinated with the Owner and performed by the manufacturer’s representative. Nothing shall be required of the Owner other than providing access to the roof system.
   7. It will be the sole responsibility of each bidder to ensure these conditions are to be met by the roofing system manufacturer or their appointed representative prior to bidding.

1.04 REFERENCES (INCLUDING LATEST REVISIONS)

A. American Society for Testing and Materials:
   1. ASTM B 209 - 90, Specification for Aluminum and Aluminum Alloy Sheet and Plate
   2. ASTM C 719 - 86, Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle)
   3. ASTM C 794 - 80 (1986), Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
   4. ASTM C 920 - 87, Specification for Elastomeric Joint Sealants
   5. ASTM D 312 - 89, Specification for Asphalt Used in Roofing
   6. ASTM D 1863 - 86, Specification for Mineral Aggregate Used on Built-up Roofs
   7. ASTM D 2178 - 89, Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
   8. ASTM D 2824 - 85, Specification for Aluminum - Pigmented Asphalt Roof Coatings
   9. ASTM D 4586 - 86, Specification for Asphalt Roof Cement, Asbestos Free
   10. ASTM A 361 - 90, Sheet Steel, Zinc-Coated (Galv.) by the Hot-Dip Process for Roofing and Siding
   11. ASTM C 177, Test for Thermal Laboratory Services
   12. ASTM C 728, Perlite Thermal Insulation Board

B. Federal Specifications:
   1. LLL-I-535B
   2. SS-A-701B
   3. SS-C-153
   4. SS-C-153C
   5. SS-R-620B
   6. TT-C-498C
   7. TT-P-320D
   8. TT-S-00227E
   9. TT-S-00230C
   10. SS-S-001534 (GSA-FSS)
   11. L-P-375

C. Industry Standards:
   1. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
   2. Single-ply Roofing Institute (SPRI) - A Professional Guide to Specifications Manual
   3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual
   4. American Society of Civil Engineers - ASCE 7

1.05 SUBMITTALS

A. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
   1. Samples of all roofing system components including all specified accessories.
   2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
   3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
   4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.
   5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumens.
   6. Written confirmation from manufacturer’s stating conformance to quality assurance as listed above in Section 1.03, Quality Assurance, Item F, Nos. 1 thru 7.

B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.

C. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.

E. Handle rolled goods so as to prevent damage to edge or ends.

F. Select and operate material handling equipment so as not to damage existing construction or applied roofing.

G. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.

H. Store rolled goods on end.

I. Protect materials against damage by construction traffic.

J. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.

K. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.

L. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.

M. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day.

1.07 SITE CONDITIONS

A. Job Condition Requirements:
   1. Apply roofing in dry weather.
   2. Do not apply roofing when ambient temperature is below 40° F (4° C).
   3. Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The Owner's personnel will be erecting interior protection for equipment, if required. The contractor is to schedule his work so that adequate time is allowed for the Owner’s personnel to perform the work. No roof work shall be performed until the Owner’s personnel have completed erection of the interior protection in that area.
   4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
   5. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing material than can be reinstalled in any working day.
   6. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
   7. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.
   8. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, use the stricter document.
   9. Follow insurance underwriter's requirements acceptable for use with specified products or systems.

10. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.
11. All kettles shall have an automatic thermostat control, and temperature gauge, all in working order.
12. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above mentioned items.
13. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Owner's representative of any problems in this regard prior to commencing cleaning operations.
14. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project. These will be removed after the completion of the project. All portable facilities shall comply with local laws, codes, and regulations.

B. Protection of Work and Property:
   1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.
   2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.
   3. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner's Project Manager is to have the 24 hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner's Project Manager are to be both home and office numbers for:
      a. Job Foreman
      b. Job Superintendent
      c. Owner or Company Officer

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Use of Premises:
   1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
   2. The contractor shall:
      a. Coordinate work in such a manner as to not interfere with the normal operation of the building.
      b. Assume full responsibility for protection and safekeeping of products stored on premises.
      c. Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.

F. Cleaning and Disposal of Materials:

1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

1.08 WARRANTY

A. Twenty (20) Year NDL with no exclusion for 2" hail occurrence Warranty: The complete roofing system shall be guaranteed for a minimum of twenty (20) years from the date of Substantial Completion for this project. Guarantee responsibilities shall be as follows:
   1. Roofing contractor shall guarantee the entire roofing system for a period of two (2) years from the date of Substantial Completion.
   2. The materials manufacturer shall guarantee the entire roofing system for a total period of twenty (20) years from the date of substantial completion.
   3. Membrane manufacturer shall provide the written warranty as specified.
   4. The entire roofing system shall be guaranteed to be watertight and against any failures of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner.
   5. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty.

B. During the proposal period each Contractor shall make arrangements with the materials manufacturer to provide the required warranty. Refer to SUBMITTALS paragraph in this section for requirements concerning submittals of warranty.

1.09 SELECTION CRITERIA FOR QUALIFYING ROOFING PROPOSALS

A. It is not the policy of the School District to purchase on the basis of low price alone. In evaluating proposals submitted, the District has the right under the Texas Education Code, Section 44, to take several items into consideration before entering into a contract. These considerations can include, but are not limited to:
   1. Unit price.
   2. Total proposal price.
   3. Suitability for the intended use.
      a. Proposed system shall follow NRCA guidelines and the system manufacturer's published specifications, and be installed in accordance with governing building codes, Factory Mutual, Underwriter's Laboratories, SMACNA, etc.
      b. Is lap integrity dependent upon: 1) hot-air fusion monolithic weld, membrane to membrane; 2) adhered, cold adhesive; 3) adhered, hot bitumen; 4) laminated, torch applied SBS or APP product?
      c. To substantiate Quality Assurance, please submit:
         1) Sample of field report.
         2) Number of weekly jobsite visits to be performed.
         3) Sample of job manifest.
      d. Warranty Comparison
         1) Warranty must be provided by manufacturer of membrane.
         2) Submit disclaimers that affect proposed warranty. Does the published warranty list an exclusion for hail; i.e., is the warranty voided by hail? If there is no disclaimer in the published warranty, submit documentation stating what size hail the system is warranted up to, including historical supporting data and testing.
         3) Submit documentation stating who is responsible for maintaining the integrity of laps in proposed system after contractor warranty expires.
         4) Submit documentation to designate what specifically constitutes Owner's responsibilities concerning roof maintenance and what maintenance is specifically manufacturer's responsibility.

5) Submit documentation stating that standard warranty shall cover all base flashing, parapet wall flashing, and top of parapet wall flashing.

4. Attendance at Pre-Proposal Walk-Through Conference.
5. Probability of continuous availability and total long-term prices to acquire the vendor's goods and services.
6. The reputation of the vendor and the vendor's goods and services.
7. The quality of the vendor's goods and services.
8. The extent to which the goods or services meet the District's needs.
9. The vendor's past relationship and past performance with the District.
10. Date of proposed delivery and placement.
11. Safety record of vendor.
12. Financial and technical resources of contractor adequate to service contract.
13. Any relevant factor that a private business entity would consider in selecting a vendor.
14. Qualification of insurance and bonds.

PART 2 PRODUCTS

2.01 GENERAL

A. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

B. Materials herein specified shall be supplied or approved in writing by the manufacturer issuing the warranty.

C. The white polyester reinforced fleece backed adhered Elvaloy® roofing system shall only be applied by manufacturer approved and trained roofing contractors.

D. The manufacturer shall have 15 years UL listing for the membrane to be used on the project. Membrane manufacturer shall have a minimum of 15 years FM approval, and 15 years manufacturing experience with the roofing membrane specified for this project.

E. All roofing and roof accessories shall be installed in compliance with manufacturer's current specifications and details.

F. All materials used on the project shall be asbestos free.

2.02 ROOFING MEMBRANE

A. The white 67 mil polyester reinforced fleece backed Elvaloy® membrane shall have the following minimum physical properties.

B.

Property	**Test Procedure**	**Physical Properties**
Color	ASTM D 751	White
Thickness	ASTM D 751	67 mil Nominal
Roll Size		76" x 90’
Breaking Strength	ASTM D 751	537 x 457 lbf
Seam Strength	ASTM D 751	90%
Elongation @ Break	ASTM D 751	35% x33%
Heat Aging	ASTM D 3045	greater or equal 90 %
Tear Strength	ASTM D 751	119 lbs x 86 lbs
Low Temp Bend	ASTM D 2136	Pass (-40° F)
Puncture Resistance	FTMS 101C	448 lbs.
Static Puncture Resistance	ASTM D 5602	pass @ 33 lbs.
Dynamic Puncturing	ASTM D 5635	pass @ 20J
Permeance	ASTM E 96	.003 Perms
Dimensional Change	ASTM D 1204	0.1%
Water Immersion	ASTM D 570	.41%
Fungi Resistance	ASTM G 21	pass no growth

Solar Reflectivity	ASTM E 903	0.822
Emissivity	ASTM E 903	0.915
Solar Reflectance Index (SRI)	ASTM E 1980	109
Solar Emissivity	ASTM E 903	0.919
Solar Reflectance Index (SRI)	ASTM E 1980	109
Solar Emissivity	ASTM E 903	0.919
Solar Reflectance Index (SRI)	ASTM E 1980	109

2.03 FLASHING MEMBRANE

A. The flashing membrane shall be a white Elvaloy® polyester reinforced flexible sheet.

B.

Property	**Test Procedure**	**Physical Properties**
Color		White
Thickness	ASTM D 751	.063" Nominal
Breaking Strength	ASTM D 751	412 x 538 lbf
Tearing Strength	ASTM D751	111 x 110 lbf
Elongation	ASTM D 751	29% x 31%
Heat Aging	ASTM D 3045	greater or equal 90% of Original
Low Temperature Bend	ASTM D 2136	Pass @ -40°C
Seam Strength	ASTM D 751	100 %
Accel. Weathering	ASTM D 2565	10M hrs. (No Change)
Linear Dimensional Change	ASTM D 1204	0.5% maximum
Wt. Change after Immersion	ASTM D 570	0.41% maximum
Static Puncture Resistance	ASTM D 5602	Pass @ 33 lbs
Dynamic Puncture Resistance	ASTM D 5635	Pass @ 20 J
Underwriters Laboratory		Class A
Factory Mutual		Class 1-90
Solar Reflectivity	ASTM E 903	0.811
Solar Emissivity	ASTM E 903	0.919
Solar Reflectance Index (SRI)	ASTM E1980	109

2.04 NON-REINFORCED MEMBRANE

A. The non-reinforced membrane shall have the following minimum properties,
   1. Description: Non-reinforced thermoplastic white membrane, thickness approximately 45 mils.
   2. Use: Inside/outside corners, multiangled intersections, sealant pockets and other conditions where molding of the membrane is required.

2.05 BITUMEN

A. Shall be ASTM D 312 Type IV steep asphalt.

B.

Slope	**Interply**	**Top Pour**	**Backnail**	**Strap**
0 - ½" per 12"	Type IV	Type IV	No	No
- 2" per 12"	Type IV	Type IV	Yes	Strap if Possible
2" - 3" per 12" T	ype IV	Type IV	Yes	Yes

2.06 CAULKS

A. Sealant for use at coping joints, reglet joints, etc., shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1

TT-S-00230C, Type II, Class A, ASTM C 920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant (modified with coal-tar or asphalt as required), or approved equal.

B. To seal the leading edge of the membrane, to bond membrane at terminations with metal, and for open seam repair, sealant shall be a thermosetting, solvent free, non-slump, self-fixturing, multipurpose structural sealant which shall meet the following physical and performance properties, M-1 as manufactured by Chem Link Inc., or approved equal.

1. **Properties**

Specific Gravity	1.62 (13.5 lbs./gallon)
Viscosity	800,000 cps Brookfield RTV, TF spindle, 4 rpm 70° F.
Shear Strength (ASTM D-1002)	300 psi+ (7 day ambient cure)
Elongation @ break (ASTM D-412)	300% (7 day ambient cure)
Hardness Shore A (ASTM C-661)	50 - 55 (14 day ambient cure)
Tack free time (ASTM C-679)	35 minutes
Low temperature flex	Minus 20° F: PASS
Slump (sag) (ASTM C-639)	Zero slump
Shrinkage (ASTM D-2453)	No measurable shrinkage (14 cay cure)
Service temperature	-40° F to 200° F

2.07 FELTS

A. Shall be Underwriters Laboratory approved and listed in the FM Global Approval Guide.

B. Shall be SBS 80 mil SS base sheet, tested in accordance with ASTM D 5147, as approved by field membrane manufacturer, or approved equal.

2.08 INSULATION

A. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved, and be listed in the FM Global Approval Guide.

B. Polyisocyanurate Roof Insulation: Insulation shall be rigid polyisocyanurate foam board; thickness and LTTR-value shall be a minimum of 3.1”=19.1; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. Board shall be surfaced on two (2) sides with non-asphaltic facer material.

C. Tapered Polyisocyanurate Roof Insulation: Shall be tapered polyisocyanurate board per Federal Specification No. HH-I-1972/1 or 2, with a 20 psi minimum compressive strength and 2.0 pcf density minimum. Insulation shall be of thickness required for one-half inch (1/2") slope per foot to roof drains as shown on drawings. Insulation shall be surfaced on two (2) sides with a non-asphaltic facer material.

D. Recovery Board: Impact-resistant, nonstructural, specially engineered gypsum and cellulose fiber panels with 95% recycled content; uniform water-resistance throughout core and surface. Board size four feet by four feet (4' x 4'), thickness 1/2"; conforming to ASTM C 1278, meeting FM 4470 Class 1 criteria, classified by Underwriters Laboratory, and listed in the FM Global Approval Guide. Board will meet the following physical properties, Securock™ Roof Board, as manufactured by USG Corporation, or approved equal.

1.

Test	**Typical Value**	**Test Method**
Fire Resistance	Class A	UL 790
Permeance	less than or equal 30	ASTM C473
Surface water absorption	less than or equal 1.6 nominal grams	ASTM C473
Water resistance	Maximum 10% weight percentage gain	
Mold Resistance	Minimum rating of "10"	ASTM D3273

2.09 FASTENERS AND PLATES

A. General: All fasteners and plates for the installation of insulation, and for the installation of the membrane, shall be supplied and warranted by the membrane manufacturer for the specific application.

B. Membrane attachment toggles, if required, shall be provided and warranted by the membrane manufacturer.

C. All fasteners and plates shall be FM Global approved corrosion resistant screws or anchors supplied and warranted by the membrane manufacturer. Fasteners shall be of a type and length recommended by the manufacturer for fastening the insulation and/or protection layer (through the existing roof in reroofing) to the structural roof deck.

2.10 FASTENERS

A. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide, and be as recommended by the fastener manufacturer for the specific application.

B. Fastener for Brick: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated steel or stainless steel nail, one piece unit, flat head, as manufactured by Rawl Zamac Nailin, or approved equal.

C. Fastener for Steel Deck: Shall be a minimum #14 fastener, fluorocarbon coated, with CR-10 coating. A minimum .200 diameter shank and .250 diameter thread. To be used with round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to thirty (30) Kesternich cycles (DIN 50018) shows less than ten percent (10%) red rust which surpasses FM Global Approval Standard 4470, Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

2.11 BONDING ADHESIVE FOR FLASHING

A. Description: Adhesive is a bonding cement of synthetic rubber for fully adhering membranes to various substrates, produced by Ashland Chemical, or approved equal.

B. **Typical Liquid Properties (Room Temperature)**

Color	Amber/Yellow
Base Product	Neoprene
Solids	25%
Specific Gravity	.87
Pounds/Gallon	7.25
Viscosity (CPS)	2500
Solvents	Ketone, Toluene, Aliphatic Hydrocarbon, Zylene
Estimated Coverage	
1. 2 Sided Application	55/70 sq. ft. (2/2.5 mils dry)
DOT Label Required	Flammable Liquid
Code - 584661	

C. Handling: Contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn.

2.12 ASPHALT ROOF PRIMER

A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, as manufactured by primary roofing membrane manufacturer, or approved equal.

Applicable Federal Specification	SS-A-701B
ASTM	D 41
Flash Point	105° F
Viscosity at 80° F (ASTM D 217)	50-60 K.U.
Weight per gallon	7.4 pounds
Drying time (to touch)	Min. 4 hours

2.13 CANT STRIP

A. Shall be wood fiber where used for non-structural purposes. Shall be treated solid wood where used for structural purposes meeting NRCA, FM Global and Underwriters Laboratory guidelines. If solid wood cant is used where insulation exists, cant is to be toe nailed into treated solid wood nailer the same height as insulation.

2.14 WOOD

A. All nailers, cants and wooden curbs shall be fire rated, treated lumber as required by NRCA, FM Global and Underwriters Laboratory guidelines.

2.15 SEAM SEALER

A. Special caulk compatible with Elvaloy® and thermoplastic membrane to seal exposed cut edges.

2.16 TRIM STRIP

A. The trim strip shall have the following minimum properties, as manufactured by primary roofing membrane manufacturer, or approved equal.
   1. Six inch (6") wide non-reinforced 45 mil thermoplastic used for capping butted ends of rolls.
   2. The trim strip is seamed with the use of hot-air welding.

2.17 CORNERS

A. Inside and outside corners shall be supplied by the membrane manufacturer and shall be of the same base material as the roof membrane.

2.18 PIPE BANDS

A. Stainless steel bands with self-locking heads.

B. Tighten with hand tool for tension control and flush cut off.

2.19 PRE-MOLDED BOOTS

A. Non-reinforced thermoplastic tapered molds for various pipes, heat welded to field membrane and sealed at top with stainless steel pipe bands and seam sealer.

2.20 PITCH PAN SEALANT

A. Shall be one-part, self-leveling polyurethane sealant meeting Federal Specification No. TT-S-00230C, Type I, Class A, ASTM C 920, Type S, Grade P, Class 25, for use in new pitch pans, as manufactured by primary roofing membrane manufacturer, or approved equal.

2.21 PIPESTANDS (6" OR SMALLER - LESS THAN 9" OFF ROOF SURFACE)

A. Black, polycarbonate construction with stainless steel roller pin assembly suitable for gas lines and conduit set in finished roof assemblies. Refer to MEP specifications.

2.22 PIPE HANGERS (6" AND LARGER - 9" TO 12" OFF ROOF SURFACE)

A. Shall be pre-assembled portable pipe hangers constructed of high density polypropylene plastic and UV inhibitors, sized according to outside pipe dimension. Refer to MEP specifications.

2.23 WALKWAY PAD

A. The walkway pad shall have the following minimum physical properties, and be applied with edges heat or solvent welded, as manufactured by primary roofing membrane manufacturer, or approved equal.

B.

Property	**Test Procedure**	**Physical Properties**
Color		Gray
Size		36" wide x 60' long
Thickness	ASTM D 638	.080" nominal
Reinforcement		1000 Denier Polyester
Tear Strength	ASTM D 751	210 X 200 lbf
Puncture Resistance		96 lbs
Cold Resistance	ASTM D 1043	-40° C
Shore A Durometer		85
Hydrostatic Resistance		400 psi
Dimensional Stability	ASTM D 1240	less than or equal 1%
Ultraviolet Stability		12,000 hrs. Excellent

2.24 TERMINATION/PRESSURE BARS

A. Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" ± .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90°), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, as manufactured by Olympic Fasteners, or approved equal.

2.25 VERTICAL WALL SHIMMING MATERIAL

A. Shall be one of the following unless otherwise accepted by Owner's representative: OSB, exterior grade plywood, gypsum core board or concrete core board. Proper selection of material is required to achieve FM Global and UL guidelines.

2.26 ICE AND WATER SHIELD

A. All Climate, self-adhering underlayment, a premium heavyweight ice and water shield, as manufactured by Elk Premium Building Products, Tamko TW Metal and Tile Underlayment, as manufactured by Tamko Roofing Products, Inc., or Vycor, Ultra, as manufactured by Grace Construction Products, or approved equal.

2.27 OVERNIGHT SEAL

A. Hot applied asphalt bitumen shall be provided for the purpose of night sealing the roof system.

2.28 DELIVERY AND STORAGE

A. All materials shall be delivered with appropriate carton and can labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

2.29 PRECAUTIONS

A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.

2.30 MISCELLANEOUS MATERIALS

A. Other materials shall be as specified or of the best grade for the proposed use as recommended by the manufacturer.

PART 3 EXECUTION

3.01 REFERENCE

A. The manufacturer's Technical Specifications shall be considered a part of this specification and should be referred to for more specific application procedures and recommendations.

B. Application of materials shall be in strict accordance with the manufacturer's recommendations except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer, the more stringent specifications shall take precedence.

C. General Installation:
   1. Protect adjacent areas with tarpaulin or other durable materials.
   2. Contractor shall prevent overspray, and be responsible for parking lot areas and/or adjoining areas not part of this contract.
   3. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.
   4. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefinished sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded prior to receiving primer.
   5. Use cleaning materials or primers necessary to render an acceptable surface/substrate.
   6. All surfaces/substrates shall be clean and dry prior to application of materials.
   7. Prior to application of felts and membrane, all foreign matter, gravel, etc., shall be removed from the insulation and/or substrate. Gravel or debris between the insulation/substrate and plies is not acceptable.
   8. Bitumen kettle shall have a visible thermometer and thermostatic control or some other means to provide positive monitoring of the bitumen temperature when it is heated in accordance with manufacturer's instructions.
   9. Ambient temperature shall be 45° F and rising.

10. The maximum heating temperature of Type III asphalt shall be 500° F.
11. The temperature of Type III asphalt shall be approximately 430° F ± at the point of application or as recommended by the membrane manufacturer.
12. Maintain kettle and/or tanker temperature at least 25° F below the actual flash point of the bituminous materials used.
13. Never heat the bituminous materials at high temperatures for prolonged periods of time.
14. Do not allow bituminous materials to stand in luggers for long periods.
15. Circulate bituminous materials.
16. Insulate hot transport lines if required.
17. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.
18. Where deteriorated base flashing is removed, primed cant strips shall be installed at the intersection of the deck and the vertical surfaces. All flashings shall be mechanically top-fastened with a termination bar a minimum of six inches (6") on center at the top leading edge, and be a minimum of eight inches (8") in height from finished membrane.
19. Provide a water test of each roof section prior to substantial completion. The test should simulate rainfall of one inch (1") per hour minimum.
20. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

3.02 SUBSTRATE PREPARATION

A. New Construction: Substrate shall be smooth and free of debris, sharp edges, and other surface irregularities prior to work starting. Substrate repair shall be performed as required to minimum of NRCA standards.

B. Metal Decks - New Construction:
   1. All loose rust, bitumen, or other foreign material shall be removed from the deck before applying asphalt primer at the minimal rate of one and one-half (1-1/2) gallons per one hundred (100) square feet of area.
   2. The deck span shall not exceed that recommended by FM Global Bulletin 1-28.
   3. Expansion/control joints shall be installed so that no one area exceeds two hundred feet by two hundred feet (200' x 200').

3.03 INSULATION

A. Manufacturer's Instructions: In regard to attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7 criteria and meet local governing building codes.

B. Precautions: The surface of the insulation must not be ruptured due to overdriving of fasteners.

C. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings one-fourth inch (1/4") or larger shall be filled with insulation.

D. Insulation shall be tapered or feathered at drains and scuppers to provide proper drainage (if applicable).

E. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.

F. Tapered insulation and crickets, when specified, shall be placed in accordance with the drawings and/or as required to minimum of NRCA standards.

3.04 MECHANICALLY FASTENED INSULATION

A. Specified insulation shall be mechanically fastened to conform to the ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

B. Insulation shall be laid with edges parallel to flutes and bearing on deck surface/flats. The long dimension of base insulation layer must be fully supported by the top flange of the metal deck. The edges of insulation boards must not cantilever over the flutes of the metal deck.

C. The top surface of the first layer of insulation shall be coated with hot asphalt using twenty-five pounds (25#) per one hundred (100) square feet of surface, and specified cover board shall be applied using offset joints, so that each layer breaks joints to a minimum of six inches (6") both ways with the preceding layer, and immediately walked in place.

3.05 NAILERS

A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

B. All Construction: Nailers shall be the same height as the new recovery board being installed where required. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced. Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds (175#) per foot. Fasteners shall be no less than two (2) per nailer, and be spaced at three feet (3') on center maximum. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

3.06 WOOD CANTS

A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory and IBC guidelines.

3.07 APPLICATION OF BASE SHEET

A. Specified cover Board shall be covered with SBS 80 mil SS base sheet fully adhered as follows:

B. All layers shall be solid mopped at the nominal rate of thirty pounds (30#) ± 20 percent per one hundred (100) square feet using asphalt Type III as required by slope, properly heated. Specified layers shall be applied in accordance with the manufacturer's recommendations and in accordance with general practices as set forth by the NRCA Roofing Manual.

3.08 APPLICATION OF FLEECE BACKED MEMBRANE

A. Fully Adhered Application: Fully adhere membrane to acceptable substrate with hot asphalt applied at the rate specified by the manufacturer.
   1. The roof surface must be clean, dry and free of foreign material.
   2. Position sheets as indicated on approved shop drawings.
   3. Fold one end of the Elvaloy® sheet on top of itself until both ends meet. Apply hot asphalt to the prepared roof surface. The sheet can then be pulled and laid into the bonding material using care not to create any wrinkles.
   4. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Using a weighted lawn roller (min. 200 lbs), roll membrane flat to properly embed fleece-backed membrane into asphalt adhesive. NO EXCEPTIONS.
   5. Repeat procedure for other sheet half.
   6. Lap seams shall be done by lapping the two inch (2") selvedge edge over the non-selvedge edge of the previous roll. The selvedge edge seam shall be made with the heat gun method.
   7. Roll ends are butted together and capped with a six inch (6") wide trim strip. The trim strip is then seamed with the heat gun.
   8. Seam sealer shall be applied to all non-factory edges.

B. Lap Seaming Procedure: Overlap membrane for attachment method specified and hot-air welded with manufacturer's approved equipment.
   1. All surfaces to be weld shall be clean, dry and free of foreign material.
   2. All seams must then be checked with a needle probe and any voids repaired with the heat gun.
   3. Caulk all exposed cut edges with seam sealer.

3.09 FLASHING

A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced Elvaloy® flashing membrane.
   1. Use prefabricated flashing accessories or components such as sealant pockets, premolded vent/pipe flashing.
   2. Mechanically fasten flashing at terminations according to approved details.

3. Fastening membrane flashing through metal counterflashing is not acceptable.

B. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.10 BASE FLASHING (APPROXIMATELY 8" IN HEIGHT MINIMUM)

A. Base flashings shall be installed using the flashing membrane, with length of run not to exceed twenty linear feet (20').

B. Wooden nailers or curbs shall be installed at all edges and openings in the roof, mechanically fastened to the deck.

C. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.

D. The roofing field membrane shall extend up over and two inches (2") above the top of cant strips at all vertical intersections or out to the roof's edge.

E. All existing substrates receiving flashing membrane shall be clean and primed with primer, prior to application as required.

F. All flashings shall be mechanically fastened with a termination bar a maximum of six inches (6") on center, be a maximum of eight inches (8") above finished roof height, extend a minimum of four inches (4") onto the field of horizontal roof membrane, and not exceed twenty linear feet (20') of run in length.

G. After proper termination of the base flashing at a minimum eight inch (8") height (or maximum eighteen inch (18") height), a saw cut reglet with counterflashing shall be installed according to NRCA and SMACNA guidelines.

H. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

I. All flashing membrane shall be adhered with flashing bonding adhesive to the vertical substrate and hot-air welded to the field of roof membrane; hot-air weld vertical laps.

J. Flashing laps shall be minimum two inch (2") width, no maximum. Hot-air weld of flashing lap shall be minimum two inch (2") width, no maximum.

K. Hot-Air Welding of Flashing Laps:
   1. When using a hand-held hot-air welder, the seams should be pressed together using a hand-held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by trial and error using two (2) pieces of the flashing membrane. Minimum width of hot-air weld two inches (2"), no maximum.
   2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
   3. Allow the seams to set fully, and probe the entire length for voids. Reseam voids immediately with a hot-air gun and roller.

L. All hot-air welded seams/laps shall be tested daily with a probe for integrity, no variance.

3.11 VERTICAL WALL FLASHING (FOR USE APPROXIMATELY 8-18" ABOVE THE FINISHED ROOF LINE AND EXTENDING UPWARD)

A. Flashing membrane shall be installed on the vertical beginning a minimum of eight inches (8") above the finished roof line (where the base flashing is terminated), with length of run not to exceed twenty feet (20'). Flashing shall be installed in strict accordance with the manufacturer's recommendations.

B. The termination bar used to terminate the minimum eight inch (8") high base flashing shall be used to terminate the lower edge of the vertical flashing. This will cause the termination bar to be buried at the termination point. Care should be taken to ensure the top edge of the base flashing and bottom edge of the vertical flashing are both secured.

C. All existing substrates receiving flashing membrane shall be clean and primed with asphalt primer, prior to application.

D. All substrates receiving welded-seam flashing membrane shall be clean and primed with primer, prior to application when applicable.

E. The vertical wall flashing membrane shall be set in flashing bonding adhesive according to manufacturer's guidelines.

F. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

G. Flashing laps shall be minimum two inch (2") width, no maximum. Hot-air weld of flashing lap shall be minimum two inch (2") width, no maximum.

H. Immediately following the laying of the flashing membrane, it shall be pressed or rolled in the width direction of the membrane. This will prevent excessive entrapment of air beneath the membrane. The pressing or rolling shall be in the width direction and with the laps so as not to buck the laps.

I. Any flashing extending further than eighteen inches (18") up onto a vertical surface shall be installed using the strapped method and must be fastened with a termination bar or installed up and over the parapet wall and fastened to the nailer on the outside of the wall.

J. The flashing membrane shall be run up the wall in sheet widths, run under the coping cap and be terminated on the outside of the wall six inches (6") on center; then the coping cap shall be reset. All side laps are to be hot-air welded.

K. Hot-air Welding Laps:
   1. When using a hand-held hot-air welder, the seams should be pressed together using a hand-held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by the contractor by using two (2) pieces of flashing membrane. Minimum width of hot-air weld shall be two inches (2").
   2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
   3. Allow the seams to set fully, and probe the entire length for voids. Reseam voids immediately with a hot-air gun and roller.

L. All hot-air welded seams/laps shall be tested daily with a probe for integrity, no variance.

M. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.12 PERIMETER FASTENING

A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened to nailer on twelve inch (12") centers maximum.

3.13 EDGING FLASHINGS

A. An NRCA-approved gravel stop/fascia system shall be installed in strict accordance with published instructions to meet ES-1.

3.14 WALKWAY PADS

A. Fully adhere and heat weld walkway pads where shown on drawings or where required to provide protected pathways from rooftop access points to mechanical or other equipment requiring rooftop maintenance.

3.15 CLEANING

A. Clean exposed surfaces of excess cement, adhesive, sealants, mortar and paint associated with the new work.

B. Clean work area of excess roofing materials and installation debris daily.

C. Repair or replace defaced or disfigured finishes caused by the work.

3.16 MEMBRANE CLEANING

A. After all membrane has been installed, it shall be cleaned with a cleaning agent compatible with the membrane to return the membrane to like new appearance.

3.17 PROTECTION

A. Protect all building surfaces against damage from roofing work.

B. Where traffic must continue over finished, installed roofing system, protect membrane, underlayment accessories and finishes from damage.

3.18 MEMBRANE PROTECTION

A. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper,

or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.19 PIPING/CONDUIT

A. Piping/conduit shall be raised to NRCA recommended heights, and new supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with Owner's representative.

B. All gas lines, piping, and conduits shall be coated with specified aluminum coating /OR/ commercial grade yellow paint per local codes.

3.20 PIPE/EQUIPMENT SUPPORTS

A. Designated pipe/equipment supports shall be removed and replaced with new treated four inch by four inch (4" x 4") wood blocking. Pipe supports shall be placed approximately ten feet (10') on center. New blocks shall be set on a double layer of membrane, and attached to the pipe with suitable strapping. Double layer of membrane shall be adhered to the roof surface.

B. Gas lines three inches (3") and over must be supported on wood block with pipe roll stands.

3.21 OVERNIGHT SEAL

A. Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual, SPRI and membrane manufacturer's recommended procedure.

B. The roofing membrane shall be sealed to the roof deck or existing roof at the end of the day or at the onset of inclement weather to prevent water from flowing into the completed roofing system. Temporary seals shall be removed upon resumption of work.

3.22 COPING JOINTS, REGLET JOINTS, CAULK JOINTS, WALL JOINTS, AND WALL CRACKS ABOVE THE ROOF LINE

A. All reglet and coping joints shall be raked clean of loose materials and debris, and sealed with caulk sealant. Sealant shall be properly installed and tooled in a workmanlike manner to ensure permanent seal.

B. All open coping and masonry terminations and intersections shall be cleaned out and sealed with backer rod and caulk sealant. Backer rod shall be minimum one and one-half (1-1/2) times the width of the opening to be sealed. Caulk sealant thickness shall be minimum of one-half (1/2) of the width of the opening to be sealed.

C. Clean joint surfaces immediately before installation of gaskets, sealant or caulking compound. Remove dirt, insecure coatings, existing sealant, moisture, and other substances which could interfere with seal of gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

D. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

E. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

F. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.

G. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint to bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

H. For normal moving joints to be sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to fifty percent (50%) of joint width, but neither more than one-half inch (1/2") deep nor less than one-fourth inch (1/4") deep.

3.23 ICE AND WATER SHIELD

A. To all eave, rake, ridge, rise wall applications and all projections, equipment and miscellaneous flashing applications, provide one (1) full sheet of the respective ice/watershield in accordance with the manufacturer's specific recommendations and application procedures. All eave applications shall extend a minimum of three feet (3') upslope beyond the interior wall, and all valley applications shall be a minimum of two (2) plies, with one (1) full sheet laminated to the deck, and one-half (1/2) sheet fully adhered to the base ply. All vertical transitions shall extend up the vertical surface a minimum of twelve inches (12"). All fiberglass underlayment applications shall extend a minimum of nine inches (9") onto the ice/water shield membrane, no exceptions.

END OF SECTION

SECTION 07 62 00

SHEET METAL AND MISCELLANEOUS ACCESSORIES

FOR FULLY ADHERED MULTI-PLY ROOF SYSTEM

PART 1 GENERAL

2.01 SUMMARY

A. Section Includes:
   1. Provide flashing and sheet metal components for moisture protection.
   2. Related accessories.

2.02 SUBMITTALS

A. Product Data:
   1. Submit shop drawings, product data and mockups of all sheet metal.

2.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers in satisfactory use in similar service for five (5) years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Reference Standards: Applicable portions of ASCE, SMACNA, ASTM and NAAMM publications.

2.04 WARRANTIES

A. Manufacturer's Product Warranty: Submit manufacturer's standard limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner/Project Consultant may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.

B. Contractor's Warranty Period: For roofing flashing and sheet metal, provide a written warranty which shall warrant work to be free of leaks and defects in materials and workmanship for two (2) years, starting from date of substantial completion.

C. Defects of the sheet metal occurring during the warranty period shall be promptly corrected by the contractor, and defects of the roofing shall be promptly corrected by the manufacturer at no additional cost to the Owner. Upon notification from the Owner or the Owner's representative that evidence of a defect exists, the responsible party shall immediately inform the Owner's representative of the date on which corrective work will be scheduled, and shall notify the Owner's representative when the corrective work has been completed.

PART 2 PRODUCTS

3.01 SHEET METAL MATERIAL

A. Hot-dipped Galvanized Steel for use as counterflashings (where not visible from the ground), pitch pans and expansion joints: Minimum 24-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

B. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 22-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

C. Prefinished Galvanized Sheet Steel (where visible from the ground): Shall be 24-gauge flat stock, prefinished with Kynar finish meeting ASTM A 446, forty-five and one-half inches to forty-eight inches width by one hundred twenty inches in length (45-1/2" - 48" x 120") for use as new metal edge gravel guard, downspouts, gutters, coping and miscellaneous metal. Standard color to be selected by Owner/Project Consultant.

D. Elvaloy® Cladded Metal: Shall be G-90 galvanized steel with 25 mil Elvaloy® membrane lamination; width shall be four feet, length shall be eight or ten feet. Standard color to be selected by Owner.

E. Stainless Steel: QQ-S-766, Class 301, 302, 304, or 316; or ASTM A 167, Type 301, 302, 304, or 316; form and condition most suitable for the purpose.

F. Aluminum and Aluminum Alloy Plate and Sheet: QQ-A-250; form, alloy, and temper shall be that most suitable for the purpose.

G. Sheet Lead: QQ-L-201, Grade B.

H. All existing sheet metal shall be replaced with new metal of like gauge and type, or as specified on drawings.

3.02 FASTENERS

A. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as recommended by sheet manufacturer for the specific application. Match finish of exposed heads with material being fastened.

B. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide.

C. Fastener for Brick: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated steel or stainless steel nail, one piece unit, flat head.

D. Screws: Self-taping sheet metal type with integral cupped hex washer head and neoprene washer, as appropriate. Equal to ZAC Tapping Fasteners by SFSIntec or approved equal.

E. Pop Rivets: Full stainless steel Series 42 or 44, as appropriate.

F. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard, sized to suit application. Use a continuous clip, minimum 20-gauge G-90 galvanized.

3.03 RELATED MATERIAL

A. Bituminous Paint: Acid and alkali resistant, black color.

B. Plastic Cement: FS SS-C-153, cutback asphalt type.

C. Solder: QQ-S-571 composition best suited for purpose; use high tin content, minimum 60/40, for stainless steel and monel alloy.

D. Copper, Sheet, and Strip: QQ-C-576, ASTM B 370, light cold-rolled temper.

E. Lead-coated Copper: ASTM B 101, Type I or II, Class A.

F. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.

G. Miscellaneous Materials:
   1. Downspout Boots: Cast iron by Neenah Foundry Company, or pre-approved equal, provide and install.
   2. Splash Blocks: Concrete, 3000 psi, 28 days. Provide and install with protection pads at all downspouts. Dimensions shall be a minimum eighteen inches wide by thirty-six inches long (18" x 36").
   3. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size, and gauge required for performance.

PART 3 EXECUTION

4.01 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, substrates are smooth and clean and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed and secure.

C. Beginning of installation means acceptance of conditions.

4.02 PREPARATION

A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Owner/Project Consultant for approval.

B. Install starter and edge strips and cleats before starting installation.

4.03 FABRICATION - GENERAL

A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

B. Fabricate gravel stops/fascia, gutters/downspouts, counterflashings, pitch pans, expansion joints, and copings with new galvanized sheet metal as specified. Fabricate gravel guard and fascia to size and dimensions as indicated on the drawings. Fabricate light metal coping, gutters and downspouts as indicated.

C. Form sheet metal on bending brake.

D. Shape, trim and hand seam metal on bench insofar as practicable.

E. Form materials with straight lines, sharp angles and smooth curves.

F. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).

G. Weld or solder joints on parts that are to be permanently and rigidly assembled.

H. Submit sheet metal models for approval by the Owner/Project Consultant.

I. Limit single-piece lengths to ten feet (10').

J. Fabricate corner pieces with eighteen inch (18") extensions, metered and sealed by forming as one piece.

K. Surface sand flange prior to applying any primers on Kynar metal.

L. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint.

M. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Owner/Project Consultant.

N. All sheet metal shall be sealed and watertight.

O. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, these are to be continuous.

P. All metal to receive bitumen or adhesive shall be first primed with asphalt primer.

Q. All prefinished metal shall be sanded and/or abraded prior to receiving primer.

R. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges are to be seamed, form seams, and solder.

S. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than one inch (1") deep, filled with mastic sealant (concealed within joints).

T. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.

U. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

V. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

4.04 INSTALLATION

A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied wall finished prior to installation of sheet metal termination. This applies to edge metal, base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and metal manufacturer's guidelines.

B. **Elvaloy® cladded metal shall be fabricated as needed; follow these specifications and standard sheet metal practice for attachment to roof details.**

C. **Edge Metal/Fascia:**
   1. Shall be installed with expansion joints, ten feet (10') on center, one-fourth inch (1/4") expansion leeway, with a cover plate.
   2. Secure metal flashings per specifications.
   3. Lock seams and end joints.
   4. Form sections identical to profiles as shown or approved similar, to match existing building.
   5. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
   6. Hem exposed edges three-fourths inch (3/4") minimum.

7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
8. Integrate flashing in a manner consistent with detailing.
9. Provide and install continuous clip around perimeter.
10. Shall be fabricated in accordance with all SMACNA provisions.
11. Color as selected from manufacturer's full range of colors including metallics.

D. **Coping:**
1. Install new metal coping as required for a permanent watertight installation.
2. All coping shall be manufactured with low profile standing seam metal to meet ES-1.
3. Shall be minimum 24-gauge prefinished Kynar installed in ten foot (10') sections maximum.
4. Vertical fascia shall extend minimum two and one-half inches (2-1/2") or be minimum one and one-half inches (1-1/2") below bottom of nailer, whichever is greater.
5. Secure metal flashings per specifications.
6. Lock seams and end joints.
7. Form sections identical to profiles as shown or approved similar, to match existing building.
8. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
9. Hem exposed edges three-fourths inch (3/4") minimum.
10. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
11. Integrate flashing in a manner consistent with detailing.
12. Provide and install continuous clip, minimum 22-gauge.
13. Shall be fabricated in accordance with all SMACNA provisions.
14. Color as selected from manufacturer's full range of colors including metallics.

E. **Expansion Joint Field and at Wall:**
1. Shall be as outlined by details, and be in full compliance with all provisions of SMACNA and FM Global requirements for attachment, installation and recommendations.
2. Secure metal flashings per specifications.
3. Lock seams and end joints.
4. Form sections identical to profiles as shown or approved similar, to match existing building.
5. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
6. Hem exposed edges three-fourths inch (3/4") minimum.
7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
8. Integrate flashing in a manner consistent with detailing.
9. Provide and install continuous clip around perimeter.
10. Shall be fabricated in accordance with all SMACNA provisions.

F. **Counterflashing:**
1. Install new metal counterflashing as required for a permanent watertight installation.
2. Saw cut brick mortar joint to receive friction fit reglet and removable counterflashing as detailed in SMACNA Figure 4-3E.

G. **Gutter and Downspout:**
1. Fabrication:
    a. Fabricate gutter and downspout of profile and size indicated.
    b. Field measure site conditions prior to fabricating work.
    c. Fabricate with required connection pieces.
    d. Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
    e. Hem exposed edges of metal.
    f. Form and seal all metal joints; provide for expansion joints per SMACNA.
2. Installation:

a. Install collector head, downspout, and accessories.
b. Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.
c. Seal all metal joints watertight for full metal surface contact.
d. d.
e. Downspouts: Rectangular profile. Seal all joints, four inches by six inches (4" x 6").
f. Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.
g. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
h. Collector Head Support: Kynar. Color and Finish to match, as recommended by SMACNA.
i. Downspout Supports: Straps, Kynar. Color and Finish to match.

H. **Overflow Scupper, Collector Head and Downspout:**
1. Fabrication:
a. Fabricate overflow scupper, collector head and downspout of profile and size indicated, taking care that the roof drain leader fits properly into the back of the collector head. Seal the pipe to the collector head for watertightness.
b. Field measure site conditions prior to fabricating work.
c. Fabricate with required connection pieces.
d. Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
e. Hem exposed edges of metal.
f. Form and seal all metal joints; provide for expansion joints per SMACNA.
2. Installation:
a. Install collector head, downspout, and accessories.
b. Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.
c. Seal all metal joints watertight for full metal surface contact.
d. Collector Head: SMACNA style profile; submit detail for approval.
e. Downspouts: Rectangular profile. Seal all joints, six inches by six inches (6" x 6").
f. Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.
g. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
h. Collector Head Support: Kynar. Color and Finish to match, as recommended by SMACNA.
i. Downspout Supports: Straps, Kynar. Color and Finish to match.
j. Color as selected from manufacturer's full range of colors including metallics.

I. **Pitch Pans:**
1. Install pitch pans of 24-gauge, G-90 galvanized steel with a 25 Mil Elvaloy® Kee membrane lamination according to NRCA standards, minimum of six inches by six inches (6" x 6").
2. Pitch pans shall be fabricated to a minimum of six inches (6") above the finished roof membrane. The top vertical edge of the thermoplastic clad metal must be folded over to conceal the uncoated side of the metal inside the pitch pan. The pitch pan flange must be a minimum of three and one half inches (3.5”) wide in contact with the horizontal roof plain or field of roof membrane. LIMIT ONE PIPE/CONDUIT PENETRATION PER PITCH PAN. FOR MULTIPLE PIPES/CONDUITS REFER TO PIPE BOX DETAIL.
3. Approved caulking or water block shall be applied under the pitch pan flange prior to securing the flange to the deck with approved fasteners a minimum of 4” on center.
4. All projections enclosed in pitch pans shall be cleaned in any manner suitable and coated with a rust inhibitive coating as approved by the Owner/Project Consultant. Coating shall be allowed to dry prior to pitch pan fill.
5. Pitch pans shall be filled with granules to proper height. DO NOT USE GROUT OR CEMENTITIOUS PRODUCTS.
6. Top finish fill shall be self-leveling, one-part urethane, completely fill to top of pitch pan sides.
7. Strip the thermoplastic clad metal flange of the pitch pan to the field membrane with one strip of flashing membrane. The flashing membrane must extend from the outer edge of the pitch pan flange onto the field membrane a minimum of three inches (3") and butt to the vertical sides of the pitch pan on all 4 sides. The

flashing membrane shall be hot air welded to the thermoplastic clad metal pitch pan and to the field membrane. Hot air welds shall be a minimum of two inches (2") wide.

8. Install preformed outside corners by hot air welding in place at all four (4) corners of the pitch pan.
9. Apply seam sealer to the edges of the flashing membrane.

J. **Bonnets/Hoods:**

1. Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.
2. Bonnets/Hoods shall be manufactured with metal compatible with metal to which bonnet is to be attached.
3. On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
4. Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

4.05 FINISH

A. Backpaint concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals. Exposed surfaces to be provided with a factory applied fluorocarbon Kynar finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.

B. New 24-gauge hot-dipped galvanized metal shall be painted on all locations visible from the ground with an industrial grade paint to match existing, or standard color selected by Owner/Project Consultant. Galvanized metal surface must be properly prepared by removing all oil, grease, and/or protective mill coatings by solvent cleaning surface in accordance with SSPC-SP1, and according to paint manufacturer's recommendation, to ensure proper adhesion of paint to metal.

END OF SECTION

SECTION 07 65 26
FLEXIBLE FLASHING SYSTEM

PART 1 GENERAL

1.01 GENERAL

A. Contractor shall review American Concrete Institute 530.1 mandatory specification checklist for additional requirements necessary for specific project.

B. Flashing system shall be provided and installed by a qualified waterproofing contractor.

C. Contractor shall provide a photo manifest of through-wall installation, including all starts, stops, and transitions in plane.

D. It is the intent of this specification that the new work will provide a watertight facility (restricted to the location where work is to be performed). The attached specifications describe the minimum acceptable standards of construction and finish.

E. Contractor shall water test all through-wall flashings once veneer is twelve inches (12") above installed flashing. Coordinate test with Architect.

1.02 QUALITY ASSURANCE

A. At a scheduled pre-construction meeting with all trades, contractor shall review flashing for the project and how the flashing shall be sequenced with the following: below grade waterproofing, air and vapor system, window installation, sealant installation, relief angles and roofing.

1.03 SUBMITTALS

A. Shop Drawings: Contractor shall provide from the manufacturer a review of the flashing design for the project and location of preformed shapes on reduced floor plan.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be a minimum of four inches (4") off the substrate, and the tarpaulin tied off with rope.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle and store material in such a manner as to avoid damage.

E. Protect materials against damage by construction traffic.

F. Storage: All materials should be stored under cover to avoid site damage. During cool weather construction, store materials inside at 50º F or higher.

G. The proper storage of materials is the sole responsibility of the contractor and damaged materials shall be discarded, removed from the project site, and replaced prior to application.

1.05 SITE CONDITIONS

A. Job Condition Requirements: Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The contractor shall follow local, state, and federal regulations, safety standards, and codes. When a conflict exists, use the stricter document.

B. Protection of Work and Property:
   1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations shall be fulfilled by the contractor as part of his proposal.

2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds shall be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Cleaning and Disposal of Materials:
1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. At completion, all work areas shall be left clean and all contractor's equipment and materials removed from the site.
3. Debris shall be deposited at an approved disposal site.
4. WARRANTY

F. Flashing Manufacturer: Project shall be installed in such a manner that the flashing material manufacturer will furnish a written ten (10) year materials warranty from the date of substantial completion of the completed project.

PART 2 PRODUCTS

2.01 BUILT-IN FLASHING MEMBRANE (ELVALOY® SHEET)

A. The built-in flashing membrane shall be 40 mil flexible sheet material, consisting of a blend of elastomeric and thermal plastic polymers, incorporating DuPontä Elvaloy®. The membrane shall be reinforced with synthetic fibers, calendered into sheet form, rolled and cut to width.

B. Cloaks shall be pre-formed, three dimensional flexible units used for detail corners, level changes, stop ends, and special applications.
1. Physical Properties:
Elongation 175% ASTM D412
Tensile Strength 650 psi ASTM D412
Tear Strength 280 psi ASTM D624
Low Temperature Flexibility -25º F Pass ASTM D146
Water Absorption Less than 0.1% ASTM D471

C. Cloak color shall be as selected by Architect and/or shall match mortar color. Reference manufacturer's list of colors for selection.

2.02 RELATED MATERIALS FOR BUILT-IN FLASHING MEMBRANE

A. Flashing Membrane Adhesive: Flashing adhesive exceeds the requirements of TTS00230C Type II, Class B, ASTM C 92094 and Canadian Spec CAN 19, 13M82. The product is terra cotta (dull red) in color.
1. Physical Properties:
Hardness: Shore A 24 ± 3 ASTM C 661
Shear Strength: 75 psi ASTM D 1002
Tack Free Time: 25 minutes ASTM C 679
Slump: (sag) Zero slump ASTM C 697
Shrinkage: No measurable shrinkage after 14 days
Low Temperature Flexibility: -20° F pass 1/4 inch mandrel
Service Temperature: -40° F to 200° F continuous service
Shelf Life: One year

2.03 SURFACE-ADHERED WITH DRIP FLASHING MEMBRANE (ELVALOY® SHEET)

A. Surface-adhered with drip membrane shall be a composite 40 mil membrane consisting of 25 mils of elastomeric/thermal plastic membrane incorporating DuPontä Elvaloy® and 15 mils of SBS asphaltic adhesive. The membrane shall be reinforced with synthetic fibers, calendered into sheet form, rolled and cut to standard widths.

B. Standard Sheet Dimensions: Thickness 40 mil
   1. Roll length: 75 ft
   2. Roll widths: 12, 18, 24, 36 in

C. Cloaks shall be pre-formed, three dimensional flexible units used for detail corners, level changes, stop ends, and special applications.
   1. Physical Properties:
      Elongation: 225% ASTM D412
      Tensile Strength: 875 psi ASTM D412
      Tear Strength: 270 psi ASTM D624
      Low Temperature Flexibility: -25º F Pass ASTM D146
      Water Absorption: Less than 0.1% ASTM D471

2.04 RELATED MATERIALS FOR SURFACE ADHERED FLASHING MEMBRANE

A. Asphalt Primer: Shall be a two-sided, self-adhering tape used to seal the top of cloaks against the back-up wythe. Adhesive may be used as an alternative.

B. Substrate Primer:
   1. Physical Properties:
      Solids by Weight: 68%
      Viscosity: 758 cps
      Weight per Gallon: 9.3 lbs.
      Elongation: >656% no Breakage, Exceeded Travel of Instron ASTM D 2370
      Tensile Strength: 85.1 psi ASTM D 2370
      10
      Hardness: Shore A 59
      Peel Strength: Aluminum No Fail at 4.60 pli
      Concrete No Fail at 3.86 pli

C. Mastic: Shall be used at all laps and joints, and top terminations.

2.05 WALL DRAINAGE SYSTEM

A. Collection device shall be a dovetail shaped material to place in the cavity of brick masonry walls for collecting mortar droppings above the level of the weep holes and flashing. The 90% open weave construction material shall be High Density Polyethylene (HDPE) mesh for thickness of 0.4 - 1.0 inch, or recycled polyester mesh for 2.0 inch thickness.

B. Material shall not oxidize, rot, promote mold or fungus, or react with other common building materials such as mortar, cement, asphalt, modified bitumen, PVC, copper, or galvanized metal; shall be Mortar Net, or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions for compliance with requirements for installation tolerances and other specific conditions.

3.02 GENERAL

A. Laying Masonry Walls: Use an inverted lintel CMU or fully grouted hollow CMU as a base for flashing at sills, floor joints, and other similar conditions.

B. Preparation: All sharp protrusions and mortar droppings must be removed from the substrate, and the surface must be clean and dry.

C. Where brick work occurs about the roof elevation, provide solid protection of the existing roof system until work is complete.

D. Flashing shall be fully supported when crossing the cavity except at sill and coping locations.

3.03 INSTALLATION OF BUILT-IN FLASHING MEMBRANE (ELVALOY® SHEET)

A. Flashing membrane and cloaks shall be installed in a bed of fresh mortar and should extend through the outer wythe a minimum of one-fourth inch (1/4") and left exposed. Flashing membrane is UV resistant.

B. Weep holes shall be provided immediately above all flashing at 24-inch centers. A minimum of two weeps shall be installed above any wall opening.

C. All joints in the flashing membrane shall be lapped a minimum of four inches (4") using flashing membrane adhesive.

D. Flashing membrane shall be installed six inches (6") above finished grade level.

E. Cloaks and end dams shall be installed at all window and door heads and sills.

F. Vertical flashing at wall openings shall extend into the wall opening one inch (1"). The door/window frame shall be installed with the flashing extending into the frame.

G. Cleaning: Flashing membrane shall not be damaged by cavity cleaning after installation. Precautions to be taken during subsequent work are:
   1. Use of cavity battens to prevent mortar droppings;
   2. Removal of droppings before they harden;
   3. Never use implements such as steel rods for cleaning the cavity; and
   4. Inspection of cavity flashing for damage as the work proceeds.

3.04 INSTALLATION OF SURFACE-ADHERED FLASHING WITH DRIP MEMBRANE(ELVALOY® SHEET)

A. Priming: All flashing substrates shall be primed. Flashing primer shall be applied with a brush, roller or sprayed. Coverage is approximately 400 square feet per U.S. gallon (3.78L). Drying time may vary depending on temperature, humidity, and air movement; drying time should be approximately 45 minutes.

B. Flashing System Installation: Starting at a corner, mount cloak to substrate flashing adhesive. Cut surface adhered membrane into workable sections (8'-10'). Remove the release sheet and adhere the membrane to the inner leaf of construction lapping the membrane onto the cloak four inches (4"). Use firm hand pressure and a steel roller to totally adhere membrane in place. Extend membrane completely through the outer leaf and leave it exposed one-fourth inch (1/4") minimum. The surface-adhered membrane is UV resistant. Apply a bead of flashing mastic to all top termination edges.

C. Termination Bar: The surface-adhered membrane shall be installed using a termination bar for additional attachment to the inner leaf (optional).

D. Weep holes shall be provided immediately above all flashing at 24-inch centers. A minimum of two baffle weeps shall be installed above any wall opening.

E. Flashing membrane shall be installed six inches (6") above finished grade level.

F. Stop end cloaks shall be installed at all windows, door heads, sills, and through-wall starts, stops, steps, etc.

G. Enveloped vertical flashing at wall openings shall extend into the wall opening one inch (1"). The door/window frame shall be installed with the flashing extending into the frame. Enveloped vertical flashing shall be installed at all abutments of dissimilar exterior wall treatments: inside and outside nineties (90°), etc.

H. Cleaning: Flashing membrane shall not be damaged by cavity cleaning after installation. Precautions to be taken during subsequent work are:
   1. Use of cavity battens to prevent mortar droppings;
   2. Removal of droppings before they harden;
   3. Never use implements such as steel rods for cleaning the cavity; and
   4. Inspection of cavity flashing for damage as the work proceeds.

3.05 INSTALLATION OF WALL DRAINAGE SYSTEM

A. Collection device shall be placed vertically on top of the flashing inside the wall cavity where it shall catch and permanently suspend mortar droppings above the level of the weep holes and flashing. The dovetail shape

shall prevent mortar droppings from forming a continuous dam and shall allow water and air to rapidly and easily move through the material to the weeps.

3.06 FLASHING MEMBRANE ADHESIVE

A. Application:
   1. Flashing adhesive shall be applied to clean, dry and relatively smooth surfaces.
   2. When joint two (2) pieces of flashing membrane, or joining flashing membrane to Cloaks:
      a. Apply two (2) one-fourth inch (1/4") beads of adhesive approximately one-half inch (1/2") and one and one-half inch (1-1/2"), respectively, from the edge of the bottom membrane along the entire width of the bottom membrane. Overlap the top membrane over the bottom membrane two inches (2") and roll lap with steel hand roller, causing excess to extrude the entire length of the overlap.
      b. Do not remove excess adhesive.

B. Safety, Storage and Handling: Keep container tightly closed when not in use. Store at room temperature. Clean up tools and hands with waterless hand cleaner.

3.07 SUBSTRATE PRIMER

A. Surface Preparation: Areas to be primed should be dry.

B. Application: Substrate primer may be applied using a soft roller or brush. It can be removed from masonry with soapy water while wet and a solvent-based cleaner if dry (mineral spirits or citrus cleaner).

C. Coverage: Depending on the condition of the surface, coverage may vary from as little as 150 square feet to 200 square feet per gallon.

D. Caution:
   1. Substrate primer should not be applied when temperatures are below 40° F or when rain is imminent.
      a. Keep substrate primer from freezing.
      b. During hot weather, the product should be stored in a cool shaded area.
      c. Do not thin this product.
      d. Curing rates will vary depending on the ambient temperature relative humidity, wind speed, sky condition and the proper rate of application. Generally speaking, Substrate primer will dry within 15 to 30 minutes when applied at 70° F or above. At 50° F, on a cloudy day, cure time may be extended to as much as one hour.
      e. Check several places on primed area for dryness prior to proceeding with the flashing application.

END OF SECTION

SECTION 07 71 13
MANUFACTURED COPINGS

PART 1 GENERAL

1.01 SUMMARY

A. Work included: Furnishing and installing factory fabricated and finished coping systems.

1.02 RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry.

B. Section 06 10 00 - Rough Carpentry.

1.03 REFERENCES

A. A. FM Global, P.O. Box 9102, Norwood, MA 02082, 617-762-4300.

B. B. SPRI Sheet Membrane and Component Suppliers to the Commercial Roofing Industry, 175 Highland Ave., Needham, MA 02194, 617-444-0242, fax: 617-444-6111.

1.04 SUBMITTALS

A. A. Product Data: Provide manufacturer's product and complete installation data for all materials in this specification.

B. B. Shop drawings: Show profiles, joining method, accessories location, anchorage and flashing details, adjacent construction interface, and dimensions.

C. C. Samples: Available on request; sized to represent material adequately.

D. D. Contract Closeout: Submit Special Warranty and Manufacturer's performance certifications.

E. E. Installation Guide: The product manufacturer shall provide a written installation guide.

1.05 PRODUCT HANDLING

A. All materials shall be delivered in the manufacturer's original sealed, labeled containers.

B. Store materials in a dry, protected, well-vented area. The contractor shall report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.

C. Remove protective plastic surface film immediately after installation [if applicable].

1.06 SUBSTITUTIONS

A. Proposals for substitution products shall be accepted only from bidding contractors a minimum of 10 working days before bid due date. The proposed substitution shall meet the performance and quality standards of this specification (see section 1.04).

1.07 JOB CONDITIONS

A. Verify that other trades with related work are complete before mounting coping covers.

B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.

C. Refer to the construction documents, shop drawings and manufacturer's installation instructions.

D. Coordinate installation with roof membrane manufacturer's instructions before starting.

E. Observe all appropriate OSHA safety guidelines for this work.

1.08 WARRANTY/GUARANTEE

A. Manufacturer's Standard Warranty: Warranted materials shall be free of defects in material and workmanship for five years after shipment. If, after inspection, the manufacturer agrees that materials are defective, the manufacturer shall at their option repair or replace them. For decorative finish warranty, consult manufacturer.

B. Standard Permasnap with 20 gauge cleat - 20-Year Excel Warranty: Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer's instructions, will not blow off, leak, or cause membrane failure, even in wind conditions up to 110 mph, or the manufacturer shall at their option repair or replace their materials.

C. Permasnap Plus! With 16 gauge cleat - 25-Year Category5SM Warranty: Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer's instructions, will not blow off, leak, or cause membrane failure, even in wind conditions up to 155 mph, or the manufacturer shall replace or repair its materials.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. W. P. Hickman Company
P.O. Box 15005
Asheville, NC 28813-0005
Phone: 828-274-4000
Toll Free: 800-892-9173
Fax: 828-274-4031
Internet address - http://www.wph.com

2.02 PARAPET COPING SYSTEM

A. Permasnap Coping: Metal coping cap with galvanized steel anchor cleats and gutter support chairs for capping any parapet wall. The system shall be watertight, maintenance free, and not require exposed fasteners or sealant. Joints shall be butt type with concealed splice plates.

B. Performance characteristics:
1. Coping sections shall expand and contract freely while mechanically locked in place on anchor cleats.
2. Coping sections shall lock to anchor cleats by mechanical pressure from support chairs.
3. All coping cover joints shall be underlayed with gutter/support chairs capable of draining water.

C. Metal: .050”

D. Coping cap: Length of 10'-0” (3048 mm); Width verify in field.

E. Coping vertical face and back leg: 5".

F. Internal splice plates: Shall be concealed with matching finish to maintain outside face continuity.

G. Coping Cleat: 20 gauge galvanized steel anchor cleat (16 gauge on Permasnap Plus!); normally 12” (305 mm) wide @ 5'-0” (1524 mm) on center to be mechanically fastened as indicated and detailed.

H. Gutter/support chair: Metal Gutter Chair in color and finish to match coping cap.

I. Fasteners: Shall be stainless steel screw type with a minimum pull-out resistance of 240 # (109 kg) as supplied by the manufacturer per substrate application. No exposed fasteners shall be permitted.

J. Finishes: Shall be standard precoated Kynar-500 from manufacturer's color list. Color shall be from mfg. standard colors.

2.03 ACCESSORIES

A. Corners, end caps, pier caps, etc. shall be fabricated by the coping manufacturer.

B. Welded or METAL-LOCK® assembly shall be used to maintain watertight integrity.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that coping installation will not disrupt other trades. Verify that substrate is dry, clean and free of foreign matter. Report and correct defects prior to any installation.

3.02 INSTALLATION

A. Submit product design drawings for review and approval to Architect or Specifier before fabrication.

B. Installing contractor shall check as-built conditions and verify the manufacturer's coping details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the coping manufacturer's installation guide when setting copings.

C. Installer shall use mechanical fasteners with minimum 240 # (109 kg) pull-out resistance suitable for parapet substrates.

END OF SECTION

SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SUMMARY

A. Work included: Manufacturer shall provide a complete prefabricated perimeter drainage gutter system including the following:
   1. Gutter complete with support brackets and hanger straps. Gutter Sections: Length of 10'-0" (3048 mm).
   2. Gutter expansion joints for gutter runs exceeding 50'.
   3. Provide all downspouts at locations where indicated on the drawings.
   4. Connect downspouts to underground storm drains, at locations where required by the drawings.

1.02 RELATED SECTIONS

A. Section 05 12 23 - Structural Steel Framing

B. Section 05 31 00 - Steel Decking

C. Section 06 10 00 - Rough Carpentry

D. Section 07 53 50 - Fully Adhered Multi-Ply Roof System

1.03 SUMMARY:

A. Provide labor, material, and equipment necessary for furnishing a complete installation of commercial gutter system.

1.04 SUBMITTALS:

A. Product Data: Provide manufacturer's product and complete installation data for all materials in this specification.

B. Shop drawings: Show profiles, joining method, location of accessory items, anchorage and flashing details, adjacent construction interface, and dimensions.

C. Samples: Available on request; sized to adequately represent material.

D. Contract Closeout: Submit Special Warranty and Manufacturer's performance certifications [if applicable].

E. Installation Guide: The product manufacturer shall provide a written installation guide.

1.05 PRODUCT HANDLING:

A. All materials shall arrive in the manufacturer's original sealed, labeled containers.

B. Store materials in a dry, protected, well-vented area. The contractor shall report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.

C. Remove protective plastic surface film after installation.

1.06 SUBSTITUTIONS

A. Proposals for substitution products shall be accepted only from bidding contractors a minimum of 10 working days before bid due date. The proposed substitution shall meet the performance and quality standards of this specification (see section 1.04).

1.07 JOB CONDITIONS:

A. Verify that other trades are complete before installing the roof edging.

B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.

C. Refer to the construction documents, shop drawings and manufacturer's installation instructions.

D. Coordinate installation with roof membrane manufacturer's installation instructions.

E. Observe all appropriate OSHA safety guidelines for this work.

1.08 WARRANTY/GUARANTEE:

A. Manufacturer's Standard Warranty: Warranted materials shall be free of defects in material and workmanship for five years after shipment. If, after inspection, the manufacturer agrees that materials are defective, the manufacturer shall at their option repair or replace them. For decorative finish warranty, consult manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURER:

A. W. P. Hickman Company
P.O. Box 15005
Asheville, NC 28813-0005
Phone: 828-274-4000
Toll Free: 800-892-9173
Fax: 828-274-4031
Internet address: wph.com

2.02 GUTTER SYSTEM:

A. Custom size rectangular Gutter, as shown on the drawings. Gutter Sections: Length of 10'-0" (3048 mm).
1. 1.5" wide .125" straps at 18" o.c. across top of gutter front edge.
2. 1" wide and .050" thick internal aluminum strap 30" o.c. at top alternate location with 1" wide .125" thick external hanger at bottom location 30" o.c. for support of gutter.
3. Include expansion joints not exceeding 40 feet maximum for long runs, locations as recommended by manufacturer.

B. B. Downspouts:
1. Factory fabricated rectangular downspouts, sizes as shown on drawings.
2. Provide three (3) downspout anchor straps per 10' section.
3. Provide factory fabricated elbows.

C. Fascia metal gauge: .050" thick formed aluminum; extruded aluminum.

D. Fasteners: As recommended by the manufacturer per substrate application.

E. Exterior finishes: Kynar-500 from manufacturer's standard colors.

2.03 ACCESSORIES:

A. Corners, end caps, expansion joints, etc. shall be fabricated by the gutter manufacturer.

PART 3 EXECUTION

3.01 INSPECTION:

A. Verify that gutter installation will not disrupt other trades. Verify that the substrate is dry, clean and free of foreign matter. Report and correct defects prior to any installation.

3.02 INSTALLATION GUTTER SYSTEM:

A. Submit product design drawings for review and approval to Architect or Specifier before fabrication.

B. Installing contractor shall check as-built conditions and verify the manufacturer's gutter details for accuracy to fit the assembly prior to fabrication. The installer shall comply with the gutter edging manufacturer's installation guide when setting gutter.

C. Installer shall furnish mechanical fasteners consistent with manufacturer's instructions.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies , whether indicated on drawings or not , and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Cutting and patching.

1.03 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2011.

B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2011a.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

D. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

F. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration.

C. Product Data: Provide data on product characteristics.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. With minimum 3 years documented experience installing work of this type.

1.06 MOCK-UP

A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
   2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.

B. If accepted, mock-up will represent minimum standard for the Work.

C. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: See Drawings for required systems and ratings.

2.02 MATERIALS

A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
   1. Durability and Longevity: Permanent.
   2. Color: Red.
   3. Manufacturers:
      a. A/DFire Protection Systems Inc: www.adfire.com.
      b. 3M Fire Protection Products: www.3m.com/firestop.
      c. Hilti, Inc: www.us.hilti.com.
      d. Specified Technologies, Inc: www.stifirestop.com.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Foam Firestoppping: Single component silicone foam compound; conforming to the following:
   1. Durability and Longevity: Permanent.
   2. Manufacturers:
      a. 3M Fire Protection Products: www.3m.com/firestop.
      b. Hilti, Inc: www.us.hilti.com.
      c. Specified Technologies, Inc: www.stifirestop.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:
   1. Durability and Longevity: Permanent.
   2. Manufacturers:
      a. A/DFire Protection Systems Inc: www.adfire.com.
      b. USG: www.usg.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:
   1. Durability and Longevity: Permanent.
   2. Manufacturers:
      a. A/DFire Protection Systems Inc: www.adfire.com.
      b. Pecora Corporation: www.pecora.com.
      c. Thermafiber, Inc: www.thermafiber.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

F. Firestop Devices - Wrap Type: Mechanical device with incombustible filler and sheet stainless steel jacket, intended to be installed after penetrating item has been installed; conforming to the following:
   1. Durability and Longevity: Permanent ; suitable for pedestrian traffic.
   2. Manufacturers:
      a. RectorSeal: www.rectorseal.com.
      b. 3M Fire Protection Products: www.3m.com/firestop.
      c. Hilti, Inc: www.us.hilti.com.
      d. Specified Technologies, Inc: www.stifirestop.com.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

G. Firestop Devices - Cast-In Type: Sleeve and sealing material, intended to be cast in concrete floor forms or in concrete on metal deck, not requiring any additional materials to achieve penetration seal.

1. Durability and Longevity: Permanent.
2. Manufacturers:
   a. 3M Fire Protection Products: www.3m.com/firestop.
   b. Hilti, Inc: www.us.hilti.com.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

H. Intumescent Putty: Compound that expands on exposure to surface heat gain; conforming to the following:
1. Durability and Longevity: Permanent.
2. Color: Red.
3. Manufacturers:
   a. RectorSeal: www.rectorseal.com.
   b. 3M Fire Protection Products: www.3m.com/firestop.
   c. Hilti, Inc: www.us.hilti.com.
   d. Specified Technologies, Inc: www.stifirestop.com.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

I. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

C. Install labelling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 91 23
BACKER RODS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Application of closed-cell foam backer rod.

1.02 RELATED SECTIONS

A. Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.
   1. Section 04 20 00 - Unit Masonry.
   2. Section 07 92 03 - Silicone Joint Sealant.

1.03 REFERENCES

A. ASTM C 1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

1.04 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Submit manufacturer's product data and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Protect materials during handling and application to prevent damage.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. W. R. MEADOWS, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com.

B. Hohmann & Barnard, Inc., 30 Rasons Court, Hauppauge, New York 11788. (800) 645-0616, Fax: (631) 234-0683. Web: www.h-b.com Email: weanchor@h-b.com.

2.02 MATERIALS

A. Performance Based Specification: backer rod joint filler shall be flexible, lightweight, non-staining, polyethylene, and closed cell. It shall be a chemical-resistant, ultraviolet stable, non-absorbent, low density, compressible foam.

B. Proprietary Based Specification: KOOL-ROD Backer Rod by W. R. MEADOWS.

C. Closed-Cell Neoprene Sponge Model #NSTA 3/8" Thickness. (ASTM D-1056 Grade 2A1) by Hohmann & Barnard, Inc..

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive backer rod. Notify architect if areas are not acceptable. Do not begin application until unacceptable conditions have been corrected.

3.02 APPLICATION

A. Install backer rod in accordance with manufacturer's instructions.

B. Ensure joint or opening is clean, dry and free of obstructions.

C. Select the proper backer rod diameter and cut to length or use directly from the spool.

D. Uniformly install backer rod with a blunt instrument or roller at a level recommended by the sealant manufacturer, specifier or architect.

E. Seal the concrete with joint sealant.

3.03 PROTECTION

A. Protect pavement joint sealant from traffic until fully cured.

END OF SECTION

SECTION 07 92 03
SILICONE BUILDING SEALANT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes one-component, ultra-low modulus, neutral-cure silicone rubber sealant for above-grade expansion and control joints of most building materials and for both new and remedial construction.

1.02 RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry.

B. Section 08 12 13 - Hollow Metal Frames.

C. Section 08 43 13 - Aluminum-Framed Storefronts.

D. Section 08 44 13 - Glazed Aluminum Curtain Walls.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
2. ASTM C679 - Standard Test Method for Tack-Free Time of Elastomeric Sealants.
3. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
4. ASTM C794 - Standard Test Method for Tack-Free Time of Elastomeric Sealants.
5. ASTM C920 - Elastomeric Joint Sealants.
6. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.
7. ASTM C1193 - Standard Guide for Use of Joint Sealants.
8. ASTM C1248 - Standard Test Method for Staining Porous Substrate by Joint Sealants.
9. ASTM C1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
10. ASTM D412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
11. ASTM D2202 - Standard Test Method for Slump of Sealants.
12. ASTM E119 (UL 263) - Standard Test Method for Fire Tests of Building Construction and Materials.

1.04 Government Services Administration (GSA), Commercial Item Descriptions (CID):

A. GSA CID A-A-272A - Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

B. GSA CID A-A-1556 - Sealing Compound Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

1.05 SUBMITTALS

A. Provide in accordance with Section 01 33 00 - Submittal Procedures:

B. Product data for silicone sealant, primer, joint backing, and other accessories. Include material safety data sheets (MSDS) and certifications showing compliance with specified standards.

C. Shop drawings detailing sealant joints and indicating joint dimensions, materials, sealant profile, and size limitations.

D. Manufacturer's color chart for selection by Architect.

E. Manufacturer's instructions for installation and field quality control testing.

F. Copy of warranties specified in Paragraph 1.5 for review by Architect.

G. Provide Material Safety Data Sheets (MSDS).

1.06 PROJECT CONDITIONS

A. Do not install silicone sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.

B. Do not install sealant when temperature is less than [5 degrees F] [3 degrees C] below dew point.

1.07 WARRANTY

A. Provide under provisions of Section 01 78 00 - Closeout Submittals:
   1. Installer's 5-year workmanship warranty.
   2. Manufacturer's 20-year material warranty for properly installed silicone sealant.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Dow Corning Corporation, P.O. Box 994, Midland, MI 48686-0994; (800) 248-2481; www.dowcorning.com/construction.

B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01 63 00 - Product Substitution Procedures.

2.02 SEALANT

A. Type: One-component, ultra-low modulus, neutral-cure silicone rubber sealant; Dow Corning® 790 Silicone Building Sealant, as manufactured by Dow Corning Corporation.

B. Compliance: Sealant shall meet or exceed requirements of these standards:
   1. ASTM C920, Type S, Grade NS, Class 100/50, Use T, NT, G, M, A, and O.
   2. GSA CID A-A-272A.
   3. GSA CID A-A-1556.

C. Color: Color as selected by ERO Architects from manufacturer's standard colors.

D. Shelf life: 12 months.

E. Application temperature range: Minus 20 to plus 120 degrees F.

F. Tack-free time: 1 hour at 50 percent relative humidity, tested in accordance with ASTM C679.

G. Working time: 10 to 20 minutes.

H. Curing time at [3/8-inch] [10-mm] depth: 7 to 14 days at [77 degrees F] [25 degrees C] and 50 percent relative humidity.

I. Flow, sag, or slump in [3 inches] [76 mm] wide joint: None, when tested in accordance with ASTM D2202.

J. Volatile organic compound (VOC) content: 43 grams/liter maximum.

K. Cured sealant properties after 21 days at [77 degrees F] [25 degrees C] and 50 percent relative humidity.
   1. Joint movement capability: Plus 100 percent extension and 50 percent compression, tested in accordance with ASTM C719.
   2. Hardness: 15-durometer hardness, Shore A, tested in accordance with ASTM C661.
   3. Properties tested in accordance with ASTM D412:
      a. Ultimate tensile strength: [100 psi] [0.07 kg per square mm].
      b. Ultimate elongation: 1,600 percent.
   4. Minimum peel strength: [15 ppi] [2.67 kg/cm], tested in accordance with ASTM C794.
   5. Properties, tested in accordance with ASTM C1135:
      a. Adhesion at 25 percent extension: [15 psi.] [0.010 kg per square mm.]
   6. Weathering after 22,400 hours, tested in accordance with ASTM C1135 using QUV Weatherometer:
      a. At 25 percent extension: [30 psi.] [0.020 kg per square mm.]
      b. At 50 percent extension: [40 psi.] [0.028 kg per square mm.]
   7. Staining after 14 days at 50 percent compression, [158 degrees F] [70 degrees C]: None on concrete, granite, limestone, and brick, when tested in accordance with ASTM C1248.

2.03 ACCESSORIES

A. Substrate primer: As recommended for project conditions and provided by silicone sealant manufacturer.

B. Sealant backing: Provide backing complying with ASTM C1330.
   1. Size: Greater than joint opening by 25 percent minimum.

C. Bond breaker tape: Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.
   1. Type: Polyethylene or other plastic tape recommended by sealant manufacturer.

D. Masking tape: Non-staining, non-absorbent type compatible with silicone sealant and adjacent surfaces.

PART 3 EXECUTION

3.01 GENERAL

A. Prepare substrates and apply silicone sealant in accordance with manufacturer's instructions.

B. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).

C. Do not use silicone sealant for:
   1. Below-grade applications.
   2. Surfaces to be immersed in water for prolonged time.
   3. Brass and copper surfaces.
   4. Materials bleeding oils, plasticizers, and solvents.
   5. Structural glazing and adhesive.
   6. Surfaces to be painted.
   7. Surfaces in direct contact with food.
   8. Medical and pharmaceutical applications.

D. Do not apply in totally confined spaces without ventilation for curing.

3.02 PREPARATION

A. Inspect [existing joints to be repaired.] [new substrates to receive silicone sealant.] Ensure surfaces are clean, dry, and free of frost, dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, and previous films and coatings.

B. Clean substrates to receive silicone sealant.
   1. Porous surfaces: Abrasive-clean followed by blasting with oil-free compressed air.
   2. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193.
   3. High-pressure water cleaning: Exercise care that water does not enter through failed joints.

C. Aluminum and other nonporous surfaces except glass require use of primer. Concrete, stone, masonry, and other nonporous surfaces typically do not require primer. Primer as recommended by Dow Corning Corporation.

D. Adhesion test: Apply silicone sealant to small area and perform adhesion test in accordance with ASTM C1193, Method A, to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with manufacturer's instructions. Allow primer to dry.

E. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

3.03 APPLICATION

A. Sealant backing: Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.

B. Bond breaker: Install on backside of joint where backing is not feasible.

C. Sealant:
   1. Use sealant-dispensing equipment to push sealant bead into opening. Fill joint opening to full and proper configuration. Apply in continuous operation.
   2. Before skinning or curing begins, tool sealant with metal spatula. Provide concave, smooth, uniform, sealant finish. Eliminate air pockets and ensure complete contact on both sides of joint opening. Tool joints in one continuous stroke.

D. Complete horizontal joints prior to vertical joints. Lap vertical sealant over horizontal joints.

E. Cleaning: Remove masking tape and excess sealant.

3.04 FIELD QUALITY CONTROL

A. ***** Edit this article to reflect type, size, and complexity of project. *****

B. Perform adhesion tests in accordance with manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant Joint Hand-Pull Tab.
   1. Perform 5 tests for first 100 linear feet of applied silicone sealant and 1 test for each 100 feet seal thereafter or perform 1 test per floor per building elevation minimum.
   2. For sealants applied between dissimilar materials, test both sides of joint.

C. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.

D. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

END OF SECTION

SECTION 07 92 13
ELASTOMERIC JOINT SEALANT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior and Exterior weatherproofing sealants.

1.02 RELATED SECTIONS

A. Section 08 12 13 - Hollow Metal Frames.

B. Section 08 43 13 - Aluminum-Framed Storefronts.

C. Section 08 44 13 - Glazed Aluminum Curtain Walls.

D. Section 09 29 00 - Gypsum Board.

E. Section 09 29 10 - Gypsum Board Accessories.

F. Section 09 30 00 - Tiling.

G. Section 09 51 00 - Acoustical Ceilings.

H. Section 12 32 00 - Manufactured Wood Casework.

1.03 REFERENCES

A. ASTM C 920 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers.

B. FS TT-S-00230C - Sealing Compound, Elastomeric Type, Single Component (For Calking, Sealing, and Glazing In Buildings and Other Structures).

C. AAMA 504 - Voluntary Specification for Field Testing of Windows and Sliding Glass.

D. AAMA 812 - Voluntary Practice for Assessment of Single Component Aerosol Expanding Polyurethane Foams for Sealing Rough Openings of Fenestration Installations.

E. US Green Building Council.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

F. Provide Material Safety Data Sheet (MSDS).

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a minimum of 3 years documented experience in the manufacture of construction sealants.

B. Pre-Application Meeting: Convene a pre-application meeting two weeks before the start of installation of wall systems. Require attendance of parties directly affecting work of this section, including the Contractor, wall system contractor, sealant applicator and manufacturer's representative. Review the surface preparation, application, cleaning, protection and coordination with other work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in accordance with the manufacturers instructions.

1. Store materials in dry, enclosed area with adequate protection from moisture.
2. Keep containers sealed until ready for use.
3. Storage Temperature: 40 degrees F (4.4 degrees C) and 100 degrees F (37.7 degrees C). Do not permit freezing.

1.07 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Henkel Corporation, which is located at: 32150 Just Imagine Dr. ; Avon, OH 44011; Toll Free Tel: 800-624-7767; Tel: 440-205-3900; Email: request info (bill.longo@us.henkel.com) www.greenseries.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 APPLICATIONS/SCOPE

A. Provide VOC Compliant Indoor/Outdoor Sealant for sealing around exterior window and door frames, sill plates, electrical and plumbing penetrations, and other areas as indicated on the Drawings.

2.03 MATERIALS

A. VOC Compliant Indoor/Outdoor Sealant: GreenSeries Acrylic/Urethane Indoor/Outdoor Sealant, synthetic latex rubber, acrylic/urethane latex sealant. Cured sealant is mold and mildew resistant and paintable.
   1. Indoor Air Quality Certified: Certified by the GREENGUARD Environmental Institute under the GREENGUARD Product Emission Standard for Children & Schools, Certification No: A10Gc9000511-4.
   2. LEED qualified.
   3. VOC: Compliant.
   4. Meets performance characteristics of TT-S-00230C, Type II, Class A and ASTM C 920, Grade NS, Class 25.
   5. Nonflammable/Non-toxic.
   6. Color:
      a. To be selected by ERO Architects from Manufactures standard colors.
   7. Tooling/Open Time: 10 to 20 minutes.
   8. Skin Time:
      a. 30 to 60 minutes.
   9. Slump: 0.10 inch max.
   10. Application Temperature:
      a. 40 degree F minimum.
   11. Service Temperature:
      a. Minus 5 degrees F to 170 degrees F.
   12. Shore "A" Hardness: 35.
   13. Tensile Strength: 70 psi.
   14. Elongation: 900 percent.
   15. Movement Capability: plus or minus 25 percent.
   16. Peel Strength at 180 degrees:
      a. 35 pli - wood.
      b. 25 pli - concrete.
      c. 28 pli - aluminum.

B. Cleaning Solvent: OSI PC-12 Pro Clean is a cleaning solvent used to dissolve uncured or fresh polyurethane foam sealant. Will not dissolve cured foam sealant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify substrate surfaces are ready to receive work.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Concrete or block walls must be well cured, dry and free of any release agents.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 92 19
ACOUSTICAL SEALANT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical sealant.

1.02 RELATED SECTIONS

A. Section 09 29 00 - Gypsum Board.

B. Section 09 29 10 - Gypsum Board Accessories.

C. Section 06 20 00 - Finish Carpentry.

D. Section 09 51 00 - Acoustical Ceilings.

1.03 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

C. ASTM C 919 - Practice for Use of Sealants in Acoustical Applications.

D. ASTM D 1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

E. ASTM D 1623 - Standard Test Method for Tensile And Tensile Adhesion Properties Of Rigid Cellular Plastics.

F. ASTM D 2856 - Standard Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer.

G. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences.

H. Underwriters Laboratories - UL Classification.

I. US Green Building Council.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of proposed materials with low-emitting materials for adhesive and sealants.
   2. List of proposed materials with recycled content. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
   3. List of proposed materials demonstrating that each material was extracted, harvested or recovered, as well as manufactured within 500 miles of the project site.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product and color.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Provide Material Safety Data Sheet (MSDS).

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a minimum of 3 years documented experience in the manufacture of construction sealants.

B. Pre-Application Meeting: Convene a pre-application meeting two weeks before the start of installation of wall systems. Require attendance of parties directly affecting work of this section, including the Contractor, wall system contractor, Acoustical sealant applicator and manufacturer's representative. Review the surface preparation, application, cleaning, protection and coordination with other work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in accordance with the manufacturers instructions.
   1. Store materials in dry, enclosed area with adequate protection from moisture.
   2. Keep containers sealed until ready for use.
   3. Storage Temperature: 65 degrees F (18 degrees C) and 90 degrees F (32 degrees C).

C. Store and dispose of solvent-based cleaning materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Henkel Corporation, which is located at: 32150 Just Imagine Dr.; Avon, OH 44011; Toll Free Tel: 800-624-7767; Tel: 440-205-3900; Email: request info (bill.longo@us.henkel.com) Web: www.greenseries.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 APPLICATIONS/SCOPE

A. Provide Draft & Acoustical Sound sealant for exposed and unexposed applications at perimeter joints, floor and ceiling runners (either wood or metal), cut-outs in gypsum board, veneer plaster systems and other areas where a sound rated assembly is indicated on the Drawings.

B. Provide GreenSeries Pro-Foam II to seal around windows, door frame joints, jambs, mud sills, header and corner joints, top plate penetrations, exterior and T joints, electrical and plumbing penetrations and other areas as indicated on the Drawings.

2.03 MATERIALS

A. VOC Compliant Acoustical Sound Sealant: OSI Green Series SC-175, synthetic latex rubber, water based sealant designed to reduce sound transmissions in walls and partition systems. Primary function is to achieve and maintain the specific STC (Sound Transmission Class) value of the system design. VOC compliant.
   1. Indoor Air Quality Certified: Certified by the GREENGUARD Environmental Institute under the GREENGUARD Standard for Low Emitting Products, Certification No: A10Gc9000511-4.
   2. Color:
      a. To be selected by ERO Architects from Manufactures standard colors.
   3. VOC: Compliant.
   4. Drytime:
      a. Initial Set: 30 minutes.
      b. Cure Time: 2 to 7 days.
   5. Application Temperature:
      a. 40 degree F minimum.
   6. Service Temperature:
      a. Minus 5 degrees F to 170 degrees F.

7. Fire Resistance: Conforms to the requirements of ASTM E 84, Class A.

B. VOC Compliant Acoustical Sound Sealant: OSI SC-175: Water based, non flammable, synthetic latex rubber sealant designed to reduce sound transmissions in walls and partition systems. Primary function is to achieve and maintain the specific STC (Sound Transmission Class) value of the system design.
   1. VOC compliant.
   2. Color:
      a. To be selected by ERO Architects from Manufactures standard colors.
   3. Flammability: Non-Flammable.
   4. Drytime:
      a. Tooling/Open Time 15 minutes.
      b. Tack Free Time 30 minutes.
      c. Cure Time 2-7 days.
   5. Application temperature:
      a. 40 degrees F (4.4 degrees C) minimum
   6. Service Temperature:
      a. Minus 5 degrees F to 170 degrees F (minus 20.4 degrees C to 76.6 degrees C).
   7. Freeze-Thaw Stability Freeze-thaw stable for at least 3 cycles. Unaffected by freezing after curing.
   8. Shore "A" Hardness 45 plus or minus 5 (Cured 30 days at room temperature)
   9. Elongation 200 percent.
   10. Accelerated Weathering No cracks, no discoloration, no chalking: 1000 hrs. in Xenon Arc Weatherometer.

C. VOC Compliant Acoustical Sound Sealant: OSI GreenSeries Draft & Acoustical Sound sealant, synthetic latex rubber, water based sealant designed to reduce sound transmissions in walls and partition systems.
   1. Indoor Air Quality Certified: Certified by the GREENGUARD Environmental Institute under the GREENGUARD Product Emission Standard for Children & Schools, Certification No: 90005-5.
   2. LEED qualified.
   3. VOC: Compliant.
   4. Color:
      a. To be selected by ERO Architects from Manufactures standard colors.
   5. Drytime:
      a. Initial Set: 30 minutes.
      b. Cure Time: 2 to 7 days.
   6. Application Temperature:
      a. 40 degree F minimum.
   7. Service Temperature:
      a. Minus 5 degrees F to 170 degrees F.
   8. Shore "A" Hardness: 45 plus or minus 5 (Cured 30 days @ room temp.)
   9. Fire Resistance:
      a. UL Classified - 48S9 (file #R9732). Conforms to UL 723: U.B.C. Standard No. 42-1 Class I.
      b. Conforms to the requirements of ASTM E 84, Class A.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify substrate surfaces are ready to receive work.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Perform acoustical sealant application work in accordance with ASTM C 919.

C. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Steel frames for wood doors.

C. Fire-rated steel doors and frames.

D. Thermally insulated steel doors.

E. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

C. Section 09 90 00 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames; 2007.

C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

D. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010.

F. ASTM C236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box; 1989 (Reapproved 1993).

G. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

I. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010.

J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2008.

K. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.

L. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

M. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

O. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Samples: Submit two samples of metal, 2 x 2 inches in size showing factory finishes, colors, and surface texture.

E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
   8. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors :
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
   2. Core: Polystyrene foam.
   3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   4. Texture: Smooth faces.
   5. Weatherstripping: Separate, see Section 08 71 00.
   6. Finish: Factory primed, for field finishing.

B. Interior Doors, Non-Fire-Rated:
   1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
   2. Core: Cardboard honeycomb.
   3. Thickness: 1-3/4 inches.

C. Interior Doors, Fire-Rated:
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.

2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
    a. Provide units listed and labeled by UL.
    b. Attach fire rating label to each fire rated unit.

D. Panels: Same construction, performance, and finish as doors.

2.04 STEEL FRAMES

A. General:
1. Comply with the requirements of grade specified for corresponding door.
    a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
    b. Frames for Sound-Rated Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
2. Finish: Factory primed, for field finishing.
3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
4. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
5. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Exterior Door Frames: Face welded, seamless with joints filled.
1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
2. Finish: Factory primed, for field finishing Finish color as selected by ERO Architects.
3. Weatherstripping: Separate, see Section 08 71 00.

C. Interior Door Frames , Non-Fire-Rated: Fully welded type.
1. Terminated Stops: Provide at all interior doors; closed end stop terminated 6 inches above floor at 45 degree angle.
2. Finish: Factory primed, for field finishing Finish color as selected by ERO Architects.

D. Interior Door Frames, Fire-Rated: Fully welded type.
1. Fire Rating: Same as door, labeled.
2. Finish: Factory primed, for field finishing. Finish color as selected by ERO Architects

E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
1. In Fire-Rated Doors: UL-listed fusible link louver, same rating as door.
2. Style: Standard straight slat blade.
3. Fasteners: Exposed, tamper proof fasteners.

B. Glazing: As specified in Section 08 80 00 , factory installed.

C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners ; prepared for countersink style tamper proof screws.

D. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

E. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10 , door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Coordinate installation of glazing.

G. Coordinate installation of electrical connections to electrical hardware items.

H. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated, non-rated, and acoustical.

1.02 RELATED REQUIREMENTS

A. Section 06 20 00 - Finish Carpentry.

B. Section 08 11 13 - Hollow Metal Doors and Frames.

C. Section 08 71 00 - Door Hardware.

D. Section 08 80 00 - Glazing.

E. Section 09 90 00 - Painting and Coating: Site finishing of doors.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.

B. ICC (IBC) - International Building Code; 2009.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010.

E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Samples: Submit two samples of door construction, ____ by ____ inch in size cut from top corner of door.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Warranty, executed in County of Hidalgo's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High Pressure Decorative Laminate Faced Doors:
   1. Ampco Products, Inc; Product ____: www.ampco.com.
   2. Poncraft Door Co; Product ____: www.poncraft.com.
   3. VT Industries, Inc; Product ____: www.vtindustries.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Premium Grade, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.
   2. High Pressure Decorative Laminate Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations .
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with International Building Code ("positive pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
   3. High pressure decorative laminate finish where indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

C. Sound Retardant Doors: Equivalent to Type PC construction with core as required to achieve rating specified; plies and faces as indicated above.

2.04 DOOR FACINGS

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.02 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.03 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.04 SCHEDULE - See Drawings

END OF SECTION

SECTION 08 41 13.10

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 Summary

A. Section Includes: Kawneer Aluminum Entrances, glass and glazing, and door hardware and components.
   1. **Types of Kawneer Aluminum Entrances include**:
      a. **Type A** - **190 Swing Door**; Narrow stile, 2-1/8" (54) vertical face dimension, 1-3/4" (44.5) depth, moderate traffic applications.
      b. **Type B** - **500 Swing Door**; Wide stile, 5" (127) vertical face dimension, 1-3/4" (44.5) depth, high traffic applications.

B. Related Sections:
   1. Section 08 43 13 - Aluminum-Framed Storefronts.
   2. Section 08 71 00 - Finish Hardware.
   3. Section 08 81 00 - Glass Glazing.
   4. Division 28 00 00 - Electronic Safety and Security.

1.02 References (Industry Standards)

1.03 System Description

A. Entrance Performance Requirements:
   1. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf (300 Pa) for single doors and 1.567 psf for pairs of doors. A single 3'0" x 7'0" (915 x 2134) entrance door and frame shall not exceed 0.50 cfm per square foot. A pair of 6'0" x 7'0" (1830 x 2134) entrance doors and frame shall not exceed 1.0 cfm per square foot.
   2. Structural: Corner strength shall be tested per the Kawneer dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity [Testing procedure and certified test results available upon request].

1.04 Submittals

A. General: Prepare, review, approve, and submit specified submittals in accordance with “Conditions of the Contract” and Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in “Conditions of the Contract.”

B. Quality Assurance/Control Submittals:
   1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.05 Warranty

A. Project Warranty: Refer to “Conditions of the Contract” for project warranty provisions.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for entrance system as follows:
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.

1.06 Quality Assurance

A. Qualifications:
   1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
   2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.
   3. On access control installations, all wiring to be coordinated with a licensed electrical installer.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.07 Delivery, Storage and Handling

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle entrance doors and components to avoid damage. Protect entrance doors against damage from elements, construction activities, and other hazards before, during and after entrance installation.

PART 2 PRODUCTS

2.01 2.01 Manufacturers (Acceptable Manufacturers/Products)

A. Acceptable Manufacturers:
   1. Address: Kawneer Company, Inc
      555 Guthridge Court,
      Technology Park/Atlanta,
      Norcross, GA 30092
      Telephone:770 449 5555
      770 734 1560
   2. Proprietary Product(s)/System(s): Kawneer Aluminum Entrances.
      a. Series: 190 Swing Doors, Narrow Stile
      b. Series: 500 Swing Doors, Wide Stile
      c. Finish/Color: (See 2.06 Finishes)

B. Alternate (Manufacturers/Products): In lieu of providing below specified base bid/contract manufacturer, provide below specified alternate manufacturers. Refer to Alternates Section.

C. Substitutions:
   1. General: Refer to Substitutions Section for procedures and submission requirements.
      a. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
      b. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid entrance door installation and construction delays.
   2. Substitution Documentation:
      a. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
      b. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for entrance door system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum entrance doors for a period of not less than ten (10) years. (Company Name)
      c. Test Reports: Submit test reports verifying compliance with each test requirement for entrance door configurations required by the project.
      d. Product Sample and Finish: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
   3. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.02 Materials

A. Aluminum (Entrances and Components):
   1. Material Standard: ASTM B 221; 6063-T6 alloy and temper.
   2. The door stile and rail face dimensions of the 190 entrance door and 500 entrance door will be as follows:

	Vertical	StileTop	RailBottom Rail
a.	2-1/8" (54)	2-1/4" (58)	3-7/8" (99)
b.	5" (127)	5" (127)	6-1/2" (166)

3. Major portions of the door members to be 0.125" (3.2) nominal in thickness and glazing molding to be 0.05" (1.3) thick.
4. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.

B. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

C. Provide adjustable glass jacks to help center the glass in the door opening.

2.03 Accessories

A. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.

B. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

C. Standard Entrance Hardware
1. Weatherstripping:
   a. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
   b. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
3. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.
4. Center Pivots: See Hardware Schedule for Donna ISD standards.
5. Offset Pivots: See Hardware Schedule for Donna ISD standards.
6. Butt Hinge: See Hardware Schedule for Donna ISD standards.
7. Continuous Hinge: See Hardware Schedule for Donna ISD standards..
8. Push/Pull: See Hardware Schedule for Donna ISD standards..
9. Exit Device: See Hardware Schedule for Donna ISD standards..
10. Closer: See Hardware Schedule for Donna ISD standards..
11. Security Lock/Dead Lock: See Hardware Schedule for Donna ISD standards..
12. Latch Handle: See Hardware Schedule for Donna ISD standards..
13. Cylinder(s)/Thumbturn: See Hardware Schedule for Donna ISD standards..

2.04 Related Materials

A. Sealants: Refer to Joint Treatment (Sealants) Section

B. Glass: Refer to Glass and Glazing Section

2.05 Fabrication

A. Entrance System Fabrication:
1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
3. Prepare components with internal reinforcement for door hardware.
4. Arrange fasteners and attachments to conceal from view.

2.06 Finishes

A. Factory Finishing:
1. Kawneer Permanodic® AA-M12C22A41, AAMA 611, Architectural Class I Clear Anodic Coating(Color #14 Clear Anodized Aluminum).

2.07 2.07 Source Quality Control

A. Source Quality: Provide aluminum entrances specified herein from a single source.

B. Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

PART 3 EXECUTION

3.01 Examination

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive entrance system and sill plate is level in accordance with manufacturer's acceptable tolerances.
   1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 Installation

A. General: Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
   1. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
   2. Provide alignment attachments and shims to permanently fasten system to building structure.
   3. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
   4. Set thresholds in bed of mastic and secure.
   5. Adjusting: Adjust operating hardware for smooth operation.

B. Related Products Installation Requirements:
   1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.
   2. Glass: Refer to Glass and Glazing Section.
      a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

3.03 Cleaning and Protection

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances at no extra cost.

3.04 DISCLAIMER STATEMENT

A. This guide specification is intended to be used by a qualified construction specifier. The guide specification is not intended to be verbatim as a project specification without appropriate modifications for the specific use intended. The guide specification must be used and coordinated with the procedures of each design firm, and the particular requirements of a specific construction project.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
   1. Types of Kawneer Aluminum Storefront Systems include:
      a. Type A - Trifab® VG 451 Storefront System - 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Non-Thermal; Center, Back, Structural Silicone or Weatherseal Glazed (Type B); Screw Spline.
      b. Type B - Trifab® VG 451T Storefront System - 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Thermal; Center, Back, Structural Silicone or Weatherseal Glazed (Type B); Screw Spline.
      c. Type C - Trifab® VG 450 Storefront System - 1-3/4" x 4-1/2" (44.5 mm x 114.3 mm) nominal dimension; Non-Thermal; Center Structural Silicone or Weatherseal Glazed (Type B); Screw Spline.

B. Related Sections:
   1. Division 07 27 26 Fluid-Applied Air Barriers for materials used to bridge between aluminum storefront system and building intersection
   2. Division 07 92 00 “Joint Sealants” for joint sealants installed as part of the aluminum sliding door system
   3. Division 08 41 13 "Aluminum-Framed Entrances and Storefronts"
   4. Division 08 44 13 "Glazed Aluminum Curtain Walls"

1.03 DEFINITIONS

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufactures Association (AAMA) - AAMA Glossary (AAMA AG).

1.04 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed storefront system shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
   1. Design Wind Loads: Determine design wind loads applicable to the Project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
      a. Basic Wind Speed (MPH): 119
      b. Importance Factor (I, II, III): 1.15
      c. Exposure Category (A, B, C, D): C

B. Storefront System Performance Requirements:
   1. Wind loads: As per Building Code.
   2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.24 psf (300 Pa).
   3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501
   4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
   5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
      a. Glass to Exterior - 0.25 (low-e)
      b. Glass to Center - 0.25 (low-e)
      c. Glass to Interior - 0.25 (low-e)

6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
   a. Glass to Exterior - 70frame and 69glass (low-e) or 69 frame and 58 glass (clear).
   b. Glass to Center - 62 frame and 68glass (low-e) or 63 frame and 56 glass (clear).
   c. Glass to Interior - 56 frame and 67 glass (low-e) or 54 frame and 58 glass (clear).
7. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
   a. Glass to Exterior - 38 (STC) and 31 (OITC)
   b. Glass to Center - 37 (STC) and 30 (OITC)
   c. Glass to Interior - 38 (STC) and 30 (OITC)
8. Windborne-Debris-Impact-Resistance Performance: Shall be tested in accordance with ASTM E 1886 and information in ASTM E 1996 and /or AAMA 506.
   a. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
   b. Small-Missile Impact: For aluminum-framed systems located more than 30 feet (9.1 m) above grade.

1.05 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum frame storefront system indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For aluminum framed storefront system and components required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, of aluminum framed storefront.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12” (300 mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.

G. Other Action Submittals:
   1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of providing aluminum framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of aluminum framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.08 WARRANTY

A. Manufactures Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. Trifab® VG 451 (non-Thermal) and Trifab® 451T (thermal) Storefront System
   3. 2” x 4-1/2” (50.8 mm x 114.3 mm) System Dimensions
   4. Glass: Center, Exterior or Interior (Refer to Drawings)
   5. Miscellaneous Framing: for Trifab VG 451 "Snap-In Flat Filler"
   6. Miscellaneous Framing: for Trifab VG 451T "Thermal Flat Filler"

B. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. Trifab® VG 450 (non-Thermal)
   3. 1-3/4” x 4-1/2” (44.5 mm x 114.3 mm) System Dimensions
   4. Glass: Center, Exterior or Interior (Refer to Drawings)

C. Substitutions: Refer to Substitutions Section for procedures and submission requirements
   1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
   2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid storefront installation and construction delays.
   3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
   4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefront for a period of not less than ten (10) years. (Company Name)
   5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
   6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.02 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070” wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.03 STOREFRONT FRAMING SYSTEM

A. Thermal Barrier (Trifab® VG 451T):
   1. Kawneer IsoLock® Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Trifab® SunShade:(at Type B - 451T Storefront System) An aluminum sunshade (consisting of outriggers, louvers, and fascia which may be selected from standard configurations), that is anchored directly to the vertical mullions. Outriggers shall be painted (Select from Kawneer's standard paints and colors. Custom colors are available upon request). Louvers and fascia shall be painted or anodized (Select from Kawneer's standard paints and colors, custom colors are available upon request or Kawneer's anodized finishes).

C. Miscellaneous Framing: Provide "Snap-In Flat Filler" for Trifab 451; Provide "Thermal Flat Filler" for Trifab 451T.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

F. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action

G. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

H. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.04 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
   1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
      a. Color: Black

2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
   a. Color: Matching structural sealant.

2.05 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: As specified in Division 08 41 13 Section "Aluminum Framed Entrances."

B. Entrance Door Hardware: As specified in Division 08 41 13 Section "Door Hardware."

2.06 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.07 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.08 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
   1. Kawneer Permanodic® AA-M12C22A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear) (Standard).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
   2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
   3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
   4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.

B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.03 FIELD QUALITY CONTROL

A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.

1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
    a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft2, whichever is greater.
    b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).

B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.04 ADJUSTING, CLEANING, AND PROTECTION

A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

SECTION 08 45 23

PRE-ENGINEERED INSULATED TRANSLUCENT FIBERGLASS SANDWICH PANEL

PART 1 GENERAL

2.01 SUMMARY

A. Section includes the pre-engineered self supporting insulated translucent sandwich panel skylight system and accessories as shown and specified. Work includes providing and installing:
   1. Flat factory prefabricated structural insulated translucent sandwich panels
   2. Aluminum installation system
   3. Aluminum flashing attached to skylights
   4. Related Sections:
      a. Structural Steel/Concrete/Rough Carpentry: Section 05 12 00
      b. Flashing and Sheet Metal: Section 07 62 00
      c. Sealants: Section 07 92 03

2.02 SUBMITTALS

A. Submit manufacturer’s product data. Include construction details, material descriptions, profiles and finishes of skylight components.

B. Submit shop drawings. Include elevations and details.

C. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum.
   1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
      a. Sandwich panels: per Working Drawings
      b. Factory finished aluminum: 5” long sections
   2. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
   3. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
      a. Reports required are:
         1) International Building Code Evaluation Report
         2) Flame Spread and Smoke Developed (UL 723) - Submit UL Card
         3) Burn Extent (ASTM D 635)
         4) Color Difference (ASTM D 2244)
         5) Impact Strength (UL 972)
         6) Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
         7) Bond Shear Strength (ASTM D 1002)
         8) Beam Bending Strength (ASTM E 72)
         9) Fall Through Resistance (ASTM E 661)
         10) Insulation U-Factor (NFRC 100)
         11) NFRC System U-Factor Certification (NFRC 700)
         12) Solar Heat Gain Coefficient (NFRC or Calculations)
         13) Condensation Resistance Factor (AAMA 1503)
         14) Air Leakage (ASTM E 283)
         15) Structural Performance (ASTM E 330)
         16) Water Penetration (ASTM E 331)
         17) Class A Roof Covering Burning Brand (ASTM E 108)
         18) UL Listed Class A Roof System (UL 790) (Optional) - Submit UL Card
         19) LEED Credits
         20) Daylight Autonomy

2.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications
   1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.
   2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
   3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 “Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems” as issued by the ICC-ES.
   4. Installer’s Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified skylight systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

2.04 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete skylight panel system.
   1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Standard skylight system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF
      a. (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
      b. Structural Loads; Provide skylight system capable of handling the following loads:
         1) Live Load: 40 PSF
         2) Wind Load: ____PSF

2.05 DELIVERY STORAGE AND HANDLING

A. Deliver panel system, components and materials in manufacturer's standard protective packaging.

B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

2.06 WARRANTY

A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering and defects in accessories, insulated translucent sandwich panels and other components of the work.

B. Extended Warranty: 20 year Limited Warranty

PART 2 PRODUCTS

3.01 MANUFACTURER

A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers’ names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

B. **Basis of Design:** Kalwall Corporation, Tel: (800) 258-9777 - Fax: (603) 627-7905 - Email: info@kalwall.com

3.02 PANEL COMPONENTS

A. Face Sheets
   1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
      a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
      b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.

c. Interior face sheets:
   1) Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 250 when tested in accordance with UL 723.
   2) Burn extent by ASTM D 635 shall be no greater than 1".
d. Exterior face sheets:
   1) Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
   2) Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
e. Appearance:
   1) Exterior face sheets: Smooth, .70 thick and crystal in color.
   2) Interior face sheets: Smooth, .45 thick and crystal in color.
   3) Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

2. Grid Core
   a. Aluminum I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
   b. I-beam Thermal break: Minimum 1", thermoset fiberglass composite.
3. Laminate Adhesive
   a. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
   b. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
   c. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
      1) 50% Relative Humidity at 68° F: 540 PSI
      2) 182° F: 100 PSI
      3) Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
      4) Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

3.03 PANEL CONSTRUCTION

A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
   1. Thickness: 2-3/4"
   2. Light transmission: _____%
   3. Solar heat gain coefficient _____.
   4. Panel U-factor by NFRC certified laboratory: 2-3/4" thermally broken grid _____ OR 2-3/4" aluminum grid _____.
   5. Complete insulated panel system shall have NFRC certified U-factor of _____.
   6. Grid pattern: Nominal size _____; pattern _____.
   7. Standard panels shall deflect no more than 1.9" at 30 PSF in 10' 0" span without a supporting frame by ASTM E 72.
   8. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.
   9. Thermally broken panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.
   10. Skylight System:
      a. Skylight system shall pass Class A Roof Burning Brand Test By ASTM E 108.
      b. (Optional) Skylight system shall be UL listed as a Class A Roof by UL 790, which requires periodic unannounced inspections and retesting by Underwriters Laboratories.

11. Skylight System shall meet the fall through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.

3.04 BATTENS AND PERIMETER CLOSURE SYSTEM

A. Closure system:
   1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
   2. Skylight perimeter closures at curbs shall be factory sealed to panels.
   3. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.
   4. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
   5. Finish:
      a. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's standards.
      b. Mill (standard)

3.05 STRUCTURAL SUPPORT FOR STANDARD MODELS

A. Center Ridge Skylights: Center Ridge Skylights to 22'-0" span shall have concealed support integral with the installation system. Options: exposed stiffeners as required by design loads. (Min. slope of 18.43°). Aluminum curb cap extrusions and flashing shall be supplied.

B. Pyramid skylights: Pyramids to 16'-0" square shall have concealed support integral with the installation system. Pyramids 17'-0" to 20'-0" shall have factory prefabricated exposed aluminum box beam supports at the hips only. (27.25°, 33.33° or 45° slope). Aluminum curb cap extrusions and flashing shall be supplied.

C. Geo skylights: Geodesic configurations to 24'-0" diameter (15° slope). Aluminum curb cap extrusions and flashing shall be supplied.

PART 3 EXECUTION

4.01 EXAMINATION

A. Installer shall examine substrates, supporting structure and installation conditions.

B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

4.02 PREPARATION

A. Metal Protection:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

4.03 INSTALLATION

A. Install the skylight system in accordance with the manufacturer's installation recommendations and approved shop drawings.
   1. Anchor component parts securely in place by perma-nent mechanical attachment system.
   2. Accommodate thermal and mechanical movements.
   3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.
   4. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.

4.04 FIELD QUALITY CONTROL

A. Water Test: Installer to test skylights according to procedures in AAMA 501.2.

B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

4.05 CLEANING

A. Clean the skylight system inside and outside, immediately after installation.

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B. Refer to manufacturer's written recommendations.

END OF SECTION

SECTION 08 71 00
FINISH HARDWARE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section comprises of furnishing hardware specified herein and noted on drawings for a complete and operational system, including any electrified hardware components, systems, controls and hardware for aluminum entrance doors. Any door shown on the drawing and not specifically referenced in the hardware sets shall be provided with identical hardware as specified on other similar openings and shall be included in the General Contractor's base bid. All fire rated door shall be provided with fire rated hardware as required by local code Authority as part of the General Contractor's base bid. The hardware supplier shall verify all cylinder types specified for locking devices supplied as part of the door system with the door manufacturer and/or door supplies.

B. The General Contractor shall notify the Architect in writing of any discrepancies (five (5) days prior to bid date) that could and/or would result in hardware being supplied that is none functional, hardware specified and/or hardware that has not been specified that will result in any code violations and any door that is not covered in this specification. Failure of the General Contractor to address any such issue could be considered acceptance of the hardware specified and all discrepancies could be corrected at the General Contractor's expense.

C. Items include but are not limited to the following:
   1. Hinges - Pivots
   2. Flush Bolts
   3. Exit Devices
   4. Locksets and Cylinders
   5. Push Plates - Pulls
   6. Coordinators
   7. Closers
   8. Kick, Mop and Protection Plates
   9. Stops, Wall Bumpers, Overhead Controls
   10. Electrified Hold Open Devices
   11. Thresholds, Seals and Door Bottoms
   12. Silencers
   13. Miscellaneous Trim and Accessories

1.02 RELATED DOCUMENTS, drawings and general provisions of contract, including General and Supplementary Conditions, and Division 1 Specification sections, apply to this section.

1.03 RELATED WORK specified elsewhere that should be examined for its effect upon this section:

A. Section 06 20 00 - Finish Carpentry

B. Section 08 11 13 - Steel Doors and Frames

C. Section 08 14 16 - Flush Wood Doors

D. Sections within 08 31 13 - Access Doors

E. Section within 08 41 13 - Aluminum Entrances, Storefront and Window Framing

F. Sections within 08 80 00 - Glass and Glazing

G. Sections within 09 91 00 - Painting

H. Division 26 - Electrical

1.04 REFERENCES SPECIFIED in this section subject to compliance as directed:

A. NFPA-80-2006 - Standard for Fire Doors and Windows

B. NFPA-101-2006 - Life Safety Code

C. ADA - The Americans with Disabilities Act - Title III - Public Accommodations

D. ANSI-A 117.1 - American National Standards Institute - Accessible and Usable

1. Buildings and Facilities

E. ANSI-A 156.5 - American National Standards institute -Auxiliary Locks and Associated Products

F. UFAS - Uniform Federal Accessibility Standards

G. UL - Underwriter's Laboratories

H. WHI - Warnock Hersey International, Testing Services

I. State and Local Codes including Authority Having Jurisdiction

J. U.B.C.7-2-97 and UL10C

K. IBC-2009 - International Building Code

L. NFPA-70 - 2006 International Electrical Code

1.05 SUBMITTALS

A. HARDWARE SCHEDULES submit copies of schedule in accordance with Division 1, General Requirements. Schedule to be in vertical format, listing each door opening, including: handing of opening, all hardware scheduled for opening or otherwise required to allow for proper function of door opening as intended, and finish of hardware. At doors with door closers or door controls include degree of door opening. Supply the schedules all Finish Hardware within two (2) weeks from date purchase order is received by the hardware supplier.

B. Submit manufacturer's cut/catalog sheets on all hardware items and any required special mounting instructions with the hardware schedule.

1.06 Certification of Compliance:

A. Submit any information necessary to indicate compliance to all of these specifications as required.

B. Submit a statement from the manufacturer that electronic hardware and systems being supplied comply with the operational descriptions exactly as specified.

1.07 Submit any samples necessary as required by the Architect.

A. Templates for finish hardware items to be sent to related door and frame suppliers within three (3) working days of receipt of approved hardware schedule.

1.08 Doors and Frames used in positive pressure opening assemblies shall meet U.B.C. 7-2-97 and UL10C in areas where this specification includes Seals for smoke door.

1.09 QUALITY ASSURANCE

A. Hardware supplier to be a qualified, Factory Authorized, direct distributor of the products to be furnished. In addition, the supplier to have in their regular employment an AHC or AHC /CDC and/or a person of equivalent experience (minimum fifteen (15) years in the industry) who will be made available at reasonable times to consult with the Architect/Contractor and/or the Building Owner regarding any matters affecting the finish hardware on this project.

B. All hardware used in labeled fire or smoke rated openings to be listed for those types of openings and bear the identifying label or mark indicating UL. (Underwriter's Laboratories) approved for fire. Exit devices in non-labeled openings to be listed for panic.

1.10 DELIVERY, HANDLING AND PACKAGING

A. Furnish all hardware with each unit clearly marked and numbered in accordance with the hardware schedule. Include door and item number for each.

B. Pack each item of hardware completes with all necessary parts and fasteners.

C. Properly wrap and cushion each item to prevent scratches and dents during delivery and storage.

1.11 SEQUENCING AND SCHEDULING

A. Any part of the finish hardware required by the frame or door manufacturers or other suppliers that is needed in order to produce doors or frames is to be sent to those suppliers in a timely manner, so as not to interrupt job progress.

1.12 WARRANTY

A. All finish hardware shall be supplied with a One- (1) year warranty against defects in materials and workmanship, commencing with substantial completion of the project except as follows:

B. 1. All Closers are to have a ten- (10) year written warranty.

C. 2. All Exit Devices (Grade 1) are to have a three- (3) year written warranty.

D. 3. All Locksets (Grade 1) are to have a seven- (7) year written warranty.

E. 4. All Continuous Hinges are to have a ten- (10) year written warranty.

PART 2 PRODUCTS

2.01 FASTENERS

A. Furnish with finish hardware all necessary screws, bolts and other fasteners of suitable size and type to anchor the hardware in position for a long life under hard use.

B. Furnish fastenings where necessary with expansion shields, toggle bolts and other anchors designated by the Architect according to the material to which the hardware is to be applied and the recommendations of the hardware manufacturer. All closers and exit devices on labeled wood doors shall be through-bolted if required by the door manufacturer. All thresholds shall be fastened with wood screws and plastic anchors. Where specified in the hardware sets, security type fasteners of the type called for are to be supplied.

C. Design of all fastenings shall harmonize with the hardware as to material and finish.

D. All hardware shall be installed with the Manufacturers standard screws as provided. The use of any other type of fasteners shall not be permitted. The general contractor shall provide wood blocking in all stud walls specified and/or scheduled to receive wall stops, No Exception.

2.02 ENVIRONMENTAL CONCERN FOR PACKAGING

A. The hardware shall ship to the job site is to be packaged in biodegradable packs such as paper or cardboard boxes and wrapping.

2.03 HINGES

A. All hinges to be of one manufacturer as hereafter listed for continuity and consideration of warranty. Provide one of the following manufacturers Ives, Hager or Stanley.

B. Unless otherwise specified provide five-knuckle, heavy-duty, button tip, full mortise template type hinges with non-rising loose pins. Provide non-removable pins for out swinging doors at secured areas or as called for in this specification (Refer to 3.02 Hardware Sets).

C. Provide all out-swinging doors with non-removable pins or security studs as called for in 3.02 Hardware Sets. Furnish three (3) hinges up to 90 inches high and one (1) additional hinge for every 30 inches or fraction thereof.

D. Furnish three (3) hinges up to 90 inches high and one (1) additional hinge for every 30 inches or fraction thereof.

E. Provide size 4½" x 4½" for all 1¾" thick doors up to and including 36 inches wide. Doors over 1¾" through 2¼" thick, use 5" x 5" hinges. Doors over 36 inches use 5" x 4½" unless otherwise noted in 3.02 Hardware Sets.

F. Were required to clear the trim and/or to permit the doors to swing 180 degrees furnish hinges of sufficient throw.

G. Provide heavy weight hinges on all doors over 36 inches in width.

H. At labeled door's stainless steel, bearing-type hinges shall be provided. For all doors equipped with closers provide bearing-type hinges.

2.04 LOCK AND LOCK TRIM

A. All of the locksets, latch sets, and trim to be of one manufacturer as hereafter listed for continuity of design and consideration of warranty. Locksets specified are Schlage "ND90" series with the Rhodes lever. Equal products manufactured by Best Lock or Falcon will be accepted.

B. Provide metal wrought box strike boxes and curved lip strikes with proper lip length to protect trim of the frame, but not to project more than 1/8 inch beyond frame trim or the inactive leaf of a pair of doors.

C. Mechanical Locks shall meet ANSI Operational Grade 1 & 2, Series 4000 as specified.

1. Hand of lock is to be field reversible or non-handed.
2. All lever trim is to be through-bolted through the door.
3. Provide all pairs of doors with a ¾" latch bolt throw.
4. Provide all doors specified with sound seal with a 3-3/4" extended back-set.

2.05 CYLINDERS AND KEYING

A. Provide all exterior and interior locks or Exit Devices requiring cylinders keyed to a new Everest master key system and which also complies with performance requirements of ANSI A156.5. All keys shall be of nickel silver material only. The hardware supplier shall meet with the General Contractor, the Architect and the Facility Owners Representative at the project jobsite to determine all permanent keying requirements. The hardware supplier shall provide One (1) Knox Box if required by the local Fire Marshall. The contractor shall, as required by the local Fire Marshall and the Facility Owner mount the Knox Box.

B. Cylinders shall be factory keyed and factory maintained as directed by the Building Owner and the Architect. Provide three- (3) keys per cylinder and six- (6) master keys per master used.

C. Factory stamp all keys "Do not duplicate" and with key symbol as directed by the Building Owner. Visual key control shall be provided on all permanent keys and cylinders.

D. Provide all locks with factory keyed construction cores and/or temporary cylinders for the complete duration of construction. Construction cores and/or temporary cylinders shall be returned to the hardware supplier upon the completed installation of all permanent cores and/or cylinders.

2.06 EXIT DEVICES

A. All exit devices and trim, including electrified items, to be of one manufacturer as hereafter listed and in the hardware sets for continuity of design and consideration of warranty; electrified devices and trim to be the same series and design as mechanical devices and trim.

B. Exit Devices to be "UL" listed for life safety. All exit devices for labeled doors shall have "UL" label for "Fire Exit Hardware". All devices mounted on labeled wood doors are to be through-bolted or per the manufacturer's listing requirements. All devices shall conform to NFPA 80 and NFPA 101 requirements.

C. All exit devices to be of a heavy duty, chassis mounted design, with a one-piece removable covers, eliminating necessity of removing the device from the door for standard maintenance and keying requirements.

D. All trims to be through-bolted to the lock stile case. Lever design to be the same as specified with the lock sets ("Sparta" #17 lever design).

E. Exit Devices shall be the modern push rail design. All exit devices shall be mounted with sex bolts.

F. All devices shall carry a three- (3) year warranty against manufacturing defects and workmanship. Exit devices shall be certified by an independent testing lab for a minimum of 1,000,000 cycles.

G. Furnish roller strikes for all rim and surface vertical rod exit devices. Internal springs shall be coil compression type. Furnish security dead latching for all active latch bolts. Latch bolts to have self lubricating coating to reduce friction and wear. Plated latch bolts not accepted.

H. All Exit Devices shall be field modifiable as incorporate an Electric Latch Retraction Feature without the purchase of new Panic Exit Hardware.

I. Exit Devices shall be the Von Duprin "99" series as specified.

2.07 SURFACE MOUNTED DOOR CLOSERS

A. All closers for this project shall be the products of a single manufacturer for continuity of design and consideration of warranty. All door closers shall be mounted as to achieve the maximum degree of opening (trim permitting).

B. All closers to be heavy duty, surface-mounted, fully hydraulic, rack and pinion action with high strength cast iron cylinder to provide control throughout the entire door opening cycle.

C. Size all closers in accordance with the manufacturer's recommendations at the factory.

D. All closers to have adjustable spring power sizes 1 or 2 through 4 or 6 and separate tamper resistant, brass, non-critical regulating screw valves for closing speed, latching speed and back-check control as a standard feature unless specified other wise.

E. All closer covers to be rectangular, full cover type of non-ferrous, non-corrosive material painted to match closer. Provide closer covers only if provided as a standard part of the door closer package.

F. Closers shall have heavy-duty arms. All closer arms shall be of sufficient length to accommodate the reveal depth and to insure proper installation. The hardware supplier shall provide any and all required brackets, spacers or filler plates as required by the manufacture for a proper and functional installation as part of their base bid.

G. Supply appropriate arm assembly for each closer so that closer body and arm are mounted on non-public side of door opening and on the interior side of exterior openings, except where required otherwise in the hardware sets.
   1. All parallel arm mounted closers to be factory indexed to insure proper installation.
   2. Furnish heavy-duty cold forged parallel arms for all parallel arm mounted closers.

H. Provide closers with special application and heavy-duty arms as specified in the hardware sets or as otherwise called for to insure a proper operating, long lasting opening. Drop plates and any additional mounting brackets required for the proper installation of the door closer shall be included in the hardware supplier's base bid.

I. Finish: Baked on Powder Coated finish shall match other hardware.

J. Provide and mount all door closers with sex bolts as provided by the manufacturer.

K. Closers shall be LCN 4040XP & 1461 series are specified. Equal products manufactured by Norton will be accepted.

2.08 DOOR STOPS AND HOLDERS

A. Door stops are to be furnished for every door leaf. Every door is to have a floor, wall, or an overhead stop.

B. Place doorstops in such a position that they permit maximum door swing, but do not present a hazard of obstruction. Furnish floor strikes for floor holders of proper height to engage holders of doors.

C. Where overhead stops and holders are specified, or otherwise required for proper door operation, they are to be heavy duty and of extruded brass, bronze or stainless steel with no plastic parts as specified. The General Contractor shall provide wood blocking in all stud walls specified and scheduled to receive wall stops.

D. Finish: Shall match other hardware where available.

E. Acceptable Products
   1. Floor and wall stops as listed in hardware sets. Equivalent products as manufactured by Ives, ABH, Glynn Johnson and Trimco are acceptable.

2.09 PUSH PLATES, DOOR PULLS, AND KICKPLATES

A. All push plates, door pull, kick plates and other miscellaneous hardware as listed in hardware sets. Equivalent products as manufactured by Ives, Rockwood and Trimco are acceptable.

B. Kick plates to be 10 inches high and Mop plates to be 6 inches high, both by 2 inches or 1 inch less than door width (LDW) as specified. They are to be of 16 gauge thick base metal. For door with louvers or narrow bottom rails, kick plate height to be 1 inch less dimension shown from the bottom of the door to the bottom of the louver or glass.

C. Where required armor plates, edge guards and other protective hardware shall be supplied in sizes as scheduled in the hardware sets.

D. Finish: Same as other hardware where available.

2.10 FLUSH BOLTS AND COORDINATORS

A. Provide Flush bolts with Dust Proof Strikes as indicated in the individual hardware sets by Ives, ABH, Glynn Johnson and Trimco are acceptable. Finish shall match the adjacent hardware.

2.11 THRESHOLDS AND SEALS

A. Provide materials and finishes as listed in hardware sets. National Guard Products has been specified to set a high level of quality, equivalent product by manufactured by Zero, and Pemko shall be acceptable. All thresholds must be in accordance with the requirements of the ADA and ANSI A117.1.

B. Provide thresholds with wood screws and plastic anchors. Supply all necessary anchoring devices for weather strip and sound seal.

C. Seals shall comply with requirements of U.B.C. 7-2-97 and UL10C. All thresholds, door bottoms and weather strip inserts shall be a silicone based product as specified in 3.02 Hardware Sets. Other materials used shall be rejected, unless originally specified.

D. Seals shall comply with the requirements of the Wood Door Manufacturer's certification requirements.

E. All thresholds shall be provided with none slip coating (SIA) as specified in the hardware sets.

2.12 FINISHES

A. Finishes for all hardware are as required in this specification and the hardware sets.

B. Special care is to be taken to make uniform the finish of all various manufactured items.

2.13 DOOR SILENCERS

A. Provide door silencers at all openings without gasket. Provide two- (2) each at pair of doors and three- (3) or four- (4) each for each single door (coordinate with the frame manufacturer).

2.14 KEY CABINET

A. Provide a key cabinet Lund 1200 series for installation by the contractor as instructed by the Architect and Owners Representative. Key Cabinet shall be of such size as to hold 150% of the total number of keys supplied for this project.

B. The hardware supplier shall assist Owners Representative in the tagging of all keys and instruct the Owners staff as to the proper use of the key cabinet system at the project site. Training shall include industry standard procedures for maintaining a key system. The hardware supplier shall provide Owners Representative two- (2) complete full size copies of the floor plans complete with the door number and key symbol shown at each door opening. One- (1) copy shall be placed in the key cabinet and one- (1) copy shall be turned over to the Owners Representative. Training shall be based on eight- (8) hours maximum. The hardware supplier shall send a list of all staff members trained in the proper use of the key cabinet to the Owners Representative and the Architect.

2.15 PROPRIETARY PRODUCTS

A. References to specific products are used to establish quality standards of utility and performance. Unless otherwise approved provide only the specified product.

B. All other materials, not specifically described, but required for a complete and proper finish hardware installation, are to be selected by the Contractor, subject to the approval of the Architect and the Building Owner.

C. Architect and the Building Owner reserve the right to approve all the substitutions proposed for this specification. All requests for substitution to be made prior to bid in accordance with Division 1, General Requirements, and are to be in writing, hand delivered to the Architect. Two (2) copies of the manufacturer's brochures and a physical sample of each item in the appropriate design and finish shall accompany requests for substitution.

PART 3 EXECUTION

3.01 INSTALLATION AND SERVICE ITEMS OF FINISH HARDWARE

A. All finish hardware shall be installed by an experienced finish hardware installer with at least ten (10) years experience after a pre-installation meeting between the contractor, hardware Manufacturers representative, the hardware supplier, the hollow metal supplier and the wood door supplier. The finish hardware installer shall be responsible for the proper installation and function of all doors and hardware.

B. The hardware supplier's office and/or warehouse shall be located within a one hundred twenty five (125) mile radius of the project site as to better service the general contractor and the Facility Owner during the course of this project.

C. Check hardware against the reviewed hardware schedule upon delivery. Store the hardware in a dry and secure location to protect against loss and damage.

D. Install finish hardware in accordance with approved hardware schedule and manufacturers' printed instructions. Pre-fit hardware before finish is applied to door; remove and reinstall after finish is complete and dry. Install and adjust hardware so that parts operate smoothly, close tightly, and do not rattle.

E. Mortise and cutting to be done neatly, and evidence of cutting to be concealed in the finished work. Protect all Finish hardware from scratching or other damage.

F. The hardware supplier, general contractor and hardware installer shall after three (3) months of the Facility Owner's acceptance of the facility perform an on site survey of the finish hardware. Any item of finish hardware found to be defective or out of adjustment shall be replaced or adjusted for the proper function and operation of the door assembly at the contractor's, supplier's and/or installer's expense. The hardware supplier shall provide a written report of any and all affected items to the Architect and the Facility Owner (No Exceptions). The scheduled inspection date for the on site inspection and adjustment of finish hardware shall be provided to the Architect as a part of the general contractor and hardware supplies close-out documentation for this project.

3.02 HARDWARE SETS FOLLOWS:

END OF SECTION

3.02 HARDWARE SETS
SPECWORKS # 119864-B85Y3P4G7

HW SET: 01
DOOR NUMBER:
101A
EACH TO HAVE:

2	EA	CONTINUOUS HINGE	112HD 83"	628	IVE
1	EA	PANIC HARDWARE	HH9947DT 990DT SNB	628	VON
1	EA	PANIC HARDWARE	HH9947NL 990NL SNB	628	VON
1	EA	CYLINDER	20-001 1-1/4" OR 20-022 EVEREST	626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH SNB	689	LCN
2	EA	MOUNTING PLATE	4040-18PA	689	LCN
2	EA	SPACER & SUPPORT	4040-30 X 4040-61	689	LCN
2	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP
		WEATHER STRIP	PROVIDED BY THE ALUMINUM DOOR MFG.		BYO

HW SET: 02
DOOR NUMBER:
106
EACH TO HAVE:

2	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	MULLION	KR9954	689	VON
1	EA	PANIC HARDWARE	HH99DT 990DT SNB	628	VON
1	EA	PANIC HARDWARE	HH99NL 990NL SNB	628	VON
1	EA	MULLION CYLINDER	20-001 1-1/4" EVEREST	626	SCH
1	EA	RIM CYLINDER	20-022 EVEREST	626	SCH
1	SET	ASTRAGAL	9605A-DOOR HEIGHT (PULL SIDE MOUNTED)	CL	NGP
2	EA	SURFACE CLOSER	4040XP SCUSH SNB	689	LCN
2	EA	SPACER & SUPPORT	4040-30 X 4040-61	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
2	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 03
DOOR NUMBER:
150B
EACH TO HAVE:

2	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	MANUAL FLUSH BOLT	FB458 (BOTTOM)	626	IVE
1	EA	MANUAL FLUSH BOLT	FB458 (TOP)	626	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST 14-042	626	SCH
1	SET	ASTRAGAL	9605A-DOOR HEIGHT (PULL SIDE MOUNTED)	CL	NGP
2	EA	WALL STOP	WS407CCV	630	IVE
2	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	513HD SIA-FRAME WIDTH	AL	NGP

HW SET: 04
DOOR NUMBER:
108C
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	DEADBOLT	B560P EVEREST	626	SCH
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH SNB	689	LCN
1	EA	SPACER & SUPPORT	4040-30 X 4040-61	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 05
DOOR NUMBER:
125A
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	DEADBOLT	B560P EVEREST	626	SCH
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 06
DOOR NUMBER:
112
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	OVERHEAD HOLDER	904F SNB (110 DEGREE INSTALLATION)	630	GLY
1	EA	LOCK GUARD	LG12	630	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 07
DOOR NUMBER:

117B 118 166
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	PANIC HARDWARE	HH99NL 990NL SNB	628	VON
1	EA	RIM CYLINDER	20-022 EVEREST	626	SCH
1	EA	SURFACE CLOSER	4040XP SHCUSH SNB	689	LCN
1	EA	SPACER & SUPPORT	4040-30 X 4040-61	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 08
DOOR NUMBER:
101B 101C 102A 102B
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	99L 996L 06 SNB	628	VON
1	EA	RIM CYLINDER	20-022 EVEREST	626	SCH
1	EA	SURFACE CLOSER	1461 HD/PA FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 09
DOOR NUMBER:
105 114 116
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	PUSH PLATE	8200 8" X 16"	630	IVE
1	EA	PULL PLATE	8305-8 3.5" X 15"	630	IVE
1	EA	SURFACE CLOSER	1461 HD FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 10
DOOR NUMBER:
119 120 121 122A 125B 126B
127 128 129 130 131A 131B
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD 83"	628	IVE
1	EA	DEADLOCK	MS1850SNSI-1-1/2" BS.	628	ADA
1	EA	MORTISE CYLINDER	20-001 1-1/4" EVEREST	626	SCH
1	EA	THUMBTURN CYLINDER	985T	626	FAL
1	EA	PULL/PUSHBAR	9190-33-0-NO	630	IVE
1	EA	SURFACE CLOSER	1461 HD FC SNB	689	LCN

1	EA	MOUNTING PLATE	1460-18	689	LCN
1	EA	WALL STOP	WS407CCV	630	IVE
		WEATHER STRIP	PROVIDED BY THE ALUMINUM DOOR MFG.		BYO

HW SET: 11
DOOR NUMBER:
124
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	DEADBOLT	B571 X (6) 61-509 RELEASE KEYS	626	SCH
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	SURFACE CLOSER	1461 SCUSH FC SNB	689	LCN
1	EA	SPACER & SUPPORT	1460-30 X 1460-61	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	ROBE HOOK	582B	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 12
DOOR NUMBER:
123
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	PRIVACY SET	ND40S RHO	626	SCH
1	EA	SURFACE CLOSER	1461 HD/PA FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
1	EA	ROBE HOOK	582B	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 13
DOOR NUMBER:
122B 126A 150A 160
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	ENTRANCE LOCK	ND92PD RHO EVEREST	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 14
DOOR NUMBER:
117A
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM LOCK	ND70PD RHO EVEREST	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 15
DOOR NUMBER:
113 167
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 16
DOOR NUMBER:
115
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD 83"	628	IVE
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	OVERHEAD HOLDER	904F SNB (110 DEGREE INSTALLATION)	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 17
DOOR NUMBER:
110
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	SURFACE CLOSER	1461 H FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 18
DOOR NUMBER:
111
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM LOCK	ND94PD RHO EVEREST	626	SCH
1	EA	FLOOR STOP	FS17	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 19
DOOR NUMBER:
107 108A
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE

1	EA	ENTRANCE LOCK	ND92PD RHO EVEREST	626	SCH
1	EA	SURFACE CLOSER	1461 HD FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 20
DOOR NUMBER:
161
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	ND96PD RHO EVEREST	626	SCH
1	EA	FLOOR STOP	FS17	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 21
DOOR NUMBER:
163
EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	DEADBOLT	B571 X (6) 61-509 RELEASE KEYS	626	SCH
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	SURFACE CLOSER	1461 HD FC SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
1	EA	ROBE HOOK	582B	626	IVE
1	SET	SEALS	2525B-HEAD & JAMBS	BRN	NGP
1	EA	THRESHOLD	513HD SIA-FRAME WIDTH	AL	NGP

HW SET: 22
DOOR NUMBER:
148B
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	CLASSROOM LOCK	ND94PD RHO EVEREST	626	SCH
1	EA	SURFACE CLOSER	1461 SCUSH FC SNB	689	LCN
1	EA	SPACER & SUPPORT	1460-30 X 1460-61	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	2525B-HEAD & JAMBS	BRN	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	513HD SIA-FRAME WIDTH	AL	NGP

HW SET: 23
DOOR NUMBER:
148A
EACH TO HAVE:

1	EA	CONTINUOUS HINGE	700 83"	630	IVE
1	EA	DEADBOLT	B560P EVEREST	626	SCH
1	EA	CLASSROOM LOCK	ND94PD RHO EVEREST	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH SNB	689	LCN
1	EA	SPACER & SUPPORT	4040-30 X 4040-61	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	162S-HEAD & JAMBS	AL	NGP
1	EA	DRIP CAP	16A-FRAME WIDTH PLUS 4"	CL	NGP
1	EA	DOOR SWEEP	200SA-DOOR WIDTH" (PULL SIDE MOUNTED)	CL	NGP
1	EA	THRESHOLD	950S SIA-FRAME WIDTH	AL	NGP

HW SET: 24
DOOR NUMBER:
155A 155B 156A 156B 158A 158B
EACH TO HAVE:

2	EA	PADLOCKS	KS43D2200 X KZ11G40 (4" SHACKLE)	452	SCH
		BALANCE HARDWARE	PROVIDED BY THE OVERHEAD DOOR MFG.		BYO

END OF SECTION

Door & Hardware Set Index Report

HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BLDG Control #119864

Door Number	Hw-Set
101A	01
101B	08
101C	08
102A	08
102B	08
105	09
106	02
107	19
108A	19
108C	04
110	17
111	18
112	06
113	15
114	09
115	16
116	09
117A	14
117B	07
118	07
119	10
120	10
121	10
122A	10
122B	13
123	12
124	11
125A	05
125B	10
126A	13
126B	10
127	10
128	10
129	10
130	10
131A	10
131B	10
148A	23
148B	22
150A	13
150B	03
155A	24
155B	24
156A	24
156B	24
158A	24
158B	24
160	13
161	20
163	21
166	07
167	15

SECTION 08 81 00
GLASS GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance architectural glass.

B. High performance architectural insulating glass.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 00 - Unit Masonry.

C. Section 08 00 13 - Hollow Metal Doors and Frames.

D. Section 08 43 13 - Aluminum-Framed Storefronts.

E. Section 08 44 13 - Glazed Aluminum Curtain Walls.

F. Section 09 29 00 - Gypsum Board.

G. Section 09 29 10 - Gypsum Board Accessories.

1.03 REFERENCES

A. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

B. ASCE 7 - "Minimum Design Loads for Buildings and Other Structures".

C. ASTM International (ASTM):

D. ASTM C 162 - Standard Terminology of Glass and Glass Products.

E. ASTM C 1036 - Standard Specification for Flat Glass.

F. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT coated and Uncoated Glass.

G. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.

H. ASTM C 1376 - Standard Specification for Pyrolitic and Vacuum Deposition Coatings on Flat Glass.

I. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.

J. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.

K. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

1.04 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or other specified gas.

D. Sealed Insulating Glass Unit Surface Designations:
   1. Surface 1 - Exterior surface of the outer glass lite.
   2. Surface 2 - Interspace surface of the outer glass lite.
   3. Surface 3 - Interspace surface of the inner glass lite.
   4. Surface 4 - Interior surface of the inner glass lite.

1.05 PERFORMANCE REQUIREMENTS

A. General: Provide glass capable of withstanding thermal movement and wind and impact loads (where applicable) as specified in paragraph B following.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness

designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
2. Design Wind Loads: Determine design wind loads applicable to the Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
    a. Basic Wind Speed: 119 mph.
    b. Importance Factor: 1.15.
    c. Exposure Category: C.
    d. For monolithic-glass lites heat treated to resist wind loads.
    e. For insulating glass.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
    1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
    2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
    3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
        a. U-Factors: NFRC 100 expressed as Btu/ sq.per h per degree F.
        b. Solar Heat Gain Coefficient: NFRC 200.
        c. Solar Optical Properties: NFRC 300.

1.06 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: For each glass product and glazing material indicated.

C. Verification Samples: For the following products, in the form of 12 inch (305 mm) square samples for insulating glass units.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
    1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

F. Qualification Data: For installers.

G. Product Test Reports: For each of the following types of glazing products:
    1. Tinted float glass.
    2. Coated float glass.
    3. Insulating glass.

H. Warranties: Special warranties specified in this Section.

1.07 QUALITY ASSURANCE

A. Sustainable Design Certification: Glass shall be Cradle to Cradle certified, minimum Silver Level, by McDonough Braungart Design Chemistry, LLC.

B. Fabricator Qualifications: PPG Certified Fabricator Network, as acceptable to the manufacturer.

C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

D. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.

E. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

F. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
   2. GANA Publications: "Laminated Glazing Reference Manual"; "Glazing Manual."
   3. AAMA: "Sloped Glazing Guidelines."
   4. IGMA: "Guidelines for Sloped Glazing."

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
   1. Insulating Glass Certification Council.
   2. Associated Laboratories, Inc.

H. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
   2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.09 WARRANTY

A. Manufacturer's Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator in which the coated glass manufacturer agrees to replace coated glass units that deteriorates during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
   1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
   1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Warranty on Laminated Glass: Manufacturer's standard form in which the laminated glass manufacturer agrees to replace laminated glass units that deteriorate during normal use within the specified warranty period. Deterioration of laminated glass is defined as defects, such as discoloration, edge separation, or blemishes exceeding those allowed by ASTM C 1172 that are not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: PPG Industries, Inc., Glass Group, which is located at: Glass Business and Discovery Center 400 Guys Run Rd. ; Pittsburgh, PA 15024; Toll Free Tel: 800-377-5267; Email: request info (ideascapes@ppg.com) Web: www.ppgideascapes.com
   1. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
   2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
   3. For uncoated glass, comply with requirements for Condition A.
   4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
   5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated or required.

C. Pyrolitic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolitic deposition process during initial manufacture, and complying with other requirements specified.

D. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.

E. Tempered Patterned Glass: ASTM C 1048, Kind FT (fully tempered), Type II (patterned flat glass), Class 1 (clear), Form 3 (patterned); and of quality, finish, and pattern specified.

F. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
   1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
   2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required.
   3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
   4. Sealing System: Comply with requirements in Section 07920 - Joint Sealants. Dual seal, with primary and secondary sealants of polyisobutylene and silicone.
   5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
   6. Spacer Material: Aluminum with mill or clear anodic finish.
   7. Desiccant: Molecular sieve or silica gel, or blend of both.
   8. Corner Construction: Manufacturer's standard corner construction.

2.03 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.04 TYPE A - MONOLITHIC (SINGLE-GLAZED) FLOAT-GLASS UNITS

A. Uncoated Clear Float Glass Units:
   1. Class 1 (clear) float glass, 1/4 inch thickness.

a. Annealed.
b. Kind HS (heat strengthened) where required.
c. Kind FT (fully tempered).

2.05 TYPE B - UNCOATED INSULATING GLASS

A. Type: Clear Insulating Glass. Clear color, low-reflective outdoor appearance.
   1. Product: Clear + Clear by PPG Industries, Inc.
   2. Insulating Unit Construction: 1/4 inch (6mm) clear glass + 1/2 inch (13mm) air space + 1/4 inch (6mm) clear glass.
   3. Performance Values: Visible Light Transmission - 79 percent; SHGC - 0.70; Shading Coefficient - 0.81; Outdoor Visible Light Reflectance - 15 percent.
   4. Heat Transfer Coefficient: U-Value Winter - 0.47, U-Value Summer - 0.50.

2.06 TYPE C - ENERGY GLAZE INSULATED SPANDREL GLASS UNIT

A. All insulating glass units shall be manufactured by a member of the PPG Certified Fabricator Network; i.e. CFP. Sealed insulating glass units to be double sealed with a primary seal of polyisobutylene and secondary seal of silicone. There shall be no voids or skips in the primary seal. Sealed insulating glass units to be hermetically sealed with a dehydrated dead air space, lites shall be separated by an aluminum spacer with four bent corners and one straight butyl injected zinc plated steel straight key joint.

B. Energy Glaze Insulated Spandrel Glass Units: 1”[25mm] Overall O.B. 1/4”[6mm] PPG Solargray Tinted - ½”[13mm] A.S. - I.B. 1/4”[6mm] Clear with OpaciSpan Harmony Solar Gray Color Ceramic Frit, Full Coverage, #4 as manufactured by Vitro America, Farmers Branch, Texas.
   1. Exterior Glass Ply: 1/4”[6mm] PPG Solargray Tinted Heat-Pro Heat-Strengthened or Tempered as required.
   2. Airspace: ½”[13mm] airspace mill finish
   3. Silicone: Black Color
   4. Interior Glass Ply: 1/4”[6mm] Clear Heat-Pro Heat-Strengthened or Tempered as required with OpaciSpan Harmony Solar Gray Color Ceramic Frit, Full Coverage, #4 Surface

C. Performance Requirements:
   1. Visible Light Transmission: 2%
   2. Exterior (Vis-Out) Reflectance: 7%
   3. Winter U-Value: 0.47
   4. Summer U-Value: 0.50
   5. Shading Coefficient: 0.39
   6. Solar Heat Gain Coefficient: 0.34

D. Shall comply with ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.

E. Units shall be certified for compliance by the IGCC in accordance with the above ASTM test method and Must carry a CBA rating level.

F. The applicable warranty period shall be ten (10) years from the date of manufacturer.

G. Basis of Design: Energy Glaze Insulated Glass Units as Manufactured by Vitro America, Farmers Branch, Texas: 1”[25mm] Overall O.B. 1/4”[6mm] PPG Solargray Tinted Heat-Pro Heat-Strengthened or Tempered - ½”[13mm] A.S. - I.B. 1/4”[6mm] Clear Heat-Pro Heat-Strengthened or Tempered with OpaciSpan Harmony Solar Gray Color Ceramic Frit, Full Coverage, #4 Surface, Silicone Standard Sight Line, Spandrel.

2.07 TYPE D - REFLECTIVE LOW E INSULATING GLASS

A. Type: Reflective Solar Control Low-E Insulating Glass. Bronze Metallic outdoor appearance.

B. Product: "Solarcool®" (2) "Solarbronze®" + "Solarban®" 70XL (3) "Starphire®" by PPG Industries, Inc.
   1. Insulating Unit Construction: 1/4 inch (6mm) "Solarbronze" Glass, "Solarcool" (Pyrolitic) on second surface (2), + 1/2 inch (13mm) air space + 1/4 inch (6mm) ' Starphire" Glass, Low-E Coating "Solarban" 70XL Solar Control (Sputtered) on third surface (3).
   2. Performance Values: Visible Light Transmission - 15 percent; SHGC - 0.15; Shading Coefficient - 0.17; Outdoor Visible Light Reflectance - 14 percent.
   3. Heat Transfer Coefficient: U-Value Winter - 0.28, U-Value Summer - 0.26.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Section 08800 - Glazing for installation requirements.

END OF SECTION

SECTION 09 22 16.13
NON-STRUCTURAL METAL STUD FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-structural metal studs for wall assemblies.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 21 16 - Thermal Insulation.

C. Section 07 42 13 - Metal Soffit Panels.

D. Section 09 29 00 - Gypsum Board.

1.03 REFERENCES

A. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

B. ASTM A 1003 - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

C. ASTM B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

D. ASTM C 645-09 - Standard Specification for Nonstructural Steel Framing Members.

E. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

F. ASTM C 847 - Standard Specification for Metal Lath.

G. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster (Plaster and Stucco Accessories).

H. ASTM C 1396 - Standard Specification for Gypsum Board.

I. ASTM C 1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.

J. AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

K. AISI - Standard for Cold-Formed Steel Framing General Provisions.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product specified, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

B. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.

C. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by, and displaying a classification label from an independent testing agency acceptable to authority having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect and store products in manufacturer's unopened packaging until ready for installation per requirements of AISI's "Code of Standard Practice".

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Dietrich Metal Framing; 200 Old Wilson Bridge Road, Columbus, OH 43085. ASD. Tel: (614) 840-4350. Fax: (614) 840-4351. E-mail: askforhelp@dietrichindustries.com. Web: www.dietrichmetalframing.com.
   1. Dietrich Metal Framing; 4200 Cedar Blvd., Baytown, TX (281) 383-1617.
   2. Dietrich Metal Framing; 1012 W. Wintergreen Rd; Hutchins, TX (972) 225-1100.
   3. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 COMPONENTS

A. Recycled Content of Steel Products: Post-consumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

B. Framing Members, General: Comply with ASTM C645-09 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C645-09 requirements for metal unless otherwise indicated.
   2. Comply with ASTM C645-09; roll-formed hot-dipped galvanized steel, complying with ASTM A1003/A1003M and ASTM A653/A653M G40 (Z120) or equivalent corrosion resistance coating; A40 galvannealed products are not acceptable.

C. Steel Studs and Runners: ASTM C645-09.
   1. Non-structural Studs: Cold-formed galvanized steel C-studs, Dietrich ProSTUD™ drywall studs as per ASTM C645-09 for conditions indicated below:
      a. Flange Size: 1-1/4 inch (32mm)
      b. Web Depth:
         1) As specified on Drawings.
      c. Member Description: ProSTUD™ 20 (20ga equivalent drywall stud) 65ksi. Minimum Thickness: 0.0220 inches (0.5588mm). Minimum Design Thickness: 0.0232 inches (0.5893mm).
      d. Members that can show certified third party testing with 5/8 inch (12 mm) regular gypsum board in accordance with ICC ES AC86 (Approved July 1995-Editorially Revised September 2005) and conform to the limiting height tables in Specification C754 need not meet the minimum thickness limitation set forth in 4.3 or the minimum section properties set forth in 8.1.
   2. Non-structural Track: Cold-formed galvanized steel runner tracks, Dietrich ProTRAK™ drywall tack, in conformance with ASTM C645-09 for conditions indicated below:
      a. Flange Size: 1-1/4 inch (32mm).
      b. Web Depth: Track web to match stud web size.
      c. Minimum Material Thickness: Track thickness to match wall stud thickness or as per design.
   3. Traditional Flat Material:
      a. Minimum Base-Metal Thickness:
         1) 0.018 inch (0.4547 mm).
         2) 0.027 inch (0.6858 mm).
         3) 0.0296 inch (0.7520 mm).
      b. Alternative flat products that can show certified third party testing with 5/8 inch (12 mm) regular gypsum board in accordance with ICC ES AC86 (Approved July 1995-Editorially Revised September 2005) and conform to the limiting height tables in Specification C754 need not meet the minimum thickness limitation set forth in 4.3 or the minimum section properties set forth in 8.1.

D. Furring Channel: Cold-formed galvanized steel in conformance with AISI's North American Specifications for Design of Cold-formed Steel Structural Members; Dietrich Metal Framing furring channel:
   1. Designation and size as indicated on the drawings.
   2. Designation: FCE, 20 gauge, 0.0296 inches (0.75 mm) sheet thickness, 7/8 inches (22 mm) height, 2-11/16 inches (68 mm) width.

3. Designation: FCED, 20 gauge, 0.0296 inches (0.75 mm) sheet thickness, 1-1/2 inches (38 mm) height, 2-7/8 inches (73 mm) width.

2.03 MATERIALS

A. Cold-Formed Steel: Complying with ASTM A 1003/A 1003M; unless indicated otherwise.

B. Galvanized Coating: Comply with ASTM C645-09; roll-formed from hot-dipped galvanized steel; complying with ASTM A1003/1003M and ASTM A653/A653M G40 (Z120) or equivalent corrosion resistant coating. A40 galvannealed products are not acceptable.

2.04 FABRICATION

A. General: Framing components may be preassembled into panels prior to erecting.

B. Fabricate panels square, with components attached in a manner so as to prevent racking or distortion.

C. Cut all framing components squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Hold members positively in place until properly fastened.

D. Fasteners: Fasten components using self-tapping screws or welding.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to installation, inspect previous work of all other trades. Verify that all work is complete and accurate to the point where this installation may properly proceed in strict accordance with framing shop drawings.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 ERECTION

A. Install cold-formed framing in accordance with requirements of ASTM C 754.

B. Framing Installation:
1. Erect framing and panels plumb, level and square in strict accordance with approved drawings.
2. Handle and lift prefabricated panels in a manner to not cause distortion in any member.
3. Anchor runner track securely to the supporting structure. Install concrete anchors only after full compressive strength has been achieved.
4. Butt all track joints. Securely anchor abutting pieces of track to a common structural element, or splice them together.
5. Align and plumb studs, and securely attach to the flanges or webs of both upper and lower tracks.
6. Attach wall stud bridging when required in a manner to prevent stud rotation. Space bridging rows according to manufacturer's recommendations.
7. Provided temporary bracing until erection is completed.
8. Where indicated in the drawings, provide for structural vertical movement using means in accordance with manufacturer's recommendations.

3.03 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09 22 26.23
METAL SUSPENSION SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Support Gypsum Board ceiling.

1.02 RELATED SECTIONS

A. Section 05 21 19 - Steel Joist Framing

B. Section 06 10 00 - Rough Carpentry.

C. Section 21 - Fire Suppression.

D. Section 23 - Heating, Ventilationg and Air-Conditioning (HVAC).

E. Section 26 - Electrical.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A 641, Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
   2. C 841, Furring.
   3. C 954, Specification for Steel Drill Screws for the Application of wood slat or Metal Plaster Bases to Steel Studs from 0.33 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
   4. C 1002, Specification for Steel Drill Screws for the Application of Wood slats.

1.04 SUBMITTALS

A. Product Data: Manufacturers' specifications and installation instructions for each product specified.

1.05 QUALITY ASSURANCE

A. Mock-Ups:
   1. Finish specified to show color, texture, and workmanship. Provide mock-ups of at least 25 sq. ft.. Obtain the Architect's approval of mock-up.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packaging and Shipping: Have materials shipped in manufacturer's original packages showing manufacturer's name and product brand name.

B. Storage and Protection: Store materials inside and protected from damage by the elements. Protect ends, edges, and faces of wood slats from damage. Protect metal framing and accessories from bending.

1.07 PROJECT CONDITIONS

A. Environmental Requirements: Comply with ASTM C 842.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. National Gypsum Company
   1. Metal Framing:
      a. Main Runner Channels: 1-1/2 in. cold rolled steel channel, weighing 475 lbs. per 1000 lin. ft. with min. base steel of 0.054 in., primed and painted flat black.
      b. Cross Furring Channels: 3/4 in. cold rolled steel channel, weighing 300 lbs. per 1000 lin. ft. with min. base steel of 0.054 in., primed and painted flat black.

2.02 ACCESSORIES

A. Tie Wire: Manufacturer's standard soft, annealed steel protected by Class 1 zinc coating and manufactured in accordance with ASTM A 641.

B. Fasteners:
   1. Screws: ASTM C 954 or ASTM C 1002 or both with heads, threads, points, and finish as recommended by the manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Tolerances: For flatness of surface, do not exceed 1/2 in. in 8 ft. for bow or warp of surface and for plumb and level.

B. CLEANING
   1. Remove protective materials from accessories and from adjacent surfaces.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum board wall panels.

B. Gypsum Board soffit and ceiling panels.

C. Accessories and Trim.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 21 16 - Thermal Insulation.

C. Section 07 92 13 - Elastomeric Joint Sealant.

D. Section 07 92 19 - Acoustical Joint Sealant.

E. Section 09 22 16.13 - Non-Structural Metal Stud Framing.

F. Section 09 65 13 - Resilient Base and Accessories.

G. Section 09 68 13 - Tile Carpeting.

H. Section 09 91 23 - Painting.

1.03 REFERENCES

A. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products.

B. ASTM C 475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

C. ASTM C 514 - Standard Specifications for Nails for the Application of Gypsum Board.

D. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

E. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.

F. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness.

G. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

H. ASTM C 1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.

I. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

J. ASTM C 1178 - Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel

K. ASTM C 1396 - Standard Specification for Gypsum Board.

L. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

M. GA-214 - Recommended Levels of Gypsum Board Finish.

N. GA-216 - Application and Finishing of Gypsum Board.

O. GA-231 - Assessing Water damage to Gypsum Board.

P. GA-238 - Guidelines for the Prevention of Mold Growth on Gypsum Board.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Design data test reports.

4. Installation methods.

C. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
   2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.

D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.
   1. Board: Submit sample of each panel product specified, 6 inches square.
   2. Trim: Submit sample of each type of trim specified, 12 inches long.
   3. Texture: Submit sample 12 inches square of textured coated gypsum board.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years documented experience.

C. Mock-Up: Provide a mock-up using approved gypsum products, including fasteners and related accessories per manufacturer's current printed instructions and recommendations.
   1. Locate in area designated by Architect.
   2. Mock-up size 10 feet by partition height.
   3. Mock-up Substrate: Match wall assembly construction.
   4. Mockup for each designated level of exposed gypsum board finish and each designated texture finish indicated.
   5. Do not proceed with remaining work until workmanship and finishes are approved by Architect.
   6. Refinish mock-up area as required to produce acceptable work.
   7. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging indicating manufacturer and product name and protect until ready for installation.

B. Store gypsum in accordance with GA-238 and manufacturer recommendations.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) in accordance with ASTM C 840 and within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 Acceptable Manufacturer: CertainTeed Gypsum, Inc., which is located at: 4300 W. Cypress St. Suite 500 ; Tampa, FL 33607; Toll Free Tel: 800-233-8990;

A. Substitutions: Permitted see Substitution Procedures 01 25 00 .

B. Single Source Responsibility: Obtain gypsum board products, joint treatment, and accessories from a single manufacturer or from manufacturers recommended by prime manufacturer of gypsum board products.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.03 GYPSUM BOARD WALL PANELS

A. Standard Gypsum Board Products:
   1. Regular Gypsum Board: Gypsum core panel solid set core enclosed in paper. Complying with ASTM C1396.
      a. Product: ProRoc Regular or Evenwall, manufactured by CertainTeed Gypsum, Inc.

b. Thickness:
   1) 5/8 inch.
   2) 1/2 inch.
c. Width:
   1) 48 or 54 inches.
d. Length:
   1) Use longest length available to avoid joints.
e. Edges:
   1) Tapered.

B. Moisture and Mold Resistant Products:
1. Restrooms and any wall where water exposure is possible.
2. Moisture and Mold Resistant Gypsum Board: Gypsum core panel with enhanced core formulated for resistance to moisture and mold; surfaced with moisture/mold resistant paper on front, back, and long edges. Complying with ASTM C 1396.
   a. Product: ProRoc Moisture and Mold Resistant with M2TECH Gypsum Board by CertainTeed Gypsum, Inc.
   b. Thickness: 5/8 inch.
   c. Width:
      1) 48 inches.
   d. Length:
      1) 12 feet.
   e. Edges: Tapered.
   f. Mold Resistance: Panel score of 10 (highest rating available) when tested in accordance with ASTM D 3273.

2.04 GYPSUM BOARD CEILING AND SOFFIT PANELS

A. Interior Ceiling Board
1. Regular Gypsum Ceiling Board: Gypsum Core panel with enhanced sag resistant core. Complying with ASTM C 1396.
   a. Basis of Design: ProRoc Interior Ceiling, manufactured by CertainTeed Gypsum, Inc.
   b. Thickness: 5/8 inch.
   c. Width: 48 inches.
   d. Length:
      1) Use longest length available to avoid joints.
   e. Edges: Tapered

2.05 ACCESSORIES

A. Interior Trim: Complying with ASTM C 1047.
1. Corner Bead
2. Casing Beads:
   a. LC-Bead.
   b. L-Bead.
   c. U-Bead.
3. Control Joint

B. Fasteners:
1. Screws: ASTM C 954 or ASTM C 1002 as recommended by panel manufacturer.
2. Nails: ASTM C 514 with heads, lengths, configurations, and finish as recommended by panel manufacturer.
3. Adhesive: Recommended by panel manufacturer.

C. Joint Treatment:
1. Tape: Comply with ASTM C 475.
2. Joint Compound: Comply with ASTM C 475.

D. Sealant: Provide Joint Sealant and Acoustical Sealant as specified in Section 07 92 00.

E. Insulation: Thermal and acoustical insulation as specified in Section 07 20 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until supports and substrates have been properly prepared.

B. Verify that framing and supports are ready to receive work and opening dimensions are as indicated on the Drawings.

C. If support and substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Examine gypsum board panels for damage and existence of mold. Install undamaged panels

C. Examine gypsum board in accordance with GA 231 for water damage.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's written instructions and ASTM C 840 and GA 216.

B. Erect single layer gypsum board in most economical direction with ends and edges occurring over firm bearing.

C. Erect single layer fire rated gypsum board with edges and ends occurring over firm bearing.

D. Erect exterior gypsum sheathing horizontally, with edges butted and ends occurring over firm bearing.

E. Place control joints consistent with lines of building spaces as indicated on Drawings.

F. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.04 FINISHING

A. General: Comply with ASTM C 840, GA 214 and GA 216.
   1. Level 4: Areas to receive flat sheen paint finish; light textured coatings; lightweight wall coverings. In areas such as Janitors Closet.
   2. Level 5: All other Areas. Areas such as Corridors, Offices and Conference Rooms.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09 29 10
GYPSUM BOARD ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. Related work specified elsewhere includes:
   1. Rough carpentry.
   2. Finish carpentry and millwork.
   3. Metal support systems.
   4. Plaster.
   5. Gypsum board systems.
   6. Painting.
   7. Wallcovering.

1.02 SUBMITTALS

A. Product data: Indicate product description, including compliance with specified requirements and installation Mark manufacturer's brochures to include only those products proposed for use.

1.03 QUALITY ASSURANCE

A. Applicable standards; standards of the following, as referenced herein:
   1. Aluminum Association (AA).
   2. American Society for Testing and Materials (ASTM).

B. Allowable tolerances in horizontal planes:
   1. Variation from level: +1/8" in 12'-0".
   2. Variation in plane of adjacent wallboard panels prior to joint treatment: 1/16".

C. Allowable tolerances in framed vertical construction.
   1. Position: +1/4" maximum variation from design position.
   2. Alignment: 1/8" in 8'-0"; 1/4" maximum in any continuous wall, line or surface.
   3. Surface smoothness: No joint or fastener location, roughness or blemish discernible after application of finish when viewed at any angle from a distance of 5'-0" under occupancy lighting conditions, with surface preparation as specified in Painting section.

1.04 DELIVERY, STORAGE AND HANDLING

A. Storage:
   1. Stack accessories off floor on pallets or similar platforms providing continuous support for accessories to prevent sagging. Stack accessories so that long lengths are not over short lengths.
   2. Do not overload floor systems.

B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Reject and remove damaged material from site.

1.05 RETAIN WARRANTY FOR FLUOROPOLYMER FINISH ONLY.

1.06 WARRANTY

A. Finish warranty: Warrant fluoropolymer coating to remain free, under normal atmospheric conditions, from peeling, checking, cracking, chalking in excess of numerical rating of 8 when measured in accord with ASTM D4214-98, of fading in excess of 5 N. B. S. Units during warranty period. Warranty period shall be 5 years, beginning at Date of Substantial Completion. **

PART 2 PRODUCTS

2.01 MANUFACTURER:

A. Acceptable manufacturer; subject to compliance with specified requirements:
   Fry Reglet Corporation.
   625 South Palm Avenue

Alhambra, CA 91803
Phone 800-237-9773 Fax 800-200-4397

B. Accessory systems of similar design and construction, as manufactured by other manufacturers, may be submitted for Architect's consideration. Acceptance is subject to compliance with specified design criteria, as evidenced by submittal of specified product data. Submittals shall comply with requirements of Product Options and Substitutions section.

2.02 MATERIALS AND FINISH:

A. Anodized finish:
   1. Architectural 200R1 medium etch (AA-M32c10A21), clear color.

2.03 REVEALS:

A. Reveal molding:
   1. Acceptable product: Number DRM.
   2. Characteristics:
      a. Description: Molding shall create a vertical or horizontal recessed reveal.
      b. Material: Extruded aluminum.
      c. Dimensions: As per Manufacturer.
   3. Type A - “F” reveal molding:
      a. Acceptable product: Number DRMF-625-200
      b. Characteristics:
         1) Description: Trim reveal molding forming wall trim reveal where drywall terminates against ceiling or other finish material in same plane.
            (a) Material: Extruded aluminum.
   4. Type B - “F” reveal molding:
      a. Acceptable product: Number FPM-75-200.
      b. Characteristics:
         1) Description: Reveal molding shall form a trim reveal for Plaster wall finish.
         2) Material: Extruded aluminum.
         3) Dimensions: As per Manufacturer.
   5. Type C - Reveal Molding:
      a. Acceptable product: Number DRM-625-200.
      b. Characteristics:
         1) Description: Reveal Molding shall form reveals in wall.
         2) Material: Extruded aluminum.
         3) Dimensions: As per Manufacturer.
   6. Type D - "J" Molding:
      a. Acceptable product: Number JPM-75
      b. Characteristics:
         1) Description: J Molding for finish plaster.
         2) Material: Extruded aluminum.
         3) Dimensions: As per Manufacturer
   7. Type E - Reveal Base
      a. Acceptable product: Modified PCS into TRM 75-400 Clear Anodized Aluminum Reveal Molding
      b. Characteristics:
         1) Description: Reveal for base at Plaster.
         2) Material: Extruded aluminum.
         3) Dimensions: As indicated on drawings.
   8. Type F - Reveal Base
      a. Acceptable product: Number DRMB-625-400.
      b. Characteristics:
         1) Description: Trim shall create reveal in drywall.
         2) Material: Extruded aluminum.
         3) Dimensions: As per Manufacturer

PART 3 EXECUTION

3.01 INSTALLATION:

A. Install gypsum wallboard accessories in accord with manufacturer's product data and as follows:
   1. Corner trim: Install at designated corners.
   2. Metal trim shapes: Install at exposed edge of wallboard at door and window openings, at intersections with other materials and at intersection of walls with ceilings.
   3. Install corner beads and metal trim shapes to framing system with mechanical anchors spaced at 8" o. c.
   4. Joint treatment: Finish joints and attachment flanges as specified in Gypsum Board Systems section.
   5. Dust surfaces and leave ready for decoration. Joint and fastener treatment shall be indistinguishable in finished work.

3.02 3.2 PROTECTION

A. Protect accessories from damage until date of Substantial Completion. Replace accessories which become damaged.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Coated glass mat backer board as tile substrate.

D. Stone thresholds.

E. Ceramic accessories.

F. Ceramic trim.

1.02 RELATED REQUIREMENTS

A. Section 07 14 00 - Fluid-Applied Waterproofing.

B. Section 07 92 00 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2009.

1. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 1999 (R2005).
2. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement
3. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 1999 (R2005).
4. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (R2005).
5. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (R2005).
6. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (R2005).
7. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (R2005).
8. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (R2005).
9. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999 (R2005).
10. ANSI A118.1 - American National Standard Specifications for Dry-Set Portland Cement Mortar; 1999 (R2005).
11. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 1999 (R2005).
12. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar; 1999 (R2005).
13. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 1999 (R2005).
14. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation; 1999 (R2005).
15. ANSI A118.8 - American National Standard Specifications for Modified Epoxy Emulsion Mortar/Grout; 1999 (R2005).
16. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (R2005).

17. ANSI A118.11 - American National Standard Specifications for EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 1999 (R2005).
18. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2008.

B. ASTM C847 - Standard Specification for Metal Lath; 2010a.

C. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2008.

D. TCNA (HB) - Handbook for Ceramic Tile Installation; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

B. Refer to architectural drawings sheets for tile locations and patterns.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures. Submittal shall be issued to the Architect for review immediately as not to delay ordering and delivery of material. Contractor must verify that all colors and materials is available and ordering must not delay installation.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, and color arrangement.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

F. Maintenance Materials: Furnish the following for County of Hidalgo's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Tile: 2 percent percent of each size, color, and surface finish combination, but not less than 10 of each type.

1.06 QUALITY ASSURANCE

A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

1.07 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.
1. Minimum size of mock-up: 48" x 48".
2. Approved mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS

A. Do not install adhesives in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.

C. Manufacturers: All products by the same manufacturer.
   1. Interceramic, Inc.: www.interceramic.com
   2. Substitutions: See Section 01 60 00 - Product Requirements.

D. Tile Type: T1
   1. Manufacturer: Interceramic, Inc.
   2. Pattern/Collection: Piertra Cristal Topaz Cubic Mosaic
   3. Size: 1" x 1"
   4. Color: Random
   5. Location: see Drawings

E. Tile Type: T2
   1. Manufacturer: Interceramic, Inc.
   2. Pattern/Collection: Keystones Pinot gold Meuier
   3. Size: 8" x 12"
   4. Color: Pinot Gold
   5. Location: see Drawings

F. Tile Type: T3
   1. Manufacturer: Interceramic, Inc.
   2. Pattern/Collection: Pinot Surface Bullnose
   3. Size: 3" x 13"
   4. Color: Pinot
   5. Location: see Drawings

G. Tile Type: T4
   1. Manufacturer: Interceramic, Inc.
   2. Pattern/Collection: Unglazed Colored-Body Porcelain Mosaics
   3. Size: 2" x 2"
   4. Color: Uni Sand
   5. Location: see Drawings

H.

2.02 TRIM AND ACCESSORIES

A. Ceramic Accessories: Provide tile trim & accessories that match color & finish of adjoining flat tile unless noted otherwise.

B. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Installer must order tile on schedule to allow for long lead on tile product due to special shapes and color.
   2. Applications: Use in the following locations:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base.
   3. Manufacturer: Same as for tile.

C. Thresholds: Marble, color as selected by ERO Architects, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
   1. Applications: Provide at the following locations:
      a. At doorways where tile terminates.
      b. At open edges of floor tile where adjacent finish is a different height. Transition must meet ADA guidelines.

2.03 ADHESIVE MATERIALS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Custom Building Products; : www.custombuildingproducts.com.

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Epoxy Adhesive: ANSI A118.3, , thinset bond type.

2.04 MORTAR MATERIALS

A. Manufacturers:
1. Bonsal American, Inc; : www.prospec.com.
2. Bostik Inc: www.bostik-us.com.
3. Custom Building Products: www.custombuildingproducts.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Mortar Bond Coat Materials:
1. Dry-Set Portland Cement type: ANSI A118.1.
2. Latex-Portland Cement type: ANSI A118.4.
3. Epoxy: ANSI A118.3.

C. Refer to manufacturer for requirements and installation for each type of tile specified.

2.05 GROUT MATERIALS

A. Manufacturers:
1. Bonsal American, Inc; : www.prospec.com.
2. Bostik Inc: www.bostik-us.com.
3. Custom Building Products; : www.custombuildingproducts.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Standard Grout: Any type specified in ANSI A118.6 or A118.7.
1. Colors: To be selected by ERO Architects from manufacturer's standard range.

C. Expoxy Grout: ANSI A118.5, modified epoxy emulsion grout, full range color as selected; use floor applications.
.

D. Refer to manufacturer for requirements and installation for each type of tile specified.

2.06 ACCESSORY MATERIALS

A. Uncoupling Membrane: 1/8 inch thick polyurethane matting with three-dimensional grid structure with dovetail shaped cavities and fleece webbing laminated to the underside to provide a mechanical bond to the substrate adhesive (DITRA).

B. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Material: Fluid-applied water-based SBS rubber membrane, 40 mils thick, minimum, with polyester fabric reinforcing at edges, corners, joints, and cracks.

C. Coated Glass Mat Backer Board: ASTM C1178/C1178M, with coated inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
1. Product: Diamondback GlasRoc Tile Backer manufactured by CertainTeed.
2. Standard Type: Thickness 5/8 inch.

D. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
   1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
   2. Alkalinity: pH range of 5-9.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

E. Install tile backer board in strict accordance with manufacturer's instructions, using galvanized roofing nails or corrosion-resistant bugle head drywall screws. Bed fiberglass self-adhesive tape at all joints and corners with material used to set tiles.

F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install ceramic accessories rigidly in prepared openings.

G. Install thresholds where indicated.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

J. Allow tile to set for a minimum of 48 hours prior to grouting.

K. Grout tile joints. Use standard grout unless otherwise indicated.

L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with The Tile Council of North America Handbook Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
   1. Use uncoupling membrane under all tile unless other underlayment is indicated.
   2. Where waterproofing membrane is indicated, install in accordance with The Tile Council of North America Handbook Method F122, with latex-Portland cement grout.
   3. Where epoxy bond coat and grout are indicated, install in accordance with The Tile Council of North America Handbook Method F131.

3.05 INSTALLATION - WALL TILE

A. On exterior walls install in accordance with The Tile Council of North America Handbook Method W202, thin-set over concrete and masonry.

B. Over coated glass mat backer board, install in accordance with The Tile Council of North America Handbook Method W245.

C. Over interior concrete and masonry install in accordance with The Tile Council of North America Handbook Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract apply to this section. This includes General and Supplementary Conditions of Division 01 (1) Specification Sections.

1.02 SUMMARY

A. Section includes acoustic panels and suspension systems for ceilings

B. Related Sections
   1. Section 09 20 00 - Gypsum Board, Framing & Accessories
   2. Division 23 - Heating, Ventilating and Air Conditioning (HVAC)
   3. Division 26 - Electrical

1.03 REFERENCES

A. ASTM A446 - Specification for Steel Sheet, Zinc-Coated (galvanized) by the Hot Dip Process, Structural (physical) Quality

B. ASTM A641 - Specification for Steel Sheet, Zinc-Coated (galvanized) Carbon Steel Wire

C. ASTM C423 - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

D. ASTM C635 - Standard Specification for Metal Suspension Systems for Acoustic Tile and Lay-in Panel Ceilings

E. ASTM C636 - Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

F. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials

G. ASTM E119 - Fire Test of Building Construction and Materials

H. ASTM E580 - Practice for Application of Ceiling Suspension Systems for Acoustic Tile and Lay-in Panels in Areas Requiring Seismic Restraint

I. ASTM E795 - Practice for Mounting Test Specimens During Sound Absorption Tests

J. ASTM E1111 - Test Method for Measuring Interzone Attenuation of Ceiling Systems

K. ASTM E1264 - Classification for Acoustic Ceiling Products

L. ASTM E1414 - Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

M. ASTM E1477 - Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating Sphere Reflectometer

N. DIN 5036 - Radiometric and Photometric Properties of Materials

O. ISO 4611 - Plastic - Determination of the Effects of Exposure to Damp, Heat, Water Spray and Salt Mist

P. ISO 11654 - Sound Absorbers for Use in Buildings - Rating of Sound Absorption

Q. ISO 14644 - Classification of Air Cleanliness

R. CISCA (Ceilings & Interior Systems Construction Association) - Ceilings Systems Handbook

S. CISCA (Ceilings & Interior Systems Construction Association) - Acoustical Ceilings - Use and Practice

T. CISCA (Ceilings & Interior Systems Construction Association) - Guidelines For Seismic Restraint Direct Hung Suspended Ceiling Assemblies

U. Danish Society of Indoor Climate - Indoor Climate Label

V. Nordic Council of Ministers - Nordic Swan Eco-label

W. Swedish Asthma & Allergy Association

X. Building Information Foundation RTS - Emission Classification of Building Materials

Y. Collaborative for High Performance Schools (CHPS) - Low-emitting Materials Database

Z. Sustainable Solutions Corporation - “GreenCircle” Certified Recycled Content

AA. Canadian Food Inspection Agency - Accepted Construction Product for use in food establishments operating under the authority of the CFIA.

1.04 SUBMITTALS

A. Product Data
   1. Submit manufacturer's published technical information for each product indicated
   2. Shop Drawings
      a. Submit reflected ceiling plans drawn to scale prescribed by Architect
         1) Include coordinated penetrations and ceiling-mounted items
         2) Include any necessary details or drawings from the manufacturer regarding recommended installation
   3. Samples
      a. Submit representative manufacturer's sample of each panel indicated
      b. Submit representative manufacturer's sample of each suspension member indicated
   4. Certifications
      a. Provide manufacturer's written certification that products submitted meet or exceed all specified requirements
      b. 2. Provide laboratory reports that certify compliance with specified tests

1.05 QUALITY ASSURANCE

A. Source Limitations
   1. Acoustic Ceiling Panel
      a. Obtain each type through one source from a single manufacturer
      b. Suspension System
         1) Obtain each type through one source from a single manufacturer
   2. Installer Qualifications
      a. Must be experienced in the installation of systems similar to those specified herein
   3. Surface Burning Characteristics
      a. ASTM E1264
         1) Class A
      b. ASTM E84
         1) Flame spread of 25 or less
         2) Smoke developed of 50 or less

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery of acoustic ceiling products will be in the original unopened packages with the manufacturer's label intact

B. Handling and storage should be in accordance with the manufacturer's Material Safety Data Sheets (MSDS)

C. Individual panels should be handled carefully to avoid damage

1.07 PROJECT CONDITIONS

A. Environmental Limitations
   1. Install acoustic panels only in conditions that are within the manufacturer's published limits for temperature and humidity
   2. Areas receiving ceiling panels should be free of construction debris and dust
   3. Mechanical, sprinkler and electrical trades shall have completed their work above the ceiling structure prior to commencement of the ceiling panel installation

1.08 COORDINATION

A. Coordinate the installation of the acoustic ceiling system with any and all trades whose work is impacted by that installation

1.09 EXTRA MATERIALS

A. Provide extra materials in the manufacturer's unopened packaging, with the manufacturer's label intact, as detailed below
   1. Acoustic Panels - Minimum [5%] of each type installed
   2. Suspension System Components - Minimum [5%] of each type installed

PART 2 PRODUCTS

2.01 MANUFACTURER

A. CertainTeed Ceilings
   1. Address: P.O. Box 860 Valley Forge, PA 19482
   2. Telephone: 800-233-8990
   3. Web: www.certainteed.com <http://www.certainteed.com>

2.02 ACOUSTIC CEILING UNITS

A. Acoustical Ceiling Panel (ACP) - [Type ACP-1] Change as needed
   1. Name: **School Board**
   2. Physical Characteristics
      a. Type: III (per ASTM E1264)
      b. Form: 2 (per ASTM E1264)
      c. Pattern: C D (per ASTM E1264)
      d. Size: 2'x2'
      e. Thickness: 5/8"
      f. Edges: Square
      g. Finished Surface: Painted
         1) Mold/Mildew inhibitor: BioShield
      h. Finished Surface Color: White
      i. Core Composition: Wet-felted mineral fiber
      j. Recycled Content:
         1) School Board: 45%
            (a) 27% (pre-consumer), 18% (post-consumer)
   3. Performance Criteria
      a. Noise Reduction Coefficient (NRC) per ASTM C423 (E-400 mounting)
         1) 1) .55
      b. Light Reflectance (LR) per ASTM E1477
         1) 0.84
      c. Ceiling Attenuation Class (CAC) per ASTM E1414
         1) 35 [School Board 2'x2',]
      d. Humidity Resistance
         1) Warranted to withstand relative humidity of up to 90% at 104ºF without sagging, warping or delaminating for 10-years
      e. Flame Spread Classification per ASTM E84: Class A
      f. Underwriters Laboratories, Inc. Fire-resistance Time-rated Assemblies
         1) Protectone School Board only: [D203, D205, G208, G218, G248, G255, L201, P204, P259, P260, P261, P262, P264, P266]
   4. Independent Certifications and Recommendations
      a. California Dept. of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-scale Environmental Chambers, inc. 2004 addenda
         1) Third-party certification of compliance
            (a) Standard classroom model
            (b) Standard office model
      b. Sustainable Solutions Corporation
         1) GreenCircle Certified recycled database

2.03 SUSPENSION SYSTEM

A. Manufacturer: CertainTeed Ceilings

B. Product
   1. Name: 15/16” Classic

C. Physical Characteristics
   1. Structural Classification: Intermediate Duty per ASTM C635
   2. Double web design manufactured of hot-dipped galvanized steel
   3. Flange Size:
      a. 15/16”
   4. Color: White

D. Components
   1. Main Runners
      a. Size: 12'
   2. Cross Tees
      a. Size: [4', 2']
      b. Joinery: Stab

E. Attachment Devices: Anchors sufficient for five-times design load indicated in ASTM C635 (Table 1). Wire for hangers of size and type to suit intended application, complying with ASTM C641, Class 1 zinc coating, not less than 12 gauge

PART 3 EXECUTION

3.01 EXAMINATION

A. Ascertain acceptability of substrates and building conditions under which the ceiling system is to be installed. Do not proceed with the installation until any and all unacceptable conditions have been rectified.

3.02 PREPARATION

A. Unless otherwise directed by the reflected ceiling plan, measure the space in which the ceiling system is to be installed and establish a layout that balances border widths at opposite ends of the ceiling.

B. When possible, coordinate the ceiling system layout to avoid the use of less than half width panels at the perimeter.

3.03 INSTALLATION

A. Install the ceiling system in accordance with the following:
   1. Manufacturer's printed instructions
   2. ASTM C636
   3. Ceilings & Interior Systems Construction Association (CISCA) recommendations
   4. Applicable local code requirements
   5. Approved shop drawings

3.04 MAINTENANCE

A. Replace any and all damaged ceiling system components

B. Clean any and all exposed surfaces in accordance with the manufacturer's printed instructions

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2010e1.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2008.

C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2010)e1.

D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2004 (reapproved 2010).

E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008.

F. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.

G. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.

H. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2011.

J. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. LEED Report: Report recycled content and VOC emission of flooring; VOC content of adhesives.

D. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.

E. Laboratory Test Reports for Credit IEQ 4: For adhesives, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Violatile Organic Emissions form various sources using Small-Scale Environmental Chambers".

F. LEED Submittal: Documentation of recycled content and location of manufacture.

1.05 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

B. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm..

1.06 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.07 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Luxury Vinyl Plank:
   1. Minimum Requirements: Comply with ASTM F 1514 & ASTM 1700, of Class corresponding to type specified.
   2. Construction: Luxury Vinyl Plank
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
      a. Size: 4 x 36 inch.
      b. Wear Layer: Quantum Guard HP Urethane Aluminum Oxide Topcoat Cured by UV Process.
      c. Overall Thickness: .100 inches.
      d. Wearlayer Thickness: .020 inches.
      e. VOC Content: As specified in Section 01 16 00.
      f. VOC Content: Certified as Low Emission by one of the following :
         1) GreenGuard Children and Schools; www.greenguard.org.
         2) Product listing in the CHPS Low-Emitting Materials Product List at; www.chps.net/manual/lem_table.htm.
      g. Manufacturers:
         1) Mannington, Inc; Product Nature's Path Plank: www.mannington.com.
      h. Tile Types: (per Mannington)
         1) Teak - 12122 Bengal
      i. Substitutions: See Section 01 60 00 - Product Requirements.
   4.

2.02 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic; top set Style B, Cove, and as follows:
   1. Height: 4 inch.
   2. Thickness: 1/8 inch thick.
   3. Finish: Smooth Matte Finish.
   4. Color: 901 Night Black.
   5. Accessories: Premolded external corners and end stops.
   6. Manufacturers:
      a. Mannington Commercial; www.mannington.com
         1) Type: Premium Edge Wall Base.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
   1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

B. Moldings, Transition and Edge Strips: Same material as flooring.

C. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is cured.

D. Clean substrate.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed. Apply primer to Sealed or Stained surfaces.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 TILE FLOORING

A. Install in accordance with manufactures instructions.

B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.

C. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

3.05 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Materials for backpriming woodwork.

D. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Exposed surfaces of steel lintels and ledge angles.
   3. Surfaces inside cabinets.
   4. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
   5. All items in exposed structure areas to be painted, including but not limited to Duct Work, Metal Conduit, Raceways, Fire Suppression Piping, Bar Joists, Metal Roof Deck, and Steel Beams unless indicated on the drawings.

E. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shop-primed items.

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2011.

B. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples: Submit two paper chip samples, 6 x 6 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

F. Maintenance Materials: Furnish the following for County of Hidalgo's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Paint and Coatings: 1 gallon of each color; store where directed.

3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

C. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request furnish information on characteristics of finish materials to ensure use of compatible primers.
   1. Notify the Architect of problems anticipated using the materials specified.

D. Material Quality: Provide the manufacturer's best quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude equal products of other manufacturers.
   2. Federal Specifications establish a minimum quality level for paint materials, except where other product identification is used. Provide written certification from the manufacturer that materials provided meet or exceed these criteria.
   3. Products that comply with qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to the Architect. Furnish material data and manufacturer's certificate of performance to Architect for proposed substitutions.

E. Interior Coating type: Provide interior painting systems which are VOC compliant as per Green Seal Environmental Standard GS-11 for interior paint VOC thresholds:
   1. Non-flat: VOC not more than 50 g/L
   2. Flat: VOC not more than 50 g/L

F. Interior/Exterior coatings type: Provide interior/exterior coating systems which are VOC compliant as per Rule 1168 of the South Coast Air Quality Management District for coatings, primers, stains:
   1. Primers, Sealers and Undercoaters" COC not more than 200 g/L
   2. Stains, interior: VOC not more than 250 g/L
   3. Floor coatings: VOC not more than 100 g/L

G. Exterior coating type: Provide exterior painting systems which are VOC compliant as per Green Seal Environmental Standard GS-11 for exterior paint VOC threshold:
   1. Non-Flat: VOC not more than 200 g/L
   2. Flat: VOC not more than 100 g/L

H. Interior/Exterior anti-corrosive and anti-rust coating types for ferrous metals: Provide interior/exterior painting systems for ferrous metals which are VOC compliant as per Green Seal Environmental GC-03 for interior/exterior paint VOC thresholds:
   1. Gloss: VOC not more than 250 g/L
   2. Semi-Gloss: VOC not more than 250 g/L
   3. Flat: VOC not more than 250 g/L

1.07 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 4 feet long by 8 feet wide, illustrating special coating color, texture, and finish.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing, VOC content.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIAL

A. Provide one gallon of each different paint system, and color with manufacturers name and color clearly labeled on the top of each container.

1.11 PRE-PAINT CONFERENCE

A. Prior to finish painting, exterior and interior, General Contractor shall schedule a "Pre-Painting Conference" to be attended by ERO Architects, Contractor, Painting Subcontractor and Manufacturers Representative.

B. Agenda to include submittal of color and finishes sample.

C. Contractor to record discussions of conference including agreements and/or disagreements and distribute a copy to all persons in attendance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.

C. Primer Sealers:
   1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.

D. Block Fillers:
   1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.

E. Concrete Stains: (Interior/Exterior)
   1. Base Manufacturer: Seal-Krete: www.seal-krete.com

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
      1) Opaque, Flat: 50 g/L, maximum.
      2) Opaque, Nonflat: 150 g/L, maximum.
      3) Opaque, High Gloss: 250 g/L, maximum.
      4) Varnishes: 350 g/L, maximum.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings
   1. Selection to be made by ERO Architects after award of contract.
   2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to County of Hidalgo.
   3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

A. General: Provide the following paint systems for the various substrates, as indicated;

B. Metals:

C. Ferrous Metals, (Anti-Corrosive coating):
   1. Semi-Gloss Acrylic Latex: 2 finish coats over primer on properly prepared surface:
   2. Primer:
      a. Sherwin-Williams Pro-Cryl Universal Water Based Primer (B66-310 Series) (5.0-10.0 mils wet, 2.0-4.0 mils dry).
         VOC: Unreduced 89 g/L < 250 g/L.
      b. First and Second Coats:
         1) Sherwin-Williams Sher-Cryl HPA High Performance Acrylic (B66-300 Series) (6.0-10.0 mils wet, 2.5-4.0 mils dry per coat) spray applied.
         VOC: 189 g/L , 250 g/L.
      c. Third Coat:
         1) Sherwin-Williams Sher-Clear 1K Acrylic Clear Coat (3 mils wet, 1 mil dry)
         VOC: <100 g/L , 200 g/L.

D. Zinc-Coated Metal:
   1. Gloss Latex: 2 finish coats over primer on properly prepared surfaces:
   2. Primer:
      a. Sherwin-Williams Pro-Cryl Universal Water Based Primer (B66-310 Series) (5.0-10.0 mils wet, 2.0-4.0 mils dry).
         VOC: Unreduced 89 g/L , 250 g/L.
   3. First and Second Coats:
      a. Sherwin-Williams Pro Industrial) VOC Acrylic Semi-Gloss, (B66W611) (6.5 - 10.0 mils wet, 2.5 - 4.0 mils dry per coat).
         VOC: 0 g/L , 200 g/L.
      b.

2.04 PAINT SYSTEMS - INTERIOR

A. General: Provide the following paint systems for the various substrates as indicated.

B. Gypsum Board (walls and ceiling): Furnish sample on 2'x2' piece of gypsum board for Architects approval prior to application.
   1. Gypsum Drywall Systems:
      a. Semi-Gloss Acrylic Enamel: 2 finish coats over primer on properly prepared surface:

b. Texture:
   1) USG Sheetrock Brand Wall and Ceiling Spray Texture (Multipupose) (fine orange peel).
   2) Texture Additive: Sheetrock Brand First Coat: Add at a rate of 1 gal. per bag of texture-substitute for 1 gal. of water.
      VOC: 2 g/L
c. Primer:
   1) Sherwin-Williams ProGreen Low VOC Primer B28W600 (4 mils wet; 1.3 mils dry).
      VOC: 43 g/L < 50 g/L.
d. First and Second Coats:
   1) Sherwin-Williams Pro Industrial 0 VOC Acrylic Semi-Gloss (B66W611) (4 mils wet, 1.4 mils dry per coat).
      VOC: 0 g/L < 50 g/L.

2. Gypsum Drywall Systems:
   a. Eg-Shel Acrylic Enamel: 2 finish coats over primer on properly prepared surface:
   b. Texture:
      1) USG Sheetrock Brand Wall and Ceiling Spray Texture (Multipupose) (fine orange peel).
      2) Texture Additive: Sheetrock Brand First Coat: Add at a rate of 1 gal. per bag of texture-substitute for 1 gal. of water.
         VOC: 2 g/L.
   c. Primer:
      1) Sherwin-Williams ProGreen Low VOC Primer B28W600 (4 mils wet; 1.3 mils dry).
         VOC: 43 g/L < 50 g/L.
   d. First and Second Coats:
      1) Sherwin-Williams Pro Industrial 0 VOC Acrylic Semi-Gloss (B66W611) (4 mils wet, 1.4 mils dry per coat).
         VOC: 0 g/L < 50 g/L.

C. Metals:
   1. Ferrous Metals:
      a. Semi-Gloss Acrylic Enamel: 2 finish coats over primer on properly prepared surface:
      b. Primer:
         1) Sherwin-Williams Pro-Cryl Universal Water Based Primer (B66-310 Series) (5.0-10.0 mils wet, 2.0-4.0 mils dry)
            VOC: Unreduced 89 g/L < 250 g/L.
      c. First and Second Coats:
         1) Sherwin-Williams Pro Industrial 0 VOC Acrylic Semi-Gloss (B31 Series) (4 mils wet, 1.4 mils dry per coat)
            VOC: 0 g/L < 50 g/L.
   2. Zinc Coated Metals
      a. Semi-Gloss Acrylic Enamel: 2 finish coats over primer on properly prepared surface:
      b. Primer:
         1) Sherwin-Williams Pro-Cryl Universal Water Based Primer (B66-310 Series) (5.0-10.0 mils wet, 2.0-4.0 mils dry)
            VOC: Unreduced 89 g/L < 250 g/L.
      c. First and Second Coats:
         1) Sherwin-Williams Pro Industrial 0 VOC Acrylic Semi-Gloss (B31 Series) (4 mils wet, 1.4 mils dry per coat)
            VOC: 0 g/L < 50 g/L.

D. Exposed Concrete Floors: (Basis of Design)
   1. Concrete Floors: (Maintanance Building - **Base Bid**)
      Equal to: **Seal Krete**
      a. Garage/Concrete Floor Sealer: Garage/Concrete Floor Sealer is a durable, water-based, acrylic sealer for concrete floors, carports, shop floors and other horizontal concrete or masonry surfaces.
         1) Technical Data:

(a) Finish: Satin to semi-gloss.
(b) Color: Clear.
(c) Weight Solids: 20 percent, ASTM D 2369.
(d) VOC Actual: Less than 100 g/L, ASTM D 3960.
(e) Odor: Low.
(f) OTC Compliant.
(g) Superior hot-tire mark release.

2. Concrete Floors: (Maintanance Building - **Alternate Bid No. 01**)
   Equal to: **Seal Krete**
   a. Epoxy-Seal: Epoxy-Seal Concrete & Garage Floor Paint is a ready-to-use, acrylic-epoxy blend formulated to resit hot tire pick-up, chemicals , oil, grease and gasoline stains.
      1) Technical Data:
         (a) Finish: Premium Satin
         (b) Color: to be selected by ERO Architects
         (c) Colorant Limits: White Base 5 oz., Deep Base 8 oz..
         (d) Volume Solids: 38.00 +/- 1%
         (e) Weight Solids: 45.00 +/- 1%
         (f) Recommended Spread Rate (per coat):
            (1) Wet mils: 3.5-4.5
            (2) Dry mils: 1.5-2.5
         (g) Coverage: 300-500 sq ft/gal

E. Concrete Masonry Units
   1. Semi-Gloss Acrylic Enamel: 2 finish coats over primer on properly prepared surface:
   2. Primer:
      a. Sherwin-Williams PrepRite Block Filler (B25W25) (16 mils wet, 8 mils dry)
         VOC: 45 g/L.
   3. First and Second Coats:
      a. Sherwin-Williams ProClassic Waterborne Acrylic Semi-Gloss (B31 Series) (4 mils wet, 1.4 mils dry per coat).
         VOC: 144 g/L < 150 g/L.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. If substrate preparation is the responsibility of another installer, notify ERO Architects of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

I. Concrete Floors and Traffic Surfaces to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

J. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

K. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

END OF SECTION

SECTION 10 21 13.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments consisting of partitions, and urinal screens.

B. Floor-mounted, overhead braced, floor mounted solid plastic (HDPE) compartments

C. Hardware and fittings.

1.02 RELATED REQUIREMENTS

A. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

A. ADA Accessibility Guidelines for Buildings and Facilities.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 4 x 4 inch in size illustrating panel finish, color, and sheen.

E. Submit maintenance data for installed products in accordance with Section 01 78 00 - Closeout Submittals.

1.06 PROJECT CONDITIONS

A. Building enclosed completely protected from outside weather with minimum inside temperature of 60 degrees F and below 100 degrees F.

1.07 WARRANTY

A. Manufacturer shall provide a 15-year warranty against corrosion, breakage and delamination of plastic material under normal conditions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide products manufactured by The Mills Company, subsidiary of Bradley Corp., Menomonee Falls, WI..

2.02 EQUIPMENT

A. Sentinel Floor-Mounted Overhead-Braced Series 400 with No-Site toilet partition system. Color to be selected by ERO Architects from manufacturers standard colors.

2.03 Substitutions: Section 01 60 00 - Product Requirements.

2.04 COMPONENTS

A. Toilet Compartments: Solid molded phenolic plastic panels, doors, and pilasters, floor-mounted unbraced.

B. Panels, doors and pilasters 1 inch (25mm) thick, constructed form high density polyethylene resins compounded under high pressure to form a single component, waterproof, non-absorbent, with a self-lubricating surface.
   1. Edges: rounded to a 3/16 inch (5mm) radius.
   2. Doors and panels 55 inches (1397mm) high mounted 14 inches (356mm) above finished floor, with aluminum heat sink fastened to bottom edge of doors.

C. Pilasters 82 inches (2083mm) high, and shall be secured to the floor using a 3" high, one-piece, type 304 stainless steel shoe with a #4 satin brushed finish.

D. Urinal screens shall have the same construction as doors, panels and pilasters. Urinal screens shall be 42" high and mounted at 18 " above finished floor.

E. Head Rails: 1" x 1 -1/2" extruded anodized aluminum with anti-grip profile and cast socket wall brackets.

F. Brackets: Continuous 54" long heavy-duty aluminum, single or double ear style.

G. Fasteners, screws and bolts: Tamper proof stainless steel.

H. Hardware: Extruded aluminum 6463-T alloy and chrome-plated non-ferrous cast metal.
   1. Hinge system integrated with doors and pilasters with no exposed metal parts. Hinge mechanism integrated into door and pilaster as a 1/2" diameter gravity cam unit with 3/16" stainless steel pin at door bottom and 1/2" nylon pin at top.
   2. Latches fabricated from extruded aluminum with a satin finish for the housing and a black anodized finish for the slide bolt.
   3. Door strike and keeper, 6" long fabricated from heavy-duty extruded aluminum with satin finish and wraparound flanges. Bumper is black rubber.
   4. Coat hook with wall bumper, chrome-plated; one per compartment, mounted on door.
   5. Door pull and door stop for each out swinging door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

B. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms.

B. Grab bars.

C. Custodial Accessories

1.02 RELATED REQUIREMENTS

A. Section 10 21 13.19 - Plastic Toilet Compartments.

1.03 REFERENCE STANDARDS

A. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2010.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

D. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2003 (Reapproved 2009).

E. ASTM C1036 - Standard Specification for Flat Glass; 2006.

F. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

PART 2 PRODUCTS

2.01 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, Bobrick Washroom Equipment, Inc. or submit comparable product in conformance with Substitution Procedures.

1. Toilet Tissue (Roll) Dispenser: (TA-1)
    a. Basis-of-Design Product: Bobrick B-2892 Double Roll Toilet Tissue Dispenser.
    b. Mounting: Surface Mounted.
    c. Capacity: Accommodates two toilet tissue rolls up to 10" diameter.
    d. Materials: 18-8S, type 304 stainless steel, 18 gauge with satin finish.
    e. Refill Indicator: wide viewing slot reveals toilet tissue supply inside.
    f. Lockset: lock & key.
2. Liquid-Soap Dispenser: (TA-2)
    a. Basis-of-Design Product: Bobrick B-4112 Soap Dispenser - ConturaSeries.
    b. Mounting: Surface Mounted.
    c. Capacity: 40 fl. oz.
    d. Materials: type 304 stainless steel, 20 gauge with satin finish.
    e. Refill Indicator: refill window.
    f. Lockset: lock & key.
3. Grab Bar - 42" Long: (TA-3)

a. Basis-of-Design Product: Bobrick B-6206.99x42 42" Stainless Steel Grab Bar, Satin Finish.
b. Mounting: Flanges with concealed fasteners.
c. Material: Stainless Steel, 0.05 inch thick.
d. Finish: Snooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
e. Dimensions: 42" Long x 1-1/2" outside diameter.

4. Grab Bar - 36" Long: (TA-4)
   a. Basis-of-Design Product: Bobrick B-6206.99x36 36" Stainless Steel Grab Bar, Satin Finish.
   b. Mounting: Flanges with concealed fasteners.
   c. Material: Stainless Steel, 0.05 inch thick.
   d. Finish: Snooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
   e. Dimensions: 36" Long x 1-1/2" outside diameter.
5. Waste Receptacle: (TA-5)
   a. Basis-of-Design Product: Bobrick B-43644 Contura Series Recessed Waste Receptacle.
   b. Mounting: Recessed Mounted.
   c. Capacity: 12.8 gal..
   d. Materials: Stainless steel, No. 4 finish (Satin).
   e. Lockset: Tumbler type for waste-receptacle.
6. Paper Towel Dispenser: (TA-6)
   a. Basis-of-Design Product: Bobrick B-4264.
   b. Mounting: Surface Mounted.
   c. Capacity: Dispenses 400 C-fold or 525 multifold paper towels.
   d. Materials: type-304 stainless steel, 22 gauge with satin finish.
   e. Lockset: Tumbler lock.
7. Sanitary-Napkin Dispenser Unit: (TA-7)
   a. Basis-of-Design Product: Bobrick B-354 Partition Mounted.
   b. Mounting: Recessed in Toilet Partition.
   c. Door or Cover: Self-closing, hinged face panel with tumbler lockset.
   d. Material & Finish: 18-8S, type 304 stainless steel, 22 gauge with satin finish.
   e. Waste Receptacle: Removable rigid molded olyethylene.
8. Mirror Unit: (TA-8)
   a. Basis-of-Design Product: Bobrick 290 2436 Framed Mirror.
   b. Hangers: Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
   c. Corners: Welded and ground smooth.
   d. Frame: 18-8 S, type 304, heavy-gauge stainless steel, 3/4" x 3/4" angle with vertical-grain satin finish. One piece, roll formed constuction with continuous integral stiffener on all sides.
   e. Size: 24"W x 36"H.
9. Warm-Air Dryer: (TA-9)
   a. Basis-of-Design Product: Dyson Airblade.
   b. Mounting: Surface Mounted.
   c. Operation: Electronic-sensor activated with timed power cut-off switch.
   d. Operation time: 12 seconds.
   e. Cover Material and Finish: die-cast aluminum casing.
   f. Electrical Requirements: 110-120V, Single Phase, 60 Hz..

B. Custodial Accessories: (for Janitor - 122)
   1. Mop and Broom Holder: (TA-12)
      a. Basis-of-Design Product: Bobrick B-223x36.
      b. Dimensions: 36" Long x 5" H Mop/Broom Holder.
      c. Mop & Broom Holders: Spring loaded rubber cams with anti-slip coatings. Powder coated steel retainers.
      d. Materials: 18-8S, type 304 stainless steel, 22 gauge with satin finish.

2.02 TOILET ROOM ACCESSORIES

A. Grab Bars: Stainless steel, 1-1/4 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings.

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fire Extinguishers

B. Cabinets

C. Accessories

1.02 RELATED WORK

A. Section 09 90 00 - Field Painting

B. Section 21 13 00 - Fire Sprinkler Systems

C. Section 21 12 00 - Standpipe and Hose Systems

1.03 REFERENCES

A. NFPA1 0-Portable Fire Extinguishers

B. UBC 43-6 (ASTM E814-83) - Fire rated cabinets fabricated in accordance to measure, restore, perform.

C. Americans with Disabilities Act 1990- Maximum 4 cabinet projection for corridors.

1.04 QUALITY ASSURANCE

A. Conform to NFPA 10 requirements for portable fire extinguishers.

B. Provide fire extinguishers, cabinets and accessories by a single manufacturer.

C. Conform to UBC 43-6 (ASTM E814-83) for fire resistive wall performance where necessary.

D. Conform to Americans with Disabilities Act 1990 on maximum cabinet projection of C in corridors where necessary.

1.05 SUBMITTALS

A. Submit brochure and product data in compliance with Section 01340.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Where shown on the drawings, provide fire extinguishers, cabinets, accessories manufactured by J.L. Industries, Inc., 4450 West 78th Street Circle, Bloomington, MN 55435, (952) 835-6850, Fax: (952) 835-2218

2.02 FIRE EXTINGUISHERS

A. Dry Chemical Type: J. L. Industries Cosmic or Galaxy Series (Size per 2006 IBC)

2.03 FIRE EXTINGUISHER CABINETS

A. Where indicated on drawings, provide J.L's Panorama Series, model number 1037 Q48 door. Door and trim to be fabricated from (stainless steel). Color anodized aluminum, special painted surfaces and graphics as indicated.

B. Provide cabinets with fire-rated option, if applicable.

2.04 ACCESSORIES

A. Extinguisher Brackets

PART 3 EXECUTION

3.01 INSTALLATION

A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of goveming authorities.

B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturers instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

END OF SECTION

SECTION 10 75 00
FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ground-Set Flagpoles.

B. Accessories

1.02 REFERENCE STANDARDS

A. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2010.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pole, accessories, and configurations.

C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

D. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules and .

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed Texas.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:
   1. American Flagpole: www.americanflagpole.com.
   2. Concord Industries, Inc: www.concordindustries.com.
   3. Pole-Tech Co., Inc: www.poletech.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GROUND SET FLAGPOLES

A. Acceptable Product: Concord Continental Ground Set Flagpole.

B. Flagpoles: Aluminum.
   1. Design: Cone tapered.
   2. Mounting: Ground mounted type.

C. Shaft:
   1. Material: Seamless cone-tapered aluminum tubing conforming to ASTM B 241/B 241M, Alloy 6063, Temper T6.
   2. Nominal Height: 30 ft; measured from nominal ground elevation.
   3. Finish: Polished to deep luster sheen; clear anodized finish conforming to AA M32-C22-A41.

D. Truck: Cast aluminum housing and spindle, with one 2 3/8" inches diameter cast nylon sheave(s); revolving mounting with 26 stainless steel ball bearings, non-fouling.

E. Halyard: #10 limited stretch braided white polypropylene halyard fitted with two chrome swivel snaps.

F. Cleat: One 9" cast aluminum cleat with finish to match shaft. Secured with two stainless steel socket head bolts.

G. Performance Requirements:
   1. Flagpole With Flag Flying: Resistant without permanent deformation to 120 miles/hr wind velocity; non-resonant, safety design factor of 2.5.

2. Flagpole Without Flag: Resistant without permanent deformation to 120 miles/hr wind velocity; non-resonant, safety design factor of 2.5.

2.03 ACCESSORIES

A. Ground Sleeve: Galvanized steel components as follows:
   1. Foundation tube: Corrugated, 16 gage, diameter and lenght specified in manufacturer's descriptive literature for indicated flagpole height; centered on, and welded to face of base plate.
   2. Base Plate; Square, side dimensions 4 inches greater than inside dimension of foundation tube.
   3. Ground Spike: 3/4 inch diameter, 18 inches long; centered on, and welded to face of base plate opposite foundation tube attachment.
   4. Setting Plate: 6 inches square, with drilled hole at center for attachment to ground spike; welded perpendiculat to length of ground spike 6 inches from base plate

B. Cleat Covers: Aluminum housing, finish matching shaft, with key-operated cylinder lock, keyed alike for multiple units; two keys supplied for each lock.

2.04 MIXES

A. Concrete: 3000 pounds per square inch compressive strength at 28 days; 6 percent air entrainment.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

B. Verification of Conditions: Anchoring devices are correct type, and in correct location, in accordance with approved shop drawings and manufacturer's instructions.

C. Installer's Examination:
   1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
   2. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
   3. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

A. Install flagpole components and accessories in accordance with approved shop drawings and manufacturer's installation instructions.

B. Ground Sleeve:
   1. Excavate in undisturbed soil to indicated depth, width, and length, providing shoring for unstable soil conditions; remove non-soil materials from excavation.
   2. Coat surface of ground sleeve assembly, and surfaces of shaft that will be installed below grade, with bituminous paint, minimum 5 mil dry film thickness (DFT).
   3. Place ground sleeve assembly in excavation, locating as indicated; drive ground spike into undisturbed soil to extent that base plate is flush with bottom of excavation.
   4. Place concrete in excavation immediately after mixing, using chute to deliver concrete to placement; surround ground sleeve with concrete, placing concrete to finish grade, and compacting with vibrators.
   5. Slope concrete surface from top of ground sleeve to grade for water run-off to grade; screed concrete surface to smooth trowel finish.
   6. Moist-cure concrete surface; allow concrete to attain full 28-day compressive strength before installing flagpole

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pre-engineered, shop-fabricated structural steel building frame, roof and wall panels.

B. Exterior doors, windows, skylights, overhead doors, and louvers.

1.02 REFERENCES REQUIREMENTS

A**.** Section 05 50 00 – Miscellaneous Metals

1.03 REFERENCE STANDARDS

A. AISC 360 – Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.; 2005.

B. ASTM A 153/A 153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardwar; 2005.

C. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2007b.

D. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009.

E. ASTM A 325M – Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2009.

F. ASTM A 500/A 500M – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.

G. ASTM A 501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2007.

H. ASTM A 529/A 529M – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2005.

I. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009.

J. ASTM A 992/A 992M – Standard Specification for Structural Steel Shapes; 2006a.

K. ASTM C 1107/C 1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2008.

L. AWS A2.4 – Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

M. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society; 2010.

N. SSPC-Paint 20 – Zinc-Rich Primers (Type I, “inorganic,” and Type II, “Organic”); Society for Protective Coatings; 2002 (Ed. 2004).

O. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 DESIGN REQUIREMENTS

A. Design members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.

B. Design members to withstand UL 580 Uplift Class 60.

C. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of (per plan) of span.

D. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

E. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects, when subject to temperature range of 100 degrees F°.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members connections; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

D. Samples: Submit two samples of precoated metal panels for each color selected, 6”x6” inch in size illustrating color and texture of finish.

E. Manufacturer’s Instructions: Indicate preparation requirements, anchor bolt placement.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

G. Project Record Documents: Record actual locations of concealed components and utilities.

1.07 QUALITY ASSURANCE

A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of the work.
   1. Design Engineer Qualifications: Licensed professional engineer, register to practice in the State of Texas.
   2. Conform to applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authority and provide data as requested.

B. Perform work in accordance with AISC 360 – Specification for Structural Steel Buildings.
   1. Maintain one copy on site.

C. Perform welding in accordance with AWS D1.1.

D. Manufacturer Qualifications: Company specializing manufacturing the Products specified in this section with minimum three years documented experience.

E. Erector Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.08 WARRANTY

A. See Section 01 78 00 – Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Pre-engineered buildings:
   1. Southern Steel Fabricators: www.southernsteelfabricators.com.
   2. Butler Manufacturing Company: www.butlermfg.com.
   3. Substitutions: See Section 01 60 00 – Product Requirements.

2.02 PRE-ENGINEERED BUILDING

A. Single span rigid frame.

B. Wall System: Preformed metal panels of horizontal profile, with sub-girt framing/ anchorage assembly, and accessory components.

C. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/ anchorage assembly, insulation, and liner panels, and accessory components.

D. Roof Slope: Per architectural drawings.

2.03 MATERIALS- FRAMING

A. Structural Steel Members: ASTM A 572/A 572M, Grade 50.

B. Structural Tubing: ASTM A 500, Grade B cold-formed.

C. Plate or Bar Stock: ATM A 529/A 529M, Grade 50.

D. Anchor bolts: ASTM A 307, galvanized to ASTM A 153/A 153M.

E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153, Class C.

F. Welding Materials: Type required for materials being welded.

G. Primer: SSPC-Paint 20, zinc rich.

H. Grout: ASTM C 1107/C 1107M, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2,400 psi in two days and 7,000 psi in 28 days.

2.04 COMPONENTS

A. Doors and frames

B. Frames

C. Wall Louvers

2.05 FABRICATION- FRAMING

A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

2.06 FABRICATION- GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal.

B. Form gutters and downspouts of aluminum profile and size indicated to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.07 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

3.02 ERECTION- FRAMING

A. Erect framing in accordance with AISC 360 – Specification for Structural Steel Buildings.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION – WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.

E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Install insulation and vapor retarder utilizing Purlins for attachment. Place wire mesh under vapor retarder for support between framing members.

H. Install sealant and gaskets to prevent weather penetration.

3.04 ERECTION – GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Slope gutters minimum 1/8 inch/ft.

D. Install splash pans under each downspout spilling into grade.

3.05 INSTALLATION – ACCESSORIES

A. Install door frames, doors, and windows and glass in accordance with manufacturer's instructions.

B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 07 9005.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

A. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.

    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07 92 00 "Joint Sealants."

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 84 13 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

A. Install stack-sleeve fittings in new slabs as slabs are constructed.

1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 07 62 00 "Sheet Metal Flashing and Trim."
3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
5. Using grout, seal the space around outside of stack-sleeve fittings.

B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 84 13 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

   a. Piping Smaller Than NPS 6 Sleeve-seal fittings.
   b. Piping NPS 6 and Larger: Galvanized-steel wall sleeves.

2. Exterior Concrete Walls below Grade:

   a. Piping Smaller Than NPS 6 Sleeve-seal fittings.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

   b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:

   a. Piping Smaller Than NPS 6: Sleeve-seal fittings.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

   b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

4. Concrete Slabs above Grade:

   a. Piping Smaller Than NPS 6 Stack-sleeve fittings.
   b. Piping NPS 6 and Larger Stack-sleeve fittings.

5. Interior Partitions:

   a. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves.
   b. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 22 05 17

SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Escutcheons.
2. Floor plates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With **polished, chrome-plated and rough-brass** finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With polished, chrome-plated and rough-brass finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, exposed-rivet hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with rough-brass finish.
i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.
j. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with rough-brass finish.
k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Bronze ball valves.
2. Bronze lift check valves.
3. Bronze swing check valves.
4. Bronze gate valves.
5. Chainwheels.

B. Related Sections:
1. Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 22 11 16 "Domestic Water Piping" for valves applicable only to this piping.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

G. SWP: Steam working pressure.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:
1. ASME B31.1 for power piping valves.
2. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set gate valves closed to prevent rattling.
4. Set ball valves open to minimize exposure of functional surfaces.
5. Block check valves in either closed or open position.

B. Use the following precautions during storage:
1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

B. Valve Sizes: Same as upstream piping unless otherwise indicated.

C. Valve Actuator Types:
1. Handwheel: For valves other than quarter-turn types.
2. Handlever: For quarter-turn valves NPS 6 and smaller.
3. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.

D. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

E. Valve-End Connections:
1. Grooved: With grooves according to AWWA C606.
2. Solder Joint: With sockets according to ASME B16.18.

3. Threaded: With threads according to ASME B1.20.1.

F. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
1. Description:
a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Threaded.
g. Seats: PTFE or TFE.
h. Stem: Bronze.
i. Ball: Chrome-plated brass.
j. Port: Full.

2.3 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Bronze Disc:
1. Description:
a. Standard: MSS SP-80, Type 1.
b. CWP Rating: 200 psig.
c. Body Design: Vertical flow.
d. Body Material: ASTM B 61 or ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: Bronze.

2.4 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:
1. Description:
a. Standard: MSS SP-80, Type 3.
b. CWP Rating: 200 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: Bronze.

2.5 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:
1. Description:
a. Standard: MSS SP-80, Type 1.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded or solder joint.
e. Stem: Bronze.
f. Disc: Solid wedge; bronze.

g. Packing: Asbestos free.
h. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, RS Bronze Gate Valves:
1. Description:
a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded or solder joint.
e. Stem: Bronze.
f. Disc: Solid wedge; bronze.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron, bronze, or aluminum.

2.6 CHAINWHEELS

A. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
2. Attachment: For connection to ball valve stems.
3. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve. Include zinc coating.
4. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install chainwheels on operators for ball valves NPS 3 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.

F. Install check valves for proper direction of flow and as follows:
   1. Swing Check Valves: In horizontal position with hinge pin level.
   2. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:
   1. Shutoff Service: Ball or gate valves.
   2. Throttling Service: Ball valve.
   3. Pump-Discharge Check Valves:
      a. NPS 4 and Smaller: Bronze swing check valves with bronze disc.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:
   1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
   2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
   3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
   4. For Grooved-End Copper Tubing: Valve ends may be grooved.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 4 and Smaller:
   1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
   2. Ball Valves: Two piece, full port, bronze with bronze trim.
   3. Bronze Swing Check Valves: Class 125, bronze disc.
   4. Bronze Gate Valves: Class 125, NRS.

END OF SECTION 22 05 23

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Pipe positioning systems.
8. Equipment supports.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 22 Section "Vibration Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.
4. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

D. Welding certificates.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Cooper B-Line, Inc.
    b. Flex-Strut Inc.
    c. Hayden Corp.
    d. Powerstrut Corporation.
    e. Thomas & Betts Corporation.
    f. Unistrut Corporation.
    g. Wesanco, Inc.

2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Metallic Coating: Hot-dipped galvanized.

B. Non-MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Allied Tube Conduit.
    b. Anvil International; a subsidiary of Mueller Water Products Inc.
    c. Empire Industries, Inc.
    d. ERICO International Corporation.
    e. GS Metals Corp.
    f. NIBCO INC.
    g. PHD Manufacturing, Inc.
    h. PHS Industries, Inc.

2. Description: Shop- or field-fabricated pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Coating: Hot-dipped galvanized.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.6 PIPE STANDS

A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Low Type Pipe Stand(For single pipes ≤ 2 1/2" in diameter): Plastic base unit with galvanized steel rods and roller to support pipe, for roof installation without membrane penetration. Product equal to Portable Pipe Hanger #SS8-R.

C. High-Type, Single-Pipe Stand (For pipes > 2 1/2" in diameter):

1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
2. Base: Plastic.
3. Vertical Members: Two HDG-channels.

4. Horizontal Member: HDG-steel channel.
5. Rod/Hanger: HDG continuous thread rod and clevis hanger.
6. Product equal to PPH #PS-1-2.

D. High-Type, Multiple-Pipe Stand:

1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
2. Bases: Plastic.
3. Vertical Members: Two or more HDG-steel channels.
4. Horizontal Member: HDG-steel channel.
5. Rod/Hanger: HDG continuous thread rod and clevis hangers, continuous thread rod.
6. Product equal to PPH #PSE-2-2.

E. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.7 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.8 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.9 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface with use of isolation pad. Do not penetrate roof membrane.
2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Division 07 Section "Roof Accessories" for curbs.

G. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. See Division 22 plumbing fixture Sections for requirements for pipe positioning systems for plumbing fixtures.

H. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

J. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

K. Install lateral bracing with pipe hangers and supports to prevent swaying.

L. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

M. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

N. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

O. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    b. NPS 4: 12 inches long and 0.06 inch thick.
    c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use coated carbon-steel pipe hangers and supports metal trapeze pipe hangers, and metal framing systems and attachments for general service applications.

F. Use padded hangers for piping that is subject to scratching.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
4. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
5. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
7. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
8. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
9. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
10. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
11. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
12. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
13. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

a. Horizontal (MSS Type 54): Mounted horizontally.
b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Stencils.
5. Valve tags.
6. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

C. Valve numbering scheme.

D. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch, Stainless steel, 0.025-inch, or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Red.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 1 1/2 inches for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Fiberboard or metal.
2. Stencil Paint: Exterior, gloss, alkyd enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch, Stainless steel, 0.025-inch, or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.6 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches.

2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Section 09 91 23 "Interior Painting."

B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

D. Pipe Label Color Schedule:

1. Low-Pressure, Compressed-Air Piping:

a. Background Color: Blue.
b. Letter Color: White.

2. Medium-Pressure, Compressed-Air Piping:

    a. Background Color: Blue.
    b. Letter Color: White.

3. Domestic Water Piping:

    a. Background Color: Green.
    b. Letter Color: White.

4. Sanitary Waste and Storm Drainage Piping:

    a. Background Color: Black.
    b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

    a. Cold Water: 1-1/2 inches round.
    b. Hot Water: 1-1/2 inches round.
    c. Low-Pressure Compressed Air: 1-1/2 inches round.
    d. High-Pressure Compressed Air: 1-1/2 inches round.

2. Valve-Tag Color:

    a. Cold Water: Green.
    b. Hot Water: Green.
    c. Low-Pressure Compressed Air: Blue.
    d. High-Pressure Compressed Air: Blue.

3. Letter Color:

    a. Cold Water: White.
    b. Hot Water: White.
    c. Low-Pressure Compressed Air: White.
    d. High-Pressure Compressed Air: White.

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 22 05 53

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating hot-water piping.
4. Supplies and drains for handicap-accessible lavatories and sinks.

B. Related Sections:

1. Division 22 Section "Plumbing Equipment Insulation."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

C. Qualification Data: For qualified Installer.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Pittsburgh Corning Corporation; Foamglas.

2. Block Insulation: ASTM C 552, Type I.
3. Special-Shaped Insulation: ASTM C 552, Type III.
4. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
5. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
6. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.

G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Aeroflex USA, Inc.; Aerocel.
    b. Armacell LLC; AP Armaflex.
    c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. CertainTeed Corp.; SoftTouch Duct Wrap.
    b. Johns Manville; Microlite.
    c. Knauf Insulation; Friendly Feel Duct Wrap.
    d. Manson Insulation Inc.; Alley Wrap.

e. Owens Corning; SOFTR All-Service Duct Wrap.

I. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

J. Phenolic:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Kingspan Tarec Industrial Insulation NV; Koolphen K.
b. Resolco International BV; Insul-phen.

2. Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type III, Grade 1.
3. Block insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type II, Grade 1.
4. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
5. Factory-Applied Jacket: ASJ. Requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ramco Insulation, Inc.; Super-Stik.

B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ramco Insulation, Inc.; Thermokote V.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc.; 81-84.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Phenolic Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-96.
b. Foster Brand, Specialty Construction Brands, Inc.; 81-33.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-20.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-30.
b. Eagle Bridges - Marathon Industries; 501.
c. Foster Brand, Specialty Construction Brands, Inc.; 30-35.
d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; Encacel.
b. Eagle Bridges - Marathon Industries; 570.
c. Foster Brand, Specialty Construction Brands, Inc.; 60-95/60-96.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-10.
b. Eagle Bridges - Marathon Industries; 550.
c. Foster Brand, Specialty Construction Brands, Inc.; 46-50.
d. Mon-Eco Industries, Inc.; 55-50.
e. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.

3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.5 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass and Phenolic Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc.; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc.; 30-45.
    d. Mon-Eco Industries, Inc.; 44-05.
    e. Pittsburgh Corning Corporation; Pittseal 444.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F.
5. Color: Gray.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc.; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc.; 95-44.
    d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Brand, Specialty Construction Brands, Inc.; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. Metal Jacket:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; Metal Jacketing Systems.
b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
c. RPR Products, Inc.; Insul-Mate.

2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

a. Sheet and roll stock ready for shop or field sizing.
b. Finish and thickness are indicated in field-applied jacket schedules.
c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper.
d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
e. Factory-Fabricated Fitting Covers:

1) Same material, finish, and thickness as jacket.
2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3) Tee covers.
4) Flange and union covers.
5) End caps.
6) Beveled collars.
7) Valve covers.
8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 428 AWF ASJ.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ABI, Ideal Tape Division; 488 AWF.
   b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   c. Compac Corporation; 120.
   d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.9 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. ITW Insulation Systems; Gerrard Strapping and Seals.
   b. RPR Products, Inc.; Insul-Mate Strapping and Seals.

2. Stainless Steel: ASTM A 167 or ASTM A 240 Type 304 or Type 316; 0.015 inch thick, 3/4 inch wide with closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with closed seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

C. Wire: 0.062-inch soft-annealed, stainless steel.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. C & F Wire.

2.10 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Engineered Brass Company.
b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
c. McGuire Manufacturing.
d. Plumberex.
e. Truebro; a brand of IPS Corporation.
f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.

4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover

and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

3.6 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.

4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 INSTALLATION OF PHENOLIC INSULATION

A. General Installation Requirements:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with 0.062-inch wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.9 FIELD-APPLIED JACKET INSTALLATION

A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.10 FINISHES

A. Do not field paint aluminum or stainless-steel jackets.

3.11 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.12 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.13 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. All sizes: Insulation shall be one of the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
b. Phenolic: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:

1. All sizes: Insulation shall be one of the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
b. Phenolic: 1 inch thick.

C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Flexible Elastomeric: 1/2 inch thick.
b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

D. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

E. Hot Service Drains:

1. All Pipe Sizes: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe, Type I or II: 1 inch thick.

F. Hot Service Vents:

1. All Pipe Sizes: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe, Type I or II: 1 inch thick.

3.14 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Domestic Water Piping:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.
b. Phenolic: 2 inches thick.

3.15 OUTDOOR, UNDERGROUND PIPING INSULATION SCHEDULE

A. Loose-fill insulation, for belowground piping, is specified in Division 33 piping distribution Sections.

B. Domestic Chilled Water (Potable), All Sizes: Cellular glass, 2 inches thick.

3.16 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. Factory-applied ASJ.

D. Piping, Exposed:

1. 20ml PVC.

3.17 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. Aluminum, Smooth 0.020 inch thick.

D. Piping, Exposed:

1. Aluminum, Smooth with Z-Shaped Locking Seam: 0.020 inch thick.

3.18 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

END OF SECTION 22 07 19

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings.
2. Encasement for piping.

1.3 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

1.5 FIELD CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Architect and/or Engineer no fewer than three days in advance of proposed interruption of water service.
2. Do not interrupt water service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

B. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

F. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

G. Copper Pressure-Seal-Joint Fittings:

1. Fittings for NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
2. Fittings for NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber, O-ring seal in each end.

H. Copper-Tube, Extruded-Tee Connections:

1. Description: Tee formed in copper tube according to ASTM F 2014.

I. Appurtenances for Grooved-End Copper Tubing:

1. Bronze Fittings for Grooved-End, Copper Tubing: ASTM B 75 copper tube or ASTM B 584 bronze castings.
2. Mechanical Couplings for Grooved-End Copper Tubing:

a. Copper-tube dimensions and design similar to AWWA C606.
b. Ferrous housing sections.
c. EPDM-rubber gaskets suitable for hot and cold water.
d. Bolts and nuts.
e. Minimum Pressure Rating: 300 psig.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Solder Filler Metals: ASTM B 32, lead-free alloys.

C. Flux: ASTM B 813, water flushable.

D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 ENCASEMENT FOR PIPING

A. Standard: ASTM A 674 or AWWA C105/A21.5.

B. Form: tube.

C. Color: Black or natural.

2.5 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

D. Plastic-to-Metal Transition Fittings:

1. Description:

a. CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.
b. One end with threaded brass insert and one solvent-cement-socket or threaded end.

2.6 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Standard: ASSE 1079.
2. Pressure Rating: 150 psig.
3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Standard: ASSE 1079.
2. Factory-fabricated, bolted, companion-flange assembly.

3. Pressure Rating: 150 psig.
4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Nonconducting materials for field assembly of companion flanges.
2. Pressure Rating: 150 psig.
3. Gasket: Neoprene or phenolic.
4. Bolt Sleeves: Phenolic or polyethylene.
5. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:

1. Standard: IAPMO PS 66.
2. Electroplated steel nipple complying with ASTM F 1545.
3. Pressure Rating and Temperature: 300 psig at 225 deg F.
4. End Connections: Male threaded or grooved.
5. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105/A21.5.

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 22 05 19 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 22 11 19 "Domestic Water Piping Specialties."

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 11 19 "Domestic Water Piping Specialties."

G. Install domestic water piping level without pitch and plumb.

H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

L. Install piping to permit valve servicing.

M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

N. Install piping free of sags and bends.

O. Install fittings for changes in direction and branch connections.

P. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

Q. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump.

R. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 22 11 23 "Domestic Water Pumps."

S. Install thermometers on inlet and outlet piping from each water heater.

T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

H. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.

I. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

J. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Piping: Join according to ASTM D 2855.

K. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings.

3.5 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.

D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:
    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.

E. Install supports for vertical copper tubing every 10 feet.

F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

   a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
   b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

      1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
      2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

   c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
   d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

   a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
   b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
   c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
   d. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Repeat procedures if biological examination shows contamination.
    e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Clean non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3, shall be one of the following:

1. Soft copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
2. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

E. Under-building-slab, domestic water, building-service piping, NPS 4 and larger, shall be one of the following:

1. Soft copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
2. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

F. Aboveground domestic water piping, NPS 4 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and brazed joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use ball or gate valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use ball valves for all piping.
3. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.

4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

C. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION 22 11 16

SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vacuum breakers.
2. Backflow preventers.
3. Water pressure-reducing valves.
4. Balancing valves.
5. Outlet boxes.
6. Hose stations.
7. Hose bibbs.
8. Wall hydrants.
9. Ground hydrants.
10. Post hydrants.
11. Air vents.
12. Trap-seal primer device.
13. Flexible connectors.

B. Related Requirements:

1. Section 22 05 19 "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.
2. Section 22 11 16 "Domestic Water Piping" for water meters.
3. Section 22 32 00 "Domestic Water Filtration Equipment" for water filters in domestic water piping.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.

1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Standard: ASSE 1001.
2. Size: NPS 1/2 to NPS 3, as required to match connected piping.
3. Body: Bronze.
4. Inlet and Outlet Connections: Threaded.
5. Finish: Rough bronze.

B. Hose-Connection Vacuum Breakers:

1. Standard: ASSE 1011.
2. Body: Bronze, nonremovable, with manual drain.
3. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
4. Finish: Rough bronze.

C. Pressure Vacuum Breakers

1. Standard: ASSE 1020.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 5 psig maximum, through middle third of flow range.
4. Accessories:

a. Valves: Ball type, on inlet and outlet.

D. Spill-Resistant Vacuum Breakers:

a.

2. Standard: ASSE 1056.
3. Operation: Continuous-pressure applications.
4. Accessories:

a. Valves: Ball type, on inlet and outlet.

2.4 BACKFLOW PREVENTERS

A. Intermediate Atmospheric-Vent Backflow Preventers:

1. Standard: ASSE 1012.
2. Operation: Continuous-pressure applications.
3. Body: Bronze.
4. End Connections: Union, solder joint.
5. Finish: Rough bronze.

B. Reduced-Pressure-Principle Backflow Preventers:

1. Standard: ASSE 1013.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 10 psig maximum, through middle third of flow range.
4. Body: Bronze for NPS 2 and smaller; steel with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
5. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
6. Configuration: Designed for horizontal, straight-through or vertical flow.
7. Accessories:

    a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
    b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
    c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

C. Double-Check, Backflow-Prevention Assemblies:

1. Standard: ASSE 1015.
2. Operation: Continuous-pressure applications unless otherwise indicated.
3. Pressure Loss: 5 psig maximum, through middle third of flow range.
4. Body: Bronze for NPS 2 and smaller; steel with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
5. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
6. Configuration: Designed for horizontal, straight-through flow.
7. Accessories:

    a. ValvesNPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
    b. ValvesNPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.

D. Dual-Check-Valve Backflow Preventers:

1. Standard: ASSE 1024.
2. Operation: Continuous-pressure applications.
3. Body: Bronze with union inlet.

E. Hose-Connection Backflow Preventers:

1. Standard: ASSE 1052.
2. Operation: Up to 10-foot head of water back pressure.
3. Inlet Size: NPS 1/2 or NPS 3/4.
4. Outlet Size: Garden-hose thread complying with ASME B1.20.7.
5. Capacity: At least 3-gpm flow.

2.5 WATER PRESSURE-REDUCING VALVES

A. Water Regulators:

1. Standard: ASSE 1003.
2. Pressure Rating: Initial working pressure of 150 psig.
3. Body: Bronze for NPS 2 and smaller; cast iron[with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and NPS.
4. Valves for Booster Heater Water Supply: Include integral bypass.
5. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and NPS 3.

B. Water-Control Valves:

1. Description: Pilot-operated, diaphragm-type, single-seated, main water-control valve.
2. Pressure Rating: Initial working pressure of 150 psig minimum with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot-control valve, restrictor device, specialty fittings, and sensor piping.
3. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
4. End Connections: Threaded for NPS 2 and smaller;flanged for NPS 2-1/2 and larger.

2.6 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. ype: Ball valve with two readout ports and memory-setting indicator.
2. Body: Bronze.
3. Size: Same as connected piping, but not larger than NPS 2.
4. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

B. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

C. Memory-Stop Balancing Valves:

1. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 2 or smaller.
4. Body: Copper alloy.
5. Port: full port.
6. Ball: Chrome-plated brass.
7. Seats and Seals: Replaceable.
8. End Connections: Solder joint or threaded.
9. Handle: Vinyl-covered steel with memory-setting device.

2.7 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.

5. Perforation Size:

    a. Strainers NPS 2 and Smaller: 0.062 inch.
    b. Strainers NPS 2-1/2 to NPS 4: 0.062 inch.
    c. Strainers NPS 5 and Larger: 0.125 inch.

6. Drain: Factory-installed, hose-end drain valve.

2.8 OUTLET BOXES

A. Icemaker Outlet Boxes:

1. Mounting: Recessed.
2. Material and Finish Stainless-steel box and faceplate.
3. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
4. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

2.9 HOSE STATIONS

A. Single-Temperature-Water Hose Stations:

1. Standard: ASME A112.18.1.
2. Cabinet: Stainless-steel enclosure with exposed valve handle, hose connection, and hose rack. Include thermometer in front.
3. Hose-Rack Material: Stainless steel.
4. Body Material: Bronze.
5. Body Finish: Rough bronze.
6. Mounting: Wall, with reinforcement.
7. Hose: Manufacturer's standard, for service fluid, temperature, and pressure; 50 feet long.
8. Nozzle: With hand-squeeze, on-off control.
9. Vacuum Breaker:

    a. Integral or factory-installed, nonremovable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
    b. Garden-hose thread complying with ASME B1.20.7 on outlet.

B. Hot- and Cold-Water Hose Stations:

1. Standard: ASME A112.18.1.
2. Faucet Type: Thermostatic mixing valve.
3. Cabinet: Stainless-steel enclosure with exposed valve handles, hose connection, and hose rack. Include thermometer in front.
4. Hose-Rack Material: Stainless steel.
5. Body Material: Bronze.
6. Body Finish: Rough bronze.
7. Mounting: Wall, with reinforcement.
8. Hose: Manufacturer's standard, for service fluid, temperature, and pressure; 50 feet long.
9. Nozzle: With hand-squeeze, on-off control.

10. Vacuum Breaker: Integral or factory-installed, nonremovable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052; and garden-hose thread complying with ASME B1.20.7 on outlet.

2.10 HOSE BIBBS

A. Hose Bibbs:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral or field-installation, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include wall flange with each chrome- or nickel-plated hose bibb.

2.11 WALL HYDRANTS

A. Nonfreeze Wall Hydrant.

1. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
2. Pressure Rating: 125 psig.
3. Operation: Loose key.
4. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounted with cover.
8. Box and Cover Finish: Polished nickel bronze.
9. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
10. Nozzle and Wall-Plate Finish: Rough bronze.
11. Operating Keys(s): One with each wall hydrant.

B. Nonfreeze, Hot- and Cold-Water Wall Hydrants:

1. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
2. Pressure Rating: 125 psig.
3. Operation: Loose key.
4. Casing and Operating Rods: Of length required to match wall thickness. Include wall clamps.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet: Concealed.

7. Box: Deep, flush mounted with cover.
8. Box and Cover Finish: Polished nickel bronze.
9. Vacuum Breaker:

    a. Nonremovable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
    b. Garden-hose thread complying with ASME B1.20.7 on outlet.

10. Operating Keys(s): One with each wall hydrant.

2.12 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.13 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Standard: ASSE 1010 or PDI-WH 201.
2. Type: Copper tube with piston.
3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.14 AIR VENTS

A. Bolted-Construction Automatic Air Vents.

1. Body: Bronze.
2. Pressure Rating and Temperature: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

B. Welded-Construction Automatic Air Vents.

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.15 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

1. Standard: ASSE 1018.
2. Pressure Rating: 125 psig minimum.
3. Body: Bronze.
4. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
5. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

B. Drainage-Type, Trap-Seal Primer Device:

1. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 minimum, trap makeup connection.
2. Size: NPS 1-1/4 minimum.
3. Material: Chrome-plated, cast brass.

2.16 FLEXIBLE CONNECTORS

A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
3. Do not install bypass piping around backflow preventers.

B. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.

C. Install water-control valves with inlet and outlet shutoff valves and bypass with globe valve. Install pressure gages on inlet and outlet.

D. Install balancing valves in locations where they can easily be adjusted.

E. Install Y-pattern strainers for water on supply side of each water pressure-reducing valve and pump.

F. Install outlet boxes recessed in wall or surface mounted on wall. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 06 10 00 "Rough Carpentry."

G. Install hose stations with check stops or shutoff valves on inlets and with thermometer on outlet.

1. Install cabinet-type units recessed in or surface mounted on wall as specified. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 06 10 00 "Rough Carpentry."

H. Install water-hammer arresters in water piping according to PDI-WH 201.

I. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.

J. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

K. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 CONNECTIONS

A. Comply with requirements for ground equipment in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

B. Fire-retardant-treated-wood blocking is specified in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.3 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Pressure vacuum breakers.
2. Intermediate atmospheric-vent backflow preventers.
3. Reduced-pressure-principle backflow preventers.
4. Double-check, backflow-prevention assemblies.
5. Dual-check-valve backflow preventers.
6. Reduced-pressure-detector, fire-protection, backflow-preventer assemblies.
7. Double-check, detector-assembly backflow preventers.
8. Water pressure-reducing valves.
9. Calibrated balancing valves.
10. Primary, thermostatic, water mixing valves.

11. Primary water tempering valves.
12. Outlet boxes.
13. Hose stations.
14. Supply-type, trap-seal primer valves.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test each backflow-prevention assembly according to authorities having jurisdiction and the device's reference standard.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 ADJUSTING

A. Set field-adjustable pressure set points of water pressure-reducing valves.

B. Set field-adjustable flow set points of balancing valves.

C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 11 19

SECTION 22 11 23

DOMESTIC WATER PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Horizontally mounted, in-line, close-coupled centrifugal pumps.

1.3 DEFINITIONS

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include materials of construction, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water pumps to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Retain shipping flange protective covers and protective coatings during storage.

B. Protect bearings and couplings against damage.

C. Comply with pump manufacturer's written rigging instructions for handling.

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 HORIZONTALLY MOUNTED, IN-LINE, CLOSE-COUPLED CENTRIFUGAL PUMPS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. Armstrong Pumps Inc.
   2. Bell & Gossett Domestic Pump; ITT Corporation.
   3. TACO Incorporated.

B. Description: Factory-assembled and -tested, in-line, single-stage, close-coupled, overhung-impeller centrifugal pumps designed for installation with pump and motor shaft mounted horizontal.

C. Pump Construction:

   1. Casing: Radially split with threaded companion-flange connections for pumps with NPS 2 pipe connections and flanged connections for pumps with NPS 2-1/2 pipe connections.
   2. Impeller: Statically and dynamically balanced, closed, and keyed to shaft.
   3. Shaft and Shaft Sleeve: Steel shaft with deflector, with copper-alloy shaft sleeve. Include water slinger on shaft between motor and seal.
   4. Seal: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and rubber bellows and gasket.
   5. Bearings: Oil-lubricated; bronze-journal or ball type.
   6. Shaft Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.

D. Motor: Single speed, with grease-lubricated ball bearings; and resiliently or rigidly mounted to pump casing.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 22 05 13 "Common Motor Requirements for Plumbing Equipment."

   1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.3 CONTROLS

A. Timers: Electric, for control of hot-water circulation pump.

   1. Type: Programmable, seven-day clock with manual override on-off switch.
   2. Enclosure: NEMA 250, Type 1, suitable for wall mounting.
   3. Operation of Pump: On or off.

4. Transformer: Provide if required.
5. Programmable Sequence of Operation: Up to two on-off cycles each day for seven days.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of domestic-water-piping system to verify actual locations of connections before pump installation.

3.2 PUMP INSTALLATION

A. Comply with HI 1.4.

B. Install horizontally mounted, in-line, close-coupled centrifugal pumps with shaft(s) horizontal.

C. Install continuous-thread hanger rods and spring hangers with vertical-limit stop of size required to support pump weight.

1. Comply with requirements for vibration isolation devices specified in Section 22 05 48 "Vibration Controls for Plumbing Piping and Equipment." Fabricate brackets or supports as required.
2. Comply with requirements for hangers and supports specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

D. Install timers on equipment room wall in readily accessible area.

3.3 CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to pumps to allow service and maintenance.

C. Connect domestic water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.

1. Install flexible connectors adjacent to pumps in suction and discharge piping of the following pumps:
   a. Horizontally mounted, in-line, close-coupled centrifugal pumps.
   b. Comply with requirements for flexible connectors specified in Section 22 11 16 "Domestic Water Piping."

2. Install shutoff valve and strainer on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for valves specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping" and comply with requirements for strainers specified in Section 22 11 19 "Domestic Water Piping Specialties."
3. Install pressure gage at suction of each pump and pressure gage at discharge of each pump. Install at integral pressure-gage tappings where provided or install pressure-gage connectors in suction and discharge piping around pumps. Comply with requirements for

pressure gages and snubbers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

D. Connect timers to pumps that they control.

3.4 IDENTIFICATION

A. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.5 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping.
4. Set timers, for automatic starting and stopping operation of pumps.
5. Perform the following startup checks for each pump before starting:

    a. Verify bearing lubrication.
    b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    c. Verify that pump is rotating in the correct direction.

6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
7. Start motor.
8. Open discharge valve slowly.
9. Adjust temperature settings on thermostats.
10. Adjust timer settings.

3.6 ADJUSTING

A. Adjust domestic water pumps to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust initial temperature set points.

C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION 22 11 23

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect and/or Engineer no fewer than three days in advance of proposed interruption of sanitary waste service.

2. Do not proceed with interruption of sanitary waste service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Standards: ASTM C 1277 and ASTM C 1540.
2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

C. Hard Copper Tube: ASTM B 88, Type M, water tube, drawn temper.

D. Copper Pressure Fittings:

1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

E. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

2.4 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Solvent Cement: ASTM D 2564.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:

    a. Standard: ASTM C 1173.
    b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    c. Sleeve Materials:

        1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
        2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
        3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

4. Shielded, Nonpressure Transition Couplings:

    a. Standard: ASTM C 1460.
    b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

5. Pressure Transition Couplings:

    a. Standard: AWWA C219.
    b. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
    c. Center-Sleeve Material: Manufacturer's standard.
    d. Gasket Material: Natural or synthetic rubber.
    e. Metal Component Finish: Corrosion-resistant coating or material.

B. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:

    a. Description:

        1) Standard: ASSE 1079.
        2) Pressure Rating: 150 psig.
        3) End Connections: Solder-joint copper alloy and threaded ferrous.

3. Dielectric Flanges:

    a. Description:

        1) Standard: ASSE 1079.
        2) Factory-fabricated, bolted, companion-flange assembly.
        3) Pressure Rating: 150 psig.
        4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

4. Dielectric-Flange Insulating Kits:

    a. Description:

        1) Nonconducting materials for field assembly of companion flanges.
        2) Pressure Rating: 150 psig.
        3) Gasket: Neoprene or phenolic.
        4) Bolt Sleeves: Phenolic or polyethylene.
        5) Washers: Phenolic with steel backing washers.

5. Dielectric Nipples:

    a. Description:

        1) Standard: IAPMO PS 66
        2) Electroplated steel nipple.
        3) Pressure Rating: 300 psig at 225 deg F.
        4) End Connections: Male threaded or grooved.
        5) Lining: Inert and noncorrosive, propylene.

2.6 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Standard: ASTM A 674 or AWWA C105/A 21.5.

B. Material: Linear low-density polyethylene film of 0.008-inch or high-density, cross-laminated polyethylene film of 0.004-inch minimum thickness.

C. Form: Tube.

D. Color: Black.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 31 20 00 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

L. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.

2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.

N. Install steel piping according to applicable plumbing code.

O. Install stainless-steel piping according to ASME A112.3.1 and applicable plumbing code.

P. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

Q. Install aboveground PVC piping according to ASTM D 2665.

R. Install underground PVC piping according to ASTM D 2321.

S. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
2. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

T. Plumbing Specialties:

1. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

U. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

V. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

W. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

X. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

Y. For PVC piping installed in a return air plenum, contractor shall wrap pipe in an approved fire wrap insulation.

3.3 JOINT CONSTRUCTION

A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

C. Join stainless-steel pipe and fittings with gaskets according to ASME A112.3.1.

D. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

E. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.

F. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

G. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Shielded, nonpressure transition couplings.
3. In Aboveground Force Main Piping: Fitting-type transition couplings.
4. In Underground Force Main Piping:

a. NPS 1-1/2 and Smaller: Fitting-type transition couplings.
b. NPS 2 and Larger: Pressure transition couplings.

B. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.
4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.5 VALVE INSTALLATION

A. General valve installation requirements are specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

B. Shutoff Valves:

1. Install shutoff valve on each sewage pump discharge.
2. Install gate or full-port ball valve for piping NPS 2 and smaller.
3. Install gate valve for piping NPS 2-1/2 and larger.

C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves.
2. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.
3. Install backwater valves in accessible locations.
4. Comply with requirements for backwater valve specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.

4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.
6. NPS 8: 10 feet with 3/4-inch rod.

H. Install supports for vertical copper tubing every 10 feet.

I. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 48 inches with 7/8-inch rod.

J. Install supports for vertical PVC piping every 48 inches.

K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Install horizontal backwater valves with cleanout cover flush with floor.
6. Comply with requirements for backwater valves, cleanouts, and drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

7. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.8 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without

introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
4. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.11 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings heavy-duty hubless-piping couplings; and coupled joints.
3. Copper DWV tube, copper drainage fittings, and soldered joints.
4. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
5. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Aboveground, soil and waste piping NPS 6 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings heavy-duty hubless-piping couplings; and coupled joints.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

D. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
   1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
   2. Copper DWV tube, copper drainage fittings, and soldered joints.
   3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
   4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

E. Aboveground, vent piping NPS 6 and larger shall be any of the following:

   1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
   2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
   3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

   1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
   2. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
   3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

G. Underground, soil and waste piping NPS 6 and larger shall be any of the following:

   1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
   2. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.
   3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

H. Aboveground sanitary-sewage force mains NPS 1-1/2 and NPS 2 shall be the following:

   1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.

I. Aboveground sanitary-sewage force mains NPS 2-1/2 to NPS 6 shall be the following:

   1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.

J. Underground sanitary-sewage force mains NPS 4 and smaller shall be any of the following:

   1. Soft copper tube, Type L; wrought-copper pressure fittings; and soldered joints.
   2. Fitting-type transition coupling for piping smaller than NPS 1-1/2 and pressure transition coupling for NPS 1-1/2 and larger if dissimilar pipe materials.

K. Underground sanitary-sewage force mains NPS 6 and larger shall be the following:

   1. Hard copper tube, Type L; wrought-copper pressure fittings; and soldered joints.

L. All exposed sewer/vent piping in shop area shall be cast iron.

END OF SECTION 22 13 16

SECTION 22 13 19

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Backwater valves.
2. Cleanouts.
3. Floor drains.
4. Trench drains.
5. Air-admittance valves.
6. Roof flashing assemblies.
7. Through-penetration firestop assemblies.
8. Miscellaneous sanitary drainage piping specialties.
9. Flashing materials.
10. Oil interceptors.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FRP: Fiberglass-reinforced plastic.

C. HDPE: High-density polyethylene plastic.

D. PE: Polyethylene plastic.

E. PP: Polypropylene plastic.

F. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
1. Grease interceptors.
2. Grease removal devices.
3. Oil interceptors.

B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.

1. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 "Cast-in-Place Concrete.

B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 BACKWATER VALVES

A. Horizontal, Cast-Iron Backwater Valves:

1. Standard: ASME A112.14.1.
2. Size: Same as connected piping.
3. Body: Cast iron.
4. Cover: Cast iron with bolted or threaded access check valve.
5. End Connections: Hub and spigot or hubless.
6. Type Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang open for airflow unless subject to backflow condition.
7. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

B. Drain-Outlet Backwater Valves:

1. Size: Same as floor drain outlet.
2. Body: Cast iron or bronze made for vertical installation in bottom outlet of floor drain.
3. Check Valve: Removable ball float.
4. Inlet: Threaded.
5. Outlet: Threaded or spigot.

C. Horizontal, Plastic Backwater Valves:

1. Size: Same as connected piping.
2. Body: PVC.
3. Cover: Same material as body with threaded access to check valve.
4. Check Valve: Removable swing check.
5. End Connections: Socket type.

2.2 CLEANOUTS

A. Exposed Metal Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Josam Company; Josam Div.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.; .
   d. Tyler Pipe; Wade Div.
   e. Watts Drainage Products Inc.
   f. Zurn Plumbing Products Group.

2. Standard: ASME A112.36.2M for cast ironfor cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee, Stainless-steel tee with side cleanout as required to match connected piping.
5. Closure: Countersunk cast-iron plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Josam Company; Josam Div.
   b. Smith, Jay R. Mfg. Co..
   c. Tyler Pipe; Wade Div.
   d. Watts Drainage Products Inc.
   e. Zurn Plumbing.

2. Standard: ASME A112.36.2M for heavy-duty, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Heavy-duty, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Not required.
7. Outlet Connection: Threaded.
8. Closure: Cast-iron plug.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Painted cast iron.

11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
14. Standard: ASME A112.3.1.
15. Size: Same as connected branch.
16. Housing: Stainless steel.
17. Closure: Stainless steel with seal.
18. Riser: Stainless-steel drainage pipe fitting to cleanout.

C. Cast-Iron Wall Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Josam Company; Josam Div.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfg. Co.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc.
    f. Zurn Plumbing.

2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk cast-iron plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, stainless-steel cover plate with screw.
8. Wall Access: Round stainless-steel wall-installation frame and cover.

2.3 FLOOR DRAINS

A. Cast-Iron Floor Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Josam Company; Josam Div.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfg. Co.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc.
    f. Zurn Plumbing.

2. Refer to plumbing fixture schedule.

B. Stainless-Steel Floor Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Josam Company.
    b. Smith, Jay R. Mfg. Co.
    c. Tyler Pipe; Wade Div.
    d. Watts Drainage Products Inc.
    e. Zurn Plumbing.

2. Refer to plumbing schedule for additional information.

2.4 TRENCH DRAINS

A. Trench Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.
d. Tyler Pipe; Wade Div.
e. Watts Drainage Products Inc.
f. Zurn Plumbing.

2. Refer to plumbing fixture schedule for additional information.

2.5 AIR-ADMITTANCE VALVES

A. Fixture Air-Admittance Valves:

1. Standard: ASSE 1051, Type A for single fixture or Type B for branch piping.
2. Housing: Plastic.
3. Operation: Mechanical sealing diaphragm.
4. Size: Same as connected fixture or branch vent piping.

B. Stack Air-Admittance Valves:

1. Standard: ASSE 1050 for vent stacks.
2. Housing: Plastic.
3. Operation: Mechanical sealing diaphragm.
4. Size: Same as connected stack vent or vent stack.

C. Wall Box:

1. Description: White plastic housing with white plastic grille, made for recessed installation. Include bottom pipe connection and space to contain one air-admittance valve.
2. Size: About 9 inches wide by 8 inches high by 4 inches deep.

2.6 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

B. Description: Manufactured assembly made of 6.0-lb/sq. ft., 0.0938-inch thick, lead flashing collar and skirt extending at least 8 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

1. Open-Top Vent Cap: Without cap.
2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.7 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
2. Size: Same as connected soil, waste, or vent stack.
3. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
4. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
5. Special Coating: Corrosion resistant on interior of fittings.

2.8 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.

    a. NPS 2: 4-inch minimum water seal.
    b. NPS 2-1/2 and Larger: 5-inch minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

D. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

E. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inch above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

F. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

G. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

H. Expansion Joints:

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

2.9 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft, 0.0469-inch thickness.
3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.

B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft..
2. Vent Pipe Flashing: 8 oz./sq. ft..

C. Zinc-Coated Steel Sheet: ASTM A 653, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.

D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.

E. Fasteners: Metal compatible with material and substrate being fastened.

F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

G. Solder: ASTM B 32, lead-free alloy.

H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.10 OIL INTERCEPTORS

A. Oil Interceptors:

1. Type: Factory-fabricated interceptor for separating and removing light oil from wastewater.
2. Refer to plumbing fixture schedule for additional information.

2.11 MOTORS

A. General requirements for motors are specified in Section 22 05 13 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Mounting: Install above grade grease interceptors and solids interceptors on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases specified in Section 03 30 00 "Cast-in-Place Concrete."

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct bases to withstand, without damage to equipment, seismic force required by code.
3. Construct concrete bases 4 inches high and extend base not less than 6 inches in all directions beyond the maximum dimensions of interceptors, unless otherwise indicated.
4. Minimum Compressive Strength: 4000 psi at 28 days.
5. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
6. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete floor.
7. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
8. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

F. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:

    a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

G. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.

H. Install fixture air-admittance valves on fixture drain piping.

I. Install stack air-admittance valves at top of stack vent and vent stack piping.

J. Install air-admittance-valve wall boxes recessed in wall.

K. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

L. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

M. Assemble open drain fittings and install with top of hub 1 inch above floor.

N. Install deep-seal traps on floor drains and other waste outlets, if indicated.

O. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.

P. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

Q. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

R. Install vent caps on each vent pipe passing through roof.

S. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.

T. Install oil interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing. Coordinate oil-interceptor storage tank and gravity drain with Section 23 11 13 "Facility Fuel-Oil Piping."

U. Install wood-blocking reinforcement for wall-mounting-type specialties.

V. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.

D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 07 62 00 "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
   1. Oil interceptors.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled FOG disposal systems and their installation, including piping and electrical connections, and to assist in testing.

B. Tests and Inspections:

   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 13 23

SANITARY WASTE INTERCEPTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Oil interceptors.

1.3 DEFINITIONS

A. FRP: Fiberglass-reinforced plastic.

B. PP: Polypropylene plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of interceptor indicated. Include materials of fabrication, dimensions, rated capacities, retention capacities, operating characteristics, size and location of each pipe connection, furnished specialties, and accessories.

B. Shop Drawings: For each type and size of precast-concrete interceptor indicated.

   1. Include materials of construction, dimensions, rated capacities, retention capacities, location and size of each pipe connection, furnished specialties, and accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Interceptors, drawn to scale, on which the following items are shown and coordinated with each other, based on input from Installers of the items involved:

   1. Interceptors.
   2. Piping connections. Include size, location, and elevation of each.
   3. Interface with underground structures and utility services.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sewer Services: Do not interrupt services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sewer services according to requirements indicated:

1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of service.
2. Do not proceed with interruption of sewer services without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 OIL INTERCEPTORS

A. Oil Interceptors: Precast concrete comply with ASTM C 913.

1. Include rubber-gasketed joints, vent connections, manholes, compartments or baffles, and piping or openings to retain grease and to permit wastewater flow.
2. Structural Design Loads:
   a. Medium-Traffic Load: Comply with ASTM C 890, A-12 (ASSHTO HS15-44).
3. Resilient Pipe Connectors: ASTM C 923, cast or fitted into interceptor walls, for each pipe connection.
4. Steps: ASTM A 615, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of interceptor to finished grade is less than 60 inches.
5. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
6. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch- diameter cover.
   a. Ductile Iron: ASTM A 536, Grade 60-40-18, unless otherwise indicated.
   b. Gray Iron: ASTM A 48, Class 35, unless otherwise indicated.
   c. Include indented top design with lettering cast into cover, using wording equivalent to " OIL INTERCEPTOR."
7. Waste-oil storage tank and piping are specified in Section 23 11 13 "Facility Fuel-Oil Piping."

2.2 PRECAST-CONCRETE MANHOLE RISERS

A. Precast-Concrete Manhole Risers ASTM C 913, with rubber-gasket joints.

1. Structural Design Loads:
   a. Medium-Traffic Load: Comply with ASTM C 890, A-12 (ASSHTO HS15-44).
2. Length: From top of underground concrete structure to grade.
3. Riser Sections: 3-inch minimum thickness and 36-inch diameter.
4. Top Section: Eccentric cone, unless otherwise indicated. Include top of cone to match grade ring size.
5. Gaskets: ASTM C 443, rubber.
6. Steps 615 deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals.

B. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, diameter matching manhole frame and cover, and height as required to adjust the manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover.

1. Ductile Iron: ASTM A 536, Grade 60-40-18, unless otherwise indicated.
2. Gray Iron: ASTM A 48, Class 35, unless otherwise indicated.
3. Include indented top design with lettering cast into cover, using wording equivalent to the following:
   a. Oil Interceptors in Sanitary Sewerage System: OIL INTERCEPTOR."

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.2 INSTALLATION

A. Install precast-concrete interceptors according to ASTM C 891. Set level and plumb.

B. Install manhole risers from top of underground concrete interceptors to manholes and gratings at finished grade.

C. Set tops of manhole frames and covers flush with finished surface in pavements. Set tops 3 inches above finish surface elsewhere, unless otherwise indicated.

D. Set tops of grating frames and grates flush with finished surface.

E. Set interceptors level and plumb.

F. Set tops of interceptor covers flush with finished surface in pavements. Set tops 3 inches above finish surface elsewhere, unless otherwise indicated.

G. Install piping and oil storage tanks according to Section 23 11 13 "Facility Fuel-Oil Piping."

3.3 CONNECTIONS

A. Piping installation requirements are specified in Section 22 13 16 "Sanitary Waste and Vent Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Make piping connections between interceptors and piping systems.

3.4 IDENTIFICATION

A. Identification materials and installation are specified in Section 31 20 00 "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground interceptors.

1. Use warning tapes or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

END OF SECTION 22 13 23

SECTION 22 15 13

GENERAL-SERVICE COMPRESSED-AIR PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes piping and related specialties for general-service compressed-air systems operating at 200 psig or less.

B. Related Sections include the following:

1. Section 22 15 19 "General-Service Packaged Air Compressors and Receivers" for general-service air compressors and accessories.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. CR: Chlorosulfonated polyethylene synthetic rubber.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. HDPE: High-density polyethylene plastic.

E. NBR: Acrylonitrile-butadiene rubber.

F. PE: Polyethylene plastic.

G. PVC: Polyvinyl chloride plastic.

H. High-Pressure Compressed-Air Piping: System of compressed-air piping and specialties operating at pressures between 150 and 200 psig.

I. Low-Pressure Compressed-Air Piping: System of compressed-air piping and specialties operating at pressures of 150 psig or less.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Plastic pipes, fittings, and valves.
2. Dielectric fittings.

3. Flexible pipe connectors.
4. Safety valves.
5. Pressure regulators. Include rated capacities and operating characteristics.
6. Automatic drain valves.
7. Filters. Include rated capacities and operating characteristics.
8. Lubricators. Include rated capacities and operating characteristics.
9. Quick couplings.
10. Hose assemblies.

1.5 INFORMATIONAL SUBMITTALS

A. Brazing and welding certificates.

B. Qualification Data: For Installers.

C. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For general-service compressed-air piping specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications," or to AWS B2.2, "Standard for Brazing Procedure and Performance Qualification."

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. ASME Compliance:

1. Comply with ASME B31.1, "Power Piping," for high-pressure compressed-air piping.
2. Comply with ASME B31.9, "Building Services Piping," for low-pressure compressed-air piping.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Compressed-Air Service: Do not interrupt compressed-air service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary compressed-air service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of compressed-air service.
2. Do not proceed with interruption of compressed-air service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Schedule 40, Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B, black or hot-dip zinc coated with ends threaded according to ASME B1.20.1.

1. Steel Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized seamless steel pipe. Include ends matching joining method.
2. Malleable-Iron Fittings: ASME B16.3, Class 150 or 300, threaded.
3. Malleable-Iron Unions: ASME B16.39, Class 150 or 300, threaded.
4. Steel Flanges: ASME B16.5, Class 150 or 300, carbon steel, threaded.
5. Wrought-Steel Butt-Welding Fittings: ASME B16.9, Schedule 40.
6. Steel Flanges: ASME B16.5, Class 150 or 300, carbon steel.
7. Grooved-End Fittings and Couplings:
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Anvil International, Inc.
      2) Victaulic Company.
      3) Ward Manufacturing, Inc.
   b. Grooved-End Fittings: ASTM A 47, malleable-iron castings or ASTM A 536, ductile-iron casting; with grooves according to AWWA C606 and dimensions matching steel pipe.
   c. Couplings: AWWA C606 or UL 213, for steel-pipe dimensions and rated for 300-psig minimum working pressure. Include ferrous housing sections, gasket suitable for compressed air, and bolts and nuts. Provide EDPM gaskets for oil-free compressed air. Provide NBR gaskets if compressed air contains oil or oil vapor.

B. Copper Tube: ASTM B 88, Type K or L seamless, drawn-temper, water tube.

1. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, wrought copper with dimensions for brazed joints.
2. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300.
3. Copper Unions: ASME B16.22 or MSS SP-123.
4. Grooved-End Fittings and Couplings:
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Anvil International, Inc.
      2) Victaulic Company.
   b. Grooved-End Fittings: ASTM B 75, copper tube or ASTM B 584, bronze castings.
   c. Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for compressed air, and bolts and nuts. Provide EDPM gasket for oil-free compressed air. Provide NBR gasket if compressed air contains oil or oil vapor.

C. Transition Couplings for Metal Piping: Metal coupling or other manufactured fitting same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.2 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for compressed-air piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

E. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.3 VALVES

A. Metal Ball, Butterfly, Check, Gate, and Globe Valves: Comply with requirements in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Description:

a. Standard: ASSE 1079.
b. Pressure Rating: 150 psig.
c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:

a. Standard: ASSE 1079.
b. Factory-fabricated, bolted, companion-flange assembly.
c. Pressure Rating: 150 psig.
d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Description:

a. Nonconducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig.
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

2.5 FLEXIBLE PIPE CONNECTORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Bronze-Hose Flexible Pipe Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: 200 psig 250 psig minimum.
2. End Connections, NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections, NPS 2-1/2 and Larger: Flanged copper alloy.

C. Stainless-Steel-Hose Flexible Pipe Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: 200 psig minimum.
2. End Connections, NPS 2 and Smaller: Threaded steel pipe nipple.
3. End Connections, NPS 2-1/2 and Larger: Flanged steel nipple.

2.6 SPECIALTIES

A. Safety Valves: ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," construction; National Board certified, labeled, and factory sealed; constructed of bronze body with poppet-type safety valve for compressed-air service.

1. Pressure Settings: Higher than discharge pressure and same or lower than receiver pressure rating.

B. Air-Main Pressure Regulators: Bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 250-psig inlet pressure, unless otherwise indicated.

1. Type: Pilot operated.

C. Air-Line Pressure Regulators: Diaphragm Pilot operated, bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 200-psig minimum inlet pressure, unless otherwise indicated.

D. Automatic Drain Valves: Stainless-steel body and internal parts, rated for 200-psig minimum working pressure, capable of automatic discharge of collected condensate. Include mounting bracket if wall mounting is indicated.

E. Coalescing Filters: Coalescing type with activated carbon capable of removing water and oil aerosols; with color-change dye to indicate when carbon is saturated and warning light to indicate when selected maximum pressure drop has been exceeded. Include mounting bracket if wall mounting is indicated.

F. Mechanical Filters: Two-stage, mechanical-separation-type, air-line filters. Equip with deflector plates, resin-impregnated-ribbon-type filters with edge filtration, and drain cock. Include mounting bracket if wall mounting is indicated.

G. Air-Line Lubricators: With drip chamber and sight dome for observing oil drop entering air stream; with oil-feed adjustment screw and quick-release collar for easy bowl removal. Include mounting bracket if wall mounting is indicated.

1. Provide with automatic feed device for supplying oil to lubricator.

2.7 QUICK COUPLINGS

A. General Requirements for Quick Couplings: Assembly with locking-mechanism feature for quick connection and disconnection of compressed-air hose.

B. Automatic-Shutoff Quick Couplings: Straight-through brass body with O-ring or gasket seal and stainless-steel or nickel-plated-steel operating parts.

1. Socket End: With one-way valve and threaded inlet for connection to piping or threaded hose fitting.
2. Plug End: Flow-sensor-bleeder, check-valve type with barbed outlet for attaching hose.

C. Valveless Quick Couplings: Straight-through brass body with stainless-steel or nickel-plated-steel operating parts.

1. Socket End: With O-ring or gasket seal, without valve, and with barbed inlet for attaching hose.
2. Plug End: With barbed outlet for attaching hose.

2.8 HOSE ASSEMBLIES

A. Description: Compatible hose, clamps, couplings, and splicers suitable for compressed-air service, of nominal diameter indicated, and rated for 300-psig minimum working pressure, unless otherwise indicated.

1. Hose: Reinforced double-wire-braid, CR-covered hose for compressed-air service.
2. Hose Clamps: Stainless-steel clamps or bands.
3. Hose Couplings: Two-piece, straight-through, threaded brass or stainless-steel O-ring or gasket-seal swivel coupling with barbed ends for connecting two sections of hose.
4. Hose Splicers: One-piece, straight-through brass or stainless-steel fitting with barbed ends for connecting two sections of hose.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Compressed-Air Piping between Air Compressors and Receivers: Use one of the following piping materials for each size range:

1. NPS 2 and Smaller: Schedule 40, black -steel pipe; threaded, malleable-iron fittings; and threaded joints.

2. NPS 2 and Smaller: Schedule 40, black-steel pipe; wrought-steel fittings; and welded joints.
3. NPS 2 and Smaller: Type K or L, copper tube; wrought-copper fittings; and brazed joints.
4. NPS 2-1/2 to NPS 4: Schedule 40, black-steel pipe; grooved-end fittings; couplings; and grooved joints.
5. NPS 2-1/2 to NPS 4: Schedule 40, black-steel pipe; wrought-steel fittings; and welded joints.
6. NPS 2-1/2 to NPS 4: Type K or L, copper tube; wrought-copper fittings; and brazed joints.
7. NPS 2-1/2 to NPS 4: Type K or L, copper tube; grooved-end copper fittings; couplings; and grooved joints.

B. Low-Pressure Compressed-Air Distribution Piping: Use one of the following piping materials for each size range:

1. NPS 2 and Smaller: Schedule 40, black-steel pipe; threaded, malleable-iron fittings; and threaded joints.
2. NPS 2 and Smaller: Type K or L, copper tube; wrought-copper fittings; and brazed or soldered joints.
3. NPS 2-1/2 to NPS 4: Schedule 40, black-steel pipe; threaded, malleable-iron fittings; and threaded joints.
4. NPS 2-1/2 to NPS 4: Schedule 40, black-steel pipe; grooved-end fittings; couplings; and grooved joints.
5. NPS 2-1/2 to NPS 4: Type K or L, copper tube; wrought-copper fittings; and brazed or soldered joints.
6. NPS 2-1/2 to NPS 4: Type K or L, copper tube; grooved-end copper fittings; couplings; and grooved joints.

C. High-Pressure Compressed-Air Distribution Piping: Use one of the following piping materials for each size range:

1. NPS 2 and Smaller: Schedule 40, black-steel pipe; threaded, malleable-iron fittings; and threaded joints.
2. NPS 2 and Smaller: Schedule 40, black-steel pipe; wrought-steel fittings; and welded joints.
3. NPS 2 and Smaller: Type K or L, copper tube; wrought-copper fittings; and brazed or soldered joints.
4. NPS 2-1/2 to NPS 6: Schedule 40, black-steel pipe; threaded, malleable-iron fittings; and threaded joints.
5. NPS 2-1/2 to NPS 6: Schedule 40, black-steel pipe; grooved-end fittings; couplings; and grooved joints.
6. NPS 2-1/2 to NPS 6: Schedule 40, black-steel pipe; wrought-steel fittings; and welded joints.
7. NPS 2-1/2 to NPS 4: Type K or L, copper tube; wrought-copper fittings; and brazed or soldered joints.
8. NPS 8: Type K or L, copper tube; grooved-end copper fittings; couplings; and grooved joints.

D. Drain Piping: Use one of the following piping materials:

1. NPS 2 and Smaller: Type L copper tube; wrought-copper fittings; and brazed or soldered joints.

3.2 VALVE APPLICATIONS

A. General-Duty Valves: Comply with requirements in Section 22 05 23 "General-Duty Valves for Plumbing Piping" for metal general-duty valves. Use metal valves, unless otherwise indicated.

1. Metal General-Duty Valves: Use valve types specified in "Valve Applications" Article in Section 22 05 23 "General-Duty Valves for Plumbing Piping" according to the following:

a. Low-Pressure Compressed Air: Valve types specified for low-pressure compressed air.
b. High-Pressure Compressed Air: Valve types specified for medium-pressure compressed air.
c. Equipment Isolation NPS 2 and Smaller: Safety-exhaust, copper-alloy ball valve with exhaust vent and pressure rating at least as great as piping system operating pressure.
d. Grooved-end valves may be used with grooved-end piping and grooved joints.

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping concealed from view and protected from physical contact by building occupants, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and to coordinate with other services occupying that space.

E. Install piping adjacent to equipment and machines to allow service and maintenance.

F. Install air and drain piping with 1 percent slope downward in direction of flow.

G. Install nipples, flanges, unions, transition and special fittings, and valves with pressure ratings same as or higher than system pressure rating, unless otherwise indicated.

H. Equipment and Specialty Flanged Connections:

1. Use steel companion flange with gasket for connection to steel pipe.
2. Use cast-copper-alloy companion flange with gasket and brazed or soldered joint for connection to copper tube. Do not use soldered joints for connection to air compressors or to equipment or machines producing shock or vibration.

I. Flanged joints may be used instead of specified joint for any piping or tubing system.

J. Install eccentric reducers where compressed-air piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.

K. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.

L. Install thermometer and pressure gage on discharge piping from each air compressor and on each receiver.

M. Install piping to permit valve servicing.

N. Install piping free of sags and bends.

O. Install fittings for changes in direction and branch connections.

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints for Steel Piping: Join according to AWS D10.12/D10.12M.

E. Brazed Joints for Copper Tubing: Join according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Join according to ASTM B 828 or CDA's "Copper Tube Handbook."

G. Flanged Joints: Use asbestos-free, nonmetallic gasket suitable for compressed air. Join flanges with gasket and bolts according to ASME B31.9 for bolting procedure.

H. Grooved Joints: Assemble couplings with housing, gasket, lubricant, and bolts. Join according to AWWA C606 for grooved joints. Do not apply lubricant to prelubricated gaskets.

I. Dissimilar Metal Piping Material Joints: Use dielectric fittings.

3.5 VALVE INSTALLATION

A. General-Duty Valves: Comply with requirements in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

B. Install shutoff valves and unions or flanged joints at compressed-air piping to air compressors.

C. Install shutoff valve at inlet to each automatic drain valve, filter, lubricator, and pressure regulator.

D. Install check valves to maintain correct direction of compressed-air flow to and from compressed-air piping specialties and equipment.

3.6 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. NPS 2 and Smaller: Use dielectric unions.

C. NPS 2-1/2 to NPS 4: Use dielectric flanges.

D. NPS 5 and Larger: Use dielectric flange kits.

3.7 FLEXIBLE PIPE CONNECTOR INSTALLATION

A. Install flexible pipe connectors in discharge piping and in inlet air piping from remote air-inlet filter of each air compressor.

B. Install bronze-hose flexible pipe connectors in copper compressed-air tubing.

C. Install stainless-steel-hose flexible pipe connectors in steel compressed-air piping.

3.8 SPECIALTY INSTALLATION

A. Install safety valves on receivers in quantity and size to relieve at least the capacity of connected air compressors.

B. Install air-main pressure regulators in compressed-air piping at or near air compressors.

C. Install air-line pressure regulators in branch piping to equipment and tools.

D. Install automatic drain valves on aftercoolers, receivers, and dryers. Discharge condensate onto nearest floor drain.

E. Install coalescing filters in compressed-air piping at or near air compressors and upstream from mechanical filters.

F. Install mechanical filters in compressed-air piping at or near air compressors and downstream from coalescing filters.

G. Install air-line lubricators in branch piping to machine tools. Mount on wall at locations indicated.

H. Install quick couplings at piping terminals for hose connections.

I. Install hose assemblies at hose connections.

3.9 CONNECTIONS

A. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment and machine.

B. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment and machine.

3.10 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.

B. Comply with requirements in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support devices.

C. Vertical Piping: MSS Type 8 or 42, clamps.

D. Individual, Straight, Horizontal Piping Runs:

1. 100 Feet or Less: MSS Type 1, adjustable, steel clevis hangers.
2. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

E. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

F. Base of Vertical Piping: MSS Type 52, spring hangers.

G. Support horizontal piping within 12 inches of each fitting and coupling.

H. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

I. Install hangers for Schedule 40, steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1/4 to NPS 1/2: 96 inches with 3/8-inch rod.
2. NPS 3/4 to NPS 1-1/4: 84 inches with 3/8-inch rod.
3. NPS 1-1/2: 12 feet with 3/8-inch rod.
4. NPS 2: 13 feet with 3/8-inch rod.
5. NPS 2-1/2: 14 feet with 1/2-inch rod.
6. NPS 3: 15 feet with 1/2-inch rod.
7. NPS 4: 17 feet with 5/8-inch rod.
8. NPS 5: 19 feet with 5/8-inch rod.

J. Install supports for vertical, Schedule 40, steel piping every 15 feet.

K. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1/4: 60 inches with 3/8-inch rod.
2. NPS 3/8 and NPS 1/2: 72 inches with 3/8-inch rod.
3. NPS 3/4: 84 inches with 3/8-inch rod.
4. NPS 1: 96 inches with 3/8-inch rod.
5. NPS 1-1/4: 108 inches with 3/8-inch rod.
6. NPS 1-1/2: 10 feet with 3/8-inch rod.
7. NPS 2: 11 feet with 3/8-inch rod.
8. NPS 2-1/2: 13 feet with 1/2-inch rod.
9. NPS 3: 14 feet with 1/2-inch rod.
10. NPS 4: 16 feet with 1/2-inch rod.
11. NPS 5: 18 feet with 1/2-inch rod.
12. NPS 6: 20 feet with 5/8-inch rod.
13. NPS 8: 23 feet with 3/4-inch rod.

L. Install supports for vertical copper tubing every 10 feet.

3.11 LABELING AND IDENTIFICATION

A. Install identifying labels and devices for general-service compressed-air piping, valves, and specialties. Comply with requirements in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.12 FIELD QUALITY CONTROL

A. Perform field tests and inspections.

B. Tests and Inspections:

1. Piping Leak Tests for Metal Compressed-Air Piping: Test new and modified parts of existing piping. Cap and fill general-service compressed-air piping with oil-free dry air or gaseous nitrogen to pressure of 50 psig above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
2. Repair leaks and retest until no leaks exist.
3. Inspect filters and pressure regulators for proper operation.

C. Prepare test reports.

END OF SECTION 22 15 13

SECTION 22 33 00

ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Commercial, light-duty, storage, electric, domestic-water heaters.
2. Flow-control, electric, tankless, domestic-water heaters.
3. Domestic-water heater accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of commercial and tankless, electric, domestic-water heater, from manufacturer.

B. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

C. Source quality-control reports.

D. Field quality-control reports.

E. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.7 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1) Storage Tank: Three years.
2) Controls and Other Components: Three years.

b. Electric, Tankless, Domestic-Water Heaters Two year(s).
c. Compression Tanks: Five <Insert number> years.

PART 2 - PRODUCTS

2.1 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS

A. Commercial, Electric, Storage, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Lochinvar Corporation.
b. Precision Boilers, Inc.
c. Rheem Manufacturing Company.

d. Smith, A. O. Water Products.
e. State Industries.

2. Standard: UL 1453.
3. Storage-Tank Construction: [ASME-code, steel horizontal or vertical arrangement, as indicated.

a. Tappings: Factory fabricated of materials compatible with tank and piping connections. Attach tappings to tank before testing.

1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.

b. Pressure Rating: 150 psig.
c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.

4. Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
c. Insulation: Comply with ASHRAE/IESNA 90.1.
d. Jacket: Steel with enameled finish.
e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
f. Temperature Control: Adjustable thermostat.
g. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
h. Relief Valves: ASME rated and stamped for combination temperature-and-pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

5. Special Requirements: NSF 5 construction.

B. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Lochinvar Corporation.
b. Rheem Manufacturing Company.
c. Smith, A. O. Water Products Co.
d. State Industries.

2. Standard: UL 174.
3. Storage-Tank Construction: Steel, vertical arrangement.

a. Tappings: ASME B1.20.1 pipe thread.
b. Pressure Rating: 150 psig.
c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.

4. Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
c. Drain Valve: ASSE 1005.
d. Insulation: Comply with ASHRAE/IESNA 90.1.
e. Jacket: Steel with enameled finish.
f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
h. Temperature Control: Adjustable thermostat.
i. Safety Control: High-temperature-limit cutoff device or system.
j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

5. Special Requirements: NSF 5 construction with legs for off-floor installation.

2.2 ELECTRIC, TANKLESS, DOMESTIC-WATER HEATERS

A. Flow-Control, Electric, Tankless, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Bosch Water Heating.
b. Chronomite Laboratories, Inc.
c. Eemax, Inc.

2. Standard: UL 499 for electric, tankless, (domestic-water heater) heating appliance.
3. Construction: Copper piping or tubing complying with NSF 61 barrier materials for potable water, without storage capacity.

a. Connections: ASME B1.20.1 pipe thread.
b. Pressure Rating: 150 psig.
c. Heating Element: Resistance heating system.
d. Temperature Control: Flow-control fitting.
e. Safety Control: High-temperature-limit cutoff device or system.
f. Jacket: Aluminum or steel with enameled finish or plastic.

4. Support: Bracket for wall mounting.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Flexcon Industries.
b. Smith, A. O. Water Products Co.
c. State Industries.
d. Taco, Inc.

2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:

    a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
    b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    c. Air-Charging Valve: Factory installed.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1.

D. Heat-Trap Fittings: ASHRAE 90.2.

E. Manifold Kits: Domestic-water heater manufacturer's factory-fabricated inlet and outlet piping for field installation, for multiple domestic-water heater installation. Include ball-, butterfly-, or gate-type shutoff valves to isolate each domestic-water heater and memory-stop balancing valves to provide balanced flow through each domestic-water heater.

1. Comply with requirements for ball-, butterfly-, or gate-type shutoff valves specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."
2. Comply with requirements for balancing valves specified in Section 22 11 19 "Domestic Water Piping Specialties."

F. Pressure-Reducing Valves: ASSE 1003 for water. Set at 25-psig- (172.5-kPa-) maximum outlet pressure unless otherwise indicated.

G. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

H. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

I. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

J. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

K. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include dimension that will support bottom of domestic-water heater a minimum of 18 inches (457 mm) above the floor.

L. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 01 40 00 "Quality Requirements" for retesting and reinspecting requirements and Section 01 73 00 "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 03 30 00 "Cast-in-Place Concrete."

1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Install anchor bolts to elevations required for proper attachment to supported equipment.
8. Anchor domestic-water heaters to substrate.

B. Electric, Tankless, Domestic-Water Heater Mounting: Install electric, tankless, domestic-water heaters at least 18 inches above floor on wall bracket.

1. Maintain manufacturer's recommended clearances.
2. Arrange units so controls and devices that require servicing are accessible.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Anchor domestic-water heaters to substrate.

C. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

D. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

E. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

F. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 22 11 19 "Domestic Water Piping Specialties."

G. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

H. Install thermometers on inlet and outlet piping of residential, solar, electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

I. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping," and comply with requirements for thermometers specified in Section 22 05 19 "Meters and Gages for Plumbing Piping."

J. Install pressure-reducing valve with integral bypass relief valve in electric, domestic-water booster-heater inlet piping and water hammer arrester in booster-heater outlet piping. Set pressure-reducing valve for outlet pressure of 25 psig. Comply with requirements for pressure-reducing valves and water hammer arresters specified in Section 22 11 19 "Domestic Water Piping Specialties."

K. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

L. Fill electric, domestic-water heaters with water.

M. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 01 40 00 "Quality Requirements" for retesting and reinspecting requirements and Section 01 73 00 "Execution" for requirements for correcting the Work.

C. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain, electric, domestic-water heaters.

END OF SECTION 22 33 00

SECTION 22 42 13.13

COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Water closets.
2. Flushometer valves.
3. Toilet seats.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

PART 2 - PRODUCTS

2.1 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS

A. Water Closets: Floor mounted, bottom outlet, top spud.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard America.
    b. Crane Plumbing
    c. Kohler Co.
    d. TOTO USA, INC.
    e. Zurn Industries, Incl

2. Bowl:

    a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    b. Material: Vitreous china.
    c. Type: Siphon jet.
    d. Style: Flushometer valve.
    e. Rim Contour: Elongated.
    f. Spud Size and Location: NPS 1-1/2; top.
    g. Color: White, UNO.

3. Bowl-to-Drain Connecting Fitting: ASTM A 1045.

4. Refer to Plumbing Schedule for Specification Standards.

2.2 WALL-MOUNTED WATER CLOSETS

A. Water Closets: Wall mounted, top spud.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard America.
    b. Crane Plumbing, L.L.C.
    c. Kohler Co.
    d. TOTO USA, INC.
    e. Zurn Industires, Inc.

2. Bowl:

    a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    b. Material: Vitreous china.
    c. Type: Siphon jet.
    d. Style: Flushometer valve.
    e. Height: Standard.
    f. Rim Contour: Elongated.
    g. Spud Size and Location: NPS 1-1/2; top.

3. Support:

    a. Standard: ASME A112.6.1M.
    b. Description: Waste-fitting assembly as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space where required.

4. Refer to Plumbing Schedule for Specification Standards.

2.3 FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Sloan Valve Company.
b. Zurn Industries, LLC.
c. Kohler Co.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Panel Finish: Chrome plated or stainless steel.
8. Minimum Inlet: NPS 1.
9. Minimum Outlet: NPS 1-1/4.

2.4 TOILET SEATS

A. Toilet Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Bemis Manufacturing Company.
c. Church Seats.
d. Kohler Co.
e. Olsonite Seat Co.

2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: To match bowl.
6. Hinge: Self-sustaining.
7. Hinge Material: Noncorroding metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.

B. Examine walls and floors for suitable conditions where water closets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install floor-mounted, back-outlet water closets attached to building floor substrate, onto waste-fitting seals; and attach to support.
4. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
4. Install actuators in locations that are easy for people with disabilities to reach.
5. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

F. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

3.5 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed water closets and fittings.

C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.13

SECTION 224213.16

COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urinals.
2. Flushometer valves.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

PART 2 - PRODUCTS

2.1 WALL-HUNG URINALS

A. Urinals: Wall hung, back outlet, siphon jet, accessible.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Standard America.
   b. Crane.
   c. Kohler Co.
   d. Zurn Industries, Inc.

2. Fixture:

   a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
   b. Material: Vitreous china.
   c. Type: Siphon jet with extended shields.
   d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
   e. Refer to plumbing fixture schedule for additional information.

3. Flushometer Valve: Refer to plumbing fixture schedule for additional information.
4. Waste Fitting:

   a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
   b. Size: NPS 2.

5. Support: ASME A112.6.1M, Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.

2.2 URINAL FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Sloan Valve Company.
   b. Zurn Industries.
   c. Kohler Co.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Panel Finish: Chrome plated or stainless steel.
8. Refer to Plumbing fixture schedule for additional information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.

B. Examine walls and floors for suitable conditions where urinals will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
4. Install trap-seal liquid in waterless urinals.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use carriers without waste fitting for urinals with tubular waste piping.
4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed urinals and fittings.

C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 224213.16

SECTION 22 42 16.13

COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:

a. Servicing and adjustments of automatic faucets.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, COUNTER-MOUNTED LAVATORIES

A. Lavatory Oval, self-rimming, vitreous china, counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Crane Plumbing, L.L.C.
c. Kohler Co.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: Self-rimming for above-counter mounting.
c. Faucet-Hole Location: Top.
d. Mounting Material: Sealant.
e. Refer to plumbing fixture schedule for additional information.

2.2 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory: Vitreous china, wall mounted, with back.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Crane Plumbing, L.L.C.
c. Kohler Co.
d. Zurn Ind. Inc.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For wall hanging.
c. Mounting Material: Chair carrier.
d. Refer to Plumbing fixture schedule for additional information.

3. Support: ASME A112.6.1M, Type II concealed-arm lavatory carrier.

2.3 SOLID-BRASS, AUTOMATICALLY OPERATED LAVATORY FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Lavatory Faucets: Automatic-type, battery-powered, or hard-wired, electronic-sensor-operated, solid-brass valve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following

   a. American Standard America.
   b. Bradley Corporation.
   c. Chicago Faucets.
   d. Sloan Valve Company.
   e. T & S Brass and Bronze Works, Inc.
   f. Kohler Co.

2. Standards: ASME A112.18.1/CSA B125.1 and UL 1951.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
5. Refer to plumbing schedule for specifications standards.

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Wheel handle.

F. Risers:

1. NPS 1/2.
2. ASME A112.18.6, braided- or corrugated-stainless-steel, flexible hose riser.

2.5 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2 by NPS 1-1/4.
2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch- thick brass tube to wall; and chrome-plated, brass or steel wall flange.

3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch- thick stainless-steel tube to wall; and stainless-steel wall flange.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

B. Examine counters and walls for suitable conditions where lavatories will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install lavatories level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 22 07 19 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.13

SECTION 22 42 16.16

COMMERCIAL SINKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service basins.
2. Service sinks.
3. Utility sinks.
4. Handwash sinks.
5. Sink faucets.
6. Supply fittings.
7. Waste fittings.

B. Related Requirements:

1. Section 22 41 00 "Residential Plumbing Fixtures" for residential sinks.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sinks to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SERVICE BASINS

A. Service Basins: Terrazzo, floor mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Acorn Engineering Company.
b. Crane Plumbing, L.L.C.
c. Florestone Products Co., Inc.
d. Stern-Williams Co., Inc.

2. Fixture:

a. Standard: IAPMO PS 99.
b. Shape: Five sided.
c. Nominal Size: 24 by 24 inches.
d. Height: 12 inches with dropped front.
e. Tiling Flange: On two sides.
f. Rim Guard: On all top surfaces.
g. Drain: Grid with NPS 3 outlet.

3. Mounting: On floor and flush to wall.
4. Refer to plumbing schedule for specification standards.

2.2 SERVICE SINKS

A. Service Sinks: Enameled, cast iron, trap standard mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Kohler Co.
c. Zurn Industries, LLC.

2. Fixture:

a. Standard: ASME A112.19.1/CSA B45.2.

b. Type: Service sink with back.
c. Back: Two faucet holes.
d. Color: White.
e. Mounting: NPS 3 P-trap standard with grid strainer inlet, cleanout, and floor flange.
f. Rim Guard: On front and sides.
g. Refer to plumbing schedule for specification standards.

2.3 UTILITY SINKS

A. Utility Sinks: Stainless steel, counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Elkay Manufacturing Co.
b. Kohler Co.
c. Just Manufacturing.

2. Fixture:

a. Standard: ASME A112.19.3/CSA B45.4.
b. Type: Ledge back.

3. Supply Fittings:

a. Standard: ASME A112.18.1/CSA B125.1.
b. Supplies: Chrome-plated brass compression stop with inlet connection matching water-supply piping type and size.

1) Operation: Wheel handle.
2) Risers: NPS 1/2, ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

4. Waste Fittings:

a. Standard: ASME A112.18.2/CSA B125.2.
b. Trap(s):

1) Size: NPS 2.
2) Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
3) Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

5. Mounting: On counter with sealant.

6. Refer to Plumbing Schedule for Specifications Standards.

2.4 HANDWASH SINKS

A. Handwash Sinks: Stainless steel, wall mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Elkay Manufacturing Co.
b. Kohler Co.
c. Just Manufacturing.

2. Fixture:

a. Standards: ASME A112.19.3/CSA B45.4 and NSF/ANSI 2.
b. Type: Basin with radius corners, back for faucet, and support brackets.

3. Supply Fittings: Comply with requirements in "Supply Fittings" Article.
4. Waste Fittings: Comply with requirements in "Waste Fittings" Article.
5. Support: ASME A112.6.1M, Type II, sink carrier.
6. Refer to Plumbing Schedule for Specification Standards.

2.5 SINK FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.

B. Sink Faucets: Manual type, two-lever-handle mixing valve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Bradley Corporation.
c. Chicago Faucets.
d. Elkay Manufacturing Co.
e. T & S Brass and Bronze Works, Inc.
f. Kohler Co.

2. Standard: ASME A112.18.1/CSA B125.1.
3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
4. Body Material: Commercial, solid brass.
5. Finish: Chrome plated.
6. Refer to Plumbing Schedule for Specification Standards.

2.6 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.

D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Wheel handle.

F. Risers:

1. NPS 1/2
2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

2.7 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2.
2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

2.8 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.

B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sinks level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-hung sinks.

C. Install accessible wall-mounted sinks at handicapped/elderly mounting height according to ICC/ANSI A117.1.

D. Set floor-mounted sinks in leveling bed of cement grout.

E. Install water-supply piping with stop on each supply to each sink faucet.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."
2. Install stops in locations where they can be easily reached for operation.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

H. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 22 07 19 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.

B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed sinks and fittings.

D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.16

SECTION 22 42 23

COMMERCIAL SHOWERS, RECEPTORS, AND BASINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Shower faucets.
2. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for showers and basins.
2. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. LEED Submittals:

1. Product Data for Prerequisite WE 1Credit WE 2, and Credit WE 3: Documentation indicating flow and water consumption requirements.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For shower faucets to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SHOWER FAUCETS

A. NSF Standard: Comply with NSF 61, "Drinking Water System Components - Health Effects," for shower materials that will be in contact with potable water.

B. Shower Faucets:

1. Manufacturers: Subject to compliance with requirements provide products by one of the following

a. American Standard America.
b. Chicago Faucets.
c. Kohler Co.
d. Moen Incorporated.
e. Powers; a division of Watts Water Technologies, Inc.

2. Description: Single-handle, mixing valve with hot- and cold-water indicators; check stops; and shower head. Refer to plumbing fixture schedule.

2.2 GROUT

A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before shower installation.

B. Examine walls and floors for suitable conditions where showers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Assemble shower components according to manufacturers' written instructions.

B. Install showers level and plumb according to roughing-in drawings.

C. Install water-supply piping with stop on each supply to each shower faucet.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with shower. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."
2. Install stops in locations where they can be easily reached for operation.

D. Install shower flow-control fittings with specified maximum flow rates in shower arms.

E. Set shower receptors and basins in leveling bed of cement grout.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheons requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between showers and floors and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Comply with traps and soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust showers and controls. Replace damaged and malfunctioning showers, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of showers and basins, inspect and repair damaged finishes.

B. Clean showers and basins, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed fixtures and fittings.

D. Do not allow use of showers and basins for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 23

SECTION 22 47 16

PRESSURE WATER COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes pressure water coolers and related components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filter Cartridges: Equal to 10 percent of quantity installed for each type and size indicated, but no fewer than 2 of each.

PART 2 - PRODUCTS

2.1 PRESSURE WATER COOLERS

A. Pressure Water Coolers: Wall mounted, standard , wheelchair accessible.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Elkay Manufacturing Co.
b. Halsey Taylor.
c. Haws Corporation.

2. Cabinet: Bi-level with two attached cabinets and with a bi-level skirt kit, all stainless steel.
3. Bubbler: One, with adjustable stream regulator, located on each cabinet deck.
4. Control: Push bar.
5. Drain: Grid with NPS 1-1/4 tailpiece.
6. Supply: NPS 3/8 with shutoff valve.
7. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.
8. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.
9. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

    a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.

C. Install mounting frames, affixed to building construction, and attach recessed, pressure water coolers to mounting frames.

D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Install ball, gate, or globe shutoff valve on water supply to each fixture. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust pressure water-cooler temperature settings.

3.5 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 47 16

SECTION 23 11 14

FACILITY AUTOMOTIVE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fuel-oil distribution systems and the following:

1. Pipes, tubes, and fittings.
2. Piping and tubing joining materials.
3. Piping specialties.
4. Valves.
5. Fuel-oil AST accessories.
6. Fuel-oil UST accessories.
7. Fuel-oil storage tank piping specialties.
8. Fuel-oil storage tank pumps.
9. Liquid-level gage system.
10. Concrete bases.

1.3 DEFINITIONS

A. AST: Aboveground storage tank.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

E. FPM: Vinylidene fluoride-hexafluoropropylene copolymer rubber.

F. FRP: Glass-fiber-reinforced plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, and dimensions of individual components and profiles. Also include, where

applicable, rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Piping specialties.
2. Valves: Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Each type and size of storage tank. Indicate dimensions, weights, loads, components, and location and size of each field connection.
4. Storage tank accessories.
5. Storage tank piping specialties.
6. Storage tank pumps.
7. Liquid-level gage system.

B. Shop Drawings: For facility automotive piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

1. Shop Drawing Scale: 1/4 inch per foot.
2. For storage tanks and pumps, include details of supports and anchors.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and details, drawn to scale, on which piping is shown and coordinated with other installations, using input from installers of the items involved.

B. Site Survey: Plans, drawn to scale, on which piping and tanks are shown and coordinated with other services and utilities.

C. Brazing certificates.

D. Welding certificates.

E. Field quality-control reports.

F. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuel-oil equipment and accessories to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with ASME B31.9, "Building Services Piping," for piping materials, installation, testing, and inspecting.

F. Comply with requirements of the EPA and of state and local authorities having jurisdiction. Include recording of fuel-oil storage tanks and monitoring of tanks and piping.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Lift and support storage tanks only at designated lifting or supporting points, as shown on Shop Drawings. Do not move or lift tanks unless empty.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

C. Store pipes and tubes with protective PE coating to avoid damaging the coating and to protect from direct sunlight.

D. Store PE pipes and valves protected from direct sunlight.

1.9 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. See Part 3 piping schedule articles for where pipes, tubes, fittings, and joining materials are applied in various services.

B. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M, for butt and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

    a. Material Group: 1.1.
    b. End Connections: Threaded or butt welding to match pipe.
    c. Lapped Face: Not permitted underground.
    d. Gasket Materials: Asbestos free, ASME B16.20 metallic, or ASME B16.21 nonmetallic, gaskets compatible with fuel oil.
    e. Bolts and Nuts: ASME B18.2.1, cadmium-plated steel.

5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

    a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

C. Drawn-Temper Copper Tube: Comply with ASTM B 88, Type L.

1. Copper Fittings: ASME B16.22, wrought copper, streamlined pattern.
2. Bronze Flanges and Flanged Fittings: ASME B16.24, Class 150.

    a. Gasket Material: Asbestos free, ASME B16.20, metallic, or ASME B16.21 nonmetallic, gaskets compatible with fuel oil.
    b. Bolts and Nuts: ASME B18.2.1, cadmium-plated steel.

D. Annealed-Temper Copper Tube: Comply with ASTM B 88, Type K.

1. Copper Fittings: ASME B16.22, wrought copper, streamlined pattern.
2. Flare Fittings: Comply with ASME B16.26 and SAE J513.

    a. Copper fittings with long nuts.
    b. Metal-to-metal compression seal without gasket.
    c. Dryseal threads complying with ASME B1.20.3.

2.2 PIPING SPECIALTIES

A. Flexible Connectors: Comply with UL 567.

1. Metallic Connectors:

    a. Listed and labeled for aboveground and underground applications by an NRTL acceptable to authorities having jurisdiction.
    b. Stainless-steel bellows with woven, flexible, bronze or stainless-steel, wire-reinforcing protective jacket.
    c. Minimum Operating Pressure: 150 psig.
    d. End Connections: Socket, flanged, or threaded end to match connected piping.
    e. Maximum Length: 30 inches
    f. Swivel end, 50-psig maximum operating pressure.
    g. Factory-furnished anode.

2. Nonmetallic Connectors:

    a. Listed and labeled for underground applications by an NRTL acceptable to authorities having jurisdiction.
    b. PFTE bellows with woven, flexible, bronze or stainless-steel, wire-reinforcing protective jacket.
    c. Minimum Operating Pressure: 150 psig.
    d. End Connections: Socket, flanged, or threaded end to match connected piping.
    e. Maximum Length: 30 inches
    f. Swivel end, 50-psig maximum operating pressure.
    g. Factory-furnished anode.

B. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.

2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

C. Basket Strainers:

1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

D. T-Pattern Strainers:

1. Body: Ductile or malleable iron with removable access coupling and end cap for strainer maintenance.
2. End Connections: Grooved ends.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 57 percent free area.
4. CWP Rating: 750 psig.

E. Manual Air Vents:

1. Body: Bronze.
2. Internal Parts: Nonferrous.
3. Operator: Screwdriver or thumbscrew.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/8.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 225 deg F.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for fuel oil.

B. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

D. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.

2.4 MANUAL FUEL-OIL SHUTOFF VALVES

A. See valve schedule in Part 3 for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller for Liquid Service: Comply with UL 842.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in the valve schedule.
5. Service Mark: Initials "WOG" shall be permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with UL 842.

1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in the valve schedule.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.

1. Body: Bronze, complying with ASTM B 584.
2. Ball: Chrome-plated brass.
3. Stem: Bronze; blowout proof.
4. Seats: Reinforced TFE; blowout proof.
5. Packing: Separate packnut with adjustable-stem packing threaded ends.
6. Ends: Threaded, flared, or socket as indicated in the valve schedule.
7. CWP Rating: 600 psig.
8. Service Mark: Initials "WOG" shall be permanently marked on valve body.

E. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Body: Bronze, complying with ASTM B 584.
2. Ball: Chrome-plated bronze.
3. Stem: Bronze; blowout proof.
4. Seats: Reinforced TFE; blowout proof.
5. Packing: Threaded-body packnut design with adjustable-stem packing.
6. Ends: Threaded, flared, or socket as indicated in the valve schedule.
7. CWP Rating: 600 psig.
8. Service Mark: Initials "WOG" shall be permanently marked on valve body.

F. Two-Piece, Regular-Port Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Body: Bronze, complying with ASTM B 584.
2. Ball: Chrome-plated bronze.
3. Stem: Bronze; blowout proof.
4. Seats: Reinforced TFE.
5. Packing: Threaded-body packnut design with adjustable-stem packing.
6. Ends: Threaded, flared, or socket as indicated in the valve schedule.
7. CWP Rating: 600 psig.
8. Service Mark: Initials "WOG" shall be permanently marked on valve body.

2.5 SPECIALTY VALVES

A. Pressure Relief Valves: Comply with UL 842.

1. Listed and labeled for fuel-oil service by an NRTL acceptable to authorities having jurisdiction.
2. Body: Brass, bronze, or cast steel.
3. Springs: Stainless steel, interchangeable.

4. Seat and Seal: Nitrile rubber.
5. Orifice: Stainless steel, interchangeable.
6. Factory-Applied Finish: Baked enamel.
7. Maximum Inlet Pressure: 150 psig.
8. Relief Pressure Setting: 60 psig.

B. Oil Safety Valves: Comply with UL 842.

1. Listed and labeled for fuel-oil service by an NRTL acceptable to authorities having jurisdiction.
2. Body: Brass, bronze, or cast steel.
3. Springs: Stainless steel.
4. Seat and Diaphragm: Nitrile rubber.
5. Orifice: Stainless steel, interchangeable.
6. Factory-Applied Finish: Baked enamel.
7. Manual override port.
8. Maximum Inlet Pressure: 60 psig.
9. Maximum Outlet Pressure: 3 psig.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for automotive piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.3 PREPARATION

A. Close equipment shutoff valves before turning off fuel oil to premises or piping section.

B. Comply with NFPA 30 and NFPA 31 requirements for prevention of accidental ignition.

3.4 OUTDOOR PIPING INSTALLATION

A. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining, to cover, seal, and protect joints.
2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer. Review protective coating damage with Architect prior to repair.
3. Replace pipe having damaged PE coating with new pipe.

B. Assemble and install entry boots for pipe penetrations through sump sidewalls for liquid-tight joints.

C. Install metal pipes and tubes, fittings, valves, and flexible connectors at piping connections to AST.

D. Install fittings for changes in direction in rigid pipe.

E. Install system components with pressure rating equal to or greater than system operating pressure.

3.5 INDOOR PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping free of sags and bends.

F. Install fittings for changes in direction and branch connections.

G. Verify final equipment locations for roughing-in.

H. Comply with requirements for equipment specifications in plumbing and HVAC Sections for roughing-in requirements.

I. Conceal pipe installations in walls, pipe spaces, or utility spaces; above ceilings; below grade or floors; and in floor channels unless indicated to be exposed to view.

J. Prohibited Locations:

1. Do not install piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
2. Do not install piping in solid walls or partitions.

K. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

L. Connect branch piping from top or side of horizontal piping.

M. Install unions in pipes NPS 2 and smaller at final connection to each piece of equipment and elsewhere as indicated. Unions are not required on flanged devices.

N. Do not use piping as grounding electrode.

O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 23 05 17 "Sleeves and Sleeve Seals for HVAC Piping."

P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 23 05 17 "Sleeves and Sleeve Seals for HVAC Piping."

Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 23 05 18 "Escutcheons for HVAC Piping."

3.6 VALVE INSTALLATION

A. Install manual fuel-oil shutoff valves on branch connections to appliance.

B. Install valves in accessible locations.

C. Protect valves from physical damage.

D. Install metal tag attached with metal chain indicating fuel-oil piping systems.

E. Identify valves as specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

F. Install pressure relief valves in distribution piping between the supply and return lines.

G. Install one-piece, bronze ball valve with hose end connection at low points in piping.

H. Install manual air vents at high points in piping.

3.7 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

1. Bevel plain ends of steel pipe.
2. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flanged Joints: Install gasket material, size, type, and thickness for service application. Install gasket concentrically positioned.

G. Flared Joints: Comply with SAE J513. Tighten finger tight, then use wrench according to fitting manufacturer's written recommendations. Do not overtighten.

3.8 FUEL-OIL AST INSTALLATION

A. Install tank bases and supports.

B. Connect piping and vent fittings.

C. Install ground connections.

D. Fill storage tanks with oil.

3.9 HANGER AND SUPPORT INSTALLATION

A. Pipe hanger and support and equipment support materials and installation requirements are specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."

B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1-1/4 and Smaller: Maximum span, 84 inches; minimum rod size, 3/8 inch.
2. NPS 1-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
3. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.

C. Support vertical steel pipe at each floor and at spacing not greater than 15 feet.

D. Install hangers for horizontal, drawn-temper copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 3/4 and Smaller: Maximum span, 60 inches; minimum rod size, 3/8 inch.
2. NPS 1: Maximum span, 72 inches; minimum rod size, 3/8 inch.
3. NPS 1-1/4: Maximum span, 84 inches; minimum rod size, 3/8 inch.
4. NPS 1-1/2 and NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.

3.10 CONNECTIONS

A. Install piping adjacent to equipment to allow service and maintenance.

B. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment having threaded pipe connection.

C. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.

D. Connect piping to equipment with ball valve and union. Install union between valve and equipment.

E. Install flexible piping connectors at final connection to burners or oil-fired appliances that must be moved for maintenance access.

3.11 LABELING AND IDENTIFYING

A. Nameplates, pipe identification, and signs are specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on or near each service regulator, service meter, and earthquake valve.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

3.12 FIELD PAINTING OF ABOVEGROUND PIPING

A. Comply with requirements in Section 09 91 13 "Exterior Painting" for painting interior and exterior fuel-oil piping.

B. Paint exposed, exterior metal piping, valves, and piping specialties, except components with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Exterior alkyd enamel semigloss.
d. Color: Gray.

C. Paint exposed, interior metal piping, valves, and piping specialties, except components with factory-applied paint or protective coating.

1. Latex Over Alkyd Primer System: MPI INT 5.1Q.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Interior latex matching topcoat.
c. Topcoat: Interior latex semigloss.
d. Color: Gray.

2. Alkyd System: MPI INT 5.1E.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Interior alkyd matching topcoat.
c. Topcoat: Interior alkyd semigloss.
d. Color: Gray.

D. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.13 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Use 3000-psig, 28-day, compressive-strength concrete and reinforcement as specified in Section 03 30 00 "Cast-in-Place Concrete."

3.14 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.15 OUTDOOR PIPING SCHEDULE

A. Aboveground piping shall be one of the following:

1. NPS 2 and Smaller: Steel pipe, steel or malleable-iron threaded fittings, and threaded joints.
2. NPS 2-1/2 and Larger: Steel pipe, steel welding fittings, and welded joints.

3.16 INDOOR PIPING SCHEDULE

A. Aboveground piping shall be one of the following:
1. Steel pipe with malleable-iron fittings and threaded joints.
2. Steel pipe with wrought-steel fittings and welded joints.

END OF SECTION 23 11 14

SECTION 230500

MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. Drawings and general previsions apply to this Section.

B. Examine all plans and specifications, visit the site(s) of the proposed project, and become fully informed as to the extent and character of the work required.

1.2 REQUIRED STANDARDS

A. Laws and Regulations of the State of Texas.

B. County of Hidalgo, City of Edinburg, codes and ordinances.

1.3 COORDINATION

A. Coordinate work under this Division to avoid conflicts and to attain satisfactory and complementary systems.

B. Coordinate work under this Division with work under other Divisions to avoid conflicts and to allow for adequate installation, maintenance, and operating space. Obtain the Architect's approval for penetrations of other parts of the Work prior to effecting them.

C. In resolving pipe, duct and conduit coordination, meet all requirements and be guided by these general orders of precedence:

1. Accommodate gravity flow lines with required slopes before other lines.
2. Accommodate lines with specific slope requirements (i.e., steam and refrigerant gas) before other lines.
3. Accommodate work with a required reference elevation before other work.
4. Accommodate mains before branches.
5. Accommodate pipe and duct before conduit.
6. Accommodate large lines before small lines.
7. Accommodate pipe before duct.
8. Accommodate high-pressure and high-velocity duct before low-pressure and low-velocity duct.

D. Coordination of the work must occur between all project contractors and the requirements of access and priority shall be maintained regardless of the equipment installed "first."In resolving pipe, duct, and conduit coordination, meet all requirements and be guided by these general orders of precedence.

1.4 DEFINITIONS

Specific meanings used in Division 23 (variant forms are inferred):

A. Work: This project, or the reference part.

B. Provide:

1. Furnish and install, complete with necessary appurtenances.
2. “Provide” is implied throughout this Division unless language is specific.

C. Required: Required by the contract Documents.

D. Necessary: Necessary in order to obtain a finished system in satisfactory operating condition, and meeting all requirements.

E. Furnish: Procure and deliver, ready for installation, necessary and/or required.

F. Install: Receive, place securely, ready for connection to work specified elsewhere, and bring into satisfactory operating condition, as necessary and/or required.

G. Connect: Connect properly to mechanical work. This includes non-physical “connections” such as indirect waste drains.

H. Architect, Project Architect or Architect/Engineer Team.

1.5 SCOPE OF WORK

A. The work under this Division includes providing complete mechanical systems for the project.

B. All items of labor, material or equipment not required in detail by the specifications or plans, but incidental to, or necessary for the complete installation and proper operation of all phases of work described herein, or reasonably implied in connection therewith, shall be furnished as if called for in detail by the Contract Documents.

1.6 WORKMANSHIP

A. All labor shall be performed in a workmanlike manner by mechanics skilled in their particular trades. All installations shall be complete in both effectiveness and appearance whether finally enclosed or left exposed. The architect reserves the right to direct the removal or replacement of any item which in his opinion shall not present a reasonable neat or workmanlike appearance, providing that same can be properly installed in an orderly way.

1.7 MANUFACTURER’S INSTRUCTIONS

A. Obtain written recommendations and installation and start-up instructions from material vendors and comply, unless otherwise required. Bring discrepancies between these instructions and project requirements to the attention of the Architect, and resolve prior

to construction. Provide signed inspection report by manufacture's representative at system start-up to verify construction and warrantability.

1.8 OWNER'S INSTRUCTIONS

A. Provide training to the Owner in the operation of all systems and equipment. **All such training shall be videotaped, and the Owner shall be provided two copies of this material in a standard VHS or DVD format at Owner's direction.**

1.9 PERMITS AND FEES

A. Permits: Obtain special permits necessary for this portion of the Work.

B. Fees: Pay any fees associated with permits, required inspections, and permanent utility connections to this part of the work.

1.10 LICENSES

A. Work under this Division shall be performed by organizations and individuals holding a current license to perform such type of work by the authority having jurisdiction. "License" in this sense means any process, regardless of its appellation, which is normally mandated by the authority in order to perform such type of work within its jurisdiction.

B. In the event that the licensed organization loses its license or is unable to obtain one, or the licensed individual performing the work becomes unlicensed or deports the organization, notify Architect immediately in writing.

1.11 UTILITY COORDINATION

A. Permanent: In general, provide all ancillary work necessary to obtain utility connections. Pay connection fees. Arrange for connection in a timely manner. Coordinate time and arrangement of other work with the serving utility, and comply with utility standards.

B. Temporary: Refer to Division 1.

1.12 LISTING AND LABELING

Materials required to be listed shall be listed and labeled for the particular service if a listing is available. Obtain and comply with the terms of listings. Listed material include.

A. NSF: Potable water and sanitary waste systems components.

B. UL: Electrical materials.

C. AMCA: Air moving devices and related accessory items.

D. ARI: HVAC equipment.

E. FM or UL: Hazardous fluid and fire protection system components.

F. FIA, FM or AGA: Fuel gas system components.

1.13 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new. Products shall be currently manufactured.

B. All materials and equipment shall be clearly marked, stamped or labeled for identification. Do not obscure nameplates. Where manufactures nameplates do not meet the requirements of the mechanical identification specification provide nameplates in accordance with the specification.

C. All products of similar type shall be provided by a single manufacturer throughout the project.

1.14 SUBMITTALS AND REVIEW

A. Contractor shall furnish to the Architect, within a reasonable time after award of contract, and prior to commencing any work, complete brochures in quadruplicate (plus quantity required by the Contractor) of all materials and equipment which the contractor proposes to furnish on the project. Data shall include descriptive literature, performance data, diagrams, capacity information, etc., to substantiate that proposed equipment will meet all of the requirements of the plans and specifications.

B. All data must be checked and any required changes noted thereon by the contractor, signed and dated prior to furnishing same to the Architect for approval. Contractor's attention is directed that it is mandatory that he thoroughly review data prior to furnishing same to assure that equipment is in accordance with plans and specifications and to assure prompt return of the data.

C. Deviations: Specifically call to the attention of the Architect every proposed deviation from the Contract Document requirements. Failure to identify deviations as such constitutes a representation that all requirements are not met.

D. Review: Review of submittals shall not be construed as releasing the Contractor from responsibility, but rather as a means to facilitate coordination of the work and the proper selection and installation of the products. All work shall be subject to final acceptance by the Architect at the completion of the project.

E. If above information is not provided complete as specified above and within the allocated time, all equipment shall be furnished exactly as specified without any substitutions.

F. Submittals shall be furnished as one complete package and bound in a binder with dividers indicating each specification section. All submitted data shall reference specification sections. Piece-mail submittals or loose submittals shall not be acceptable.

1.15 SUBSTITUTIONS

A. Refer to the Conditions of the Contract.

B. Where one vendor is indicated for a product, it is to establish a level of quality and performance; provide a product equal to that product in all respects from a vendor of equivalent performance.

C. Where multiple vendors are indicated for a product, any of those vendors meeting the requirements may be submitted.

D. Some product specifications in this Division are of the Acceptable Manufacturer type. Vendors listed as Acceptable Manufacturers are acceptable as vendors. However, the product submitted is subject to review as being fully equivalent in detail to the basis of design.

E. Where multiple vendors are listed with product model numbers, each model and vendor is acceptable, provide all requirements are met. Model numbers are indicated to the extent believe necessary to identify a type and are not necessary completely.

F. The architectural/engineering team has designed the facility using requirements of the Basis of Design equipment. Any substitutions from the basis of design, which will require additional A/E design and/or coordination, shall include the cost of necessary redesign by professionals licensed in the respective disciplines and the approval of the professional of record.

G. Additional submittal reviews beyond two (2) for the same product shall incur a cost for necessary review by the licensed professional.

1.16 DRAWINGS AND SPECIFICATIONS

A. These specifications are accompanied by Drawings. The Drawings and Specifications are complementary each to the other, and what is called for by one shall be as binding as if called for by both.

B. The Drawings are generally diagrammatic. Lay out work at the site to conform to existing conditions; architectural, structural, mechanical, and electrical conditions; to avoid all obstructions; and to conform to details of installation as required. Provide an integrated satisfactorily operating installation. All necessary offsets in piping, fittings,

duct, etc., required to avoid interferences between piping, equipment, architectural, and structural elements shall be provided by the Contractor. Provide all necessary routing and offsets to avoid conflict.

C. Verify and arrange that sufficient space is provided for the installation of proposed products and that adequate access will exist for service and maintenance of equipment. For this work, adequate access shall be defined as meaning that service personnel can access and maintain a piece of equipment without having to alter permanent construction. Further, for equipment located above ceilings, access shall be available within 3 feet of ceiling opening or lay-in ceiling.

1.17 COMPLEMENTARY DOCUMENTS

A. Contract documents are complementary; requirements are not necessarily repetitively stated at each possible subject; consider that a requirement applies wherever applicable.

B. In the event of conflicting requirements in different parts of the Documents, the more expensive shall be presumed to apply, unless the Architect clarifies the requirement in a less expensive manner and waives the more expensive requirement in writing. Since codes and standards are incorporated by reference, a particular conflict may appear in that a reference may use language that implies that a particular requirement in the Construction Documents is waived under the reference. This is not the case, unless specifically so clarified by the Architect. Generally, the specific Drawings and Specifications take precedence over waivers in multi-purpose reference documents.

C. Because of licensure and workmanship requirements, persons performing the work are presumed to be familiar with applicable codes, ordinances, laws, regulations and standards. Therefore, details of materials, methods, arrangements and size contained in such publications are not necessarily replicated in the Contract Documents. This in no way deletes the requirement of the Contractor to comply. In the event of an apparent conflict between such publications and the Contract Documents, request clarification from the Architect prior to construction.

1.18 REGULATORY MEETINGS

A. Comply with laws, rules and regulations, permit requirements, and ordinances. It is intended that the work of the Division be estimated and performed under the supervision of licensed master craftsman who are familiar with these requirements, whether illustrated or specifically detailed in the particular Contract Documents of this

project or not. Therefore, regulatory requirements may not be so illustrated or detailed.

1.19 PROTECTION

A. All work, equipment and materials shall be protected at all times to prevent damage or breakage either in transit, storage, installation or testing. All openings shall be closed with caps or plugs during installation. All materials and equipment shall be covered and protected against dirt, water, chemicals or mechanical injury.

1.20 CUTTING AND PATCHING

A. The work shall be carefully laid out in advance and the exact size and locations of openings arranged.

1.21 VIBRATION AND NOISE

A. Objectionable vibration and/or noise will not be tolerated.

1.22 DEMOLITION

A. Coordinate with other divisions before commencing work.

1.23 RECORD DOCUMENTS

A. Drawings: The Contractor shall maintain and update daily a set of “blueline” prints in the Field Office for the sole purpose of recording “installed” conditions. Revise the drawings to reflect as-built conditions, including all addenda, change orders, final shop drawing reviews, and field routing. Underground utilities shall be dimensionally located relative to readily accessible and identifiable permanent reference points, with accurate slope and elevation indicated. Submit prints for review. Revise, certify accuracy, and provide two final sets to the Architect.

B. Owner’s Manual: Prior to final acceptance, provide two bound volumes to the Architect. Index by subject. Include corrected submittals and shop drawings that reflect final review comments; installation, operation and maintenance instructions, parts lists, wiring diagrams, and piping diagrams; warranties.

1.24 INSPECTION, OBSERVATION, AND TESTING

A. Cooperate with Architect’s representative and authorities having jurisdiction. Provide complete access to the work at reasonable times.

B. Cover-up: Prior to covering up work, or conducting observed tests, request observation as appropriate. Provide adequate advance notice defined as a minimum of five working days. In some cases the Architect’s representative may waive observation; otherwise arrange for observed construction and testing prior to cover-up.

Should the minimum required notice not be provided and the contractor covers up work requiring observation, such work shall be uncovered at contractor's expense.

C. Pre-Testing: Self-inspect, pre-test, and remedy work prior to performing observed test.

D. Sectional Work: In circumstances where a requirement for phased construction or other considerations dictate sectional construction and/or testing, notify the Architect when construction begins on the first section of a system, and when the first section will be ready for observed testing, as well as subsequent sections. Test in the largest practical sections.

1.25 WORK PERFORMED UNDER OTHER DIVISIONS

A. Refer to Division 2 for piped utilities beyond 5 feet from the building.

B. Refer to Division 26 for power wiring systems external to equipment and control panels; starters in motor centers; safety switches not integral to equipment or starters provided under Division 23.

C. Refer to Division 14 for kitchen, laboratory, medical and like equipment.

1.26 REFERENCE TO OTHER DIVISIONS

A. Refer to Division 26 for additional material requirements of electrical components provided under Division 23, such as loose starters, wiring and devices integral to equipment.

B. Refer to Division 2 for additional requirements governing excavation and backfill, supplemental to the requirements stated in this Division 23.

C. Comply with all requirements applicable to work required under this Division.

1.27 TESTING SERVICES

A. Additional Testing: In addition to any specified testing, the Architect may cause additional testing to be performed by an independent testing laboratory or any other qualified party. If such testing reveals deficient work by the Contractor, the Contractor shall pay for both the testing and remedial work. If such testing does not reveal deficient work by the Contractor, the Owner shall pay for the testing and the cost of repairing any damage caused by such testing.

B. Specified Testing Services: If independent testing services are specified regarding work under this Division, cooperate fully with the testing agency. Provide access to the work. Provide test holes and taps necessary. Remove work that is not tested on site, deliver to testing agency, and reinstall if undamaged; replace if damaged. Provide utilities, operational capability, and facilities for on-site testing as necessary.

1.27 WORK BY OWNER

A. The owner will award contracts on work which includes:

1. None.

1.28 OWNER FURNISHED PRODUCTS

A. Products furnished to the site and paid for by the Owner.

1. None.

END OF SECTION 230500

SECTION 230510

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Equipment installation requirements common to equipment sections.
9. Painting and finishing.
10. Concrete bases.
11. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. PE: Polyethylene plastic.
   2. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

   1. EPDM: Ethylene-propylene-diene terpolymer rubber.
   2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

   1. Transition fittings.
   2. Dielectric fittings.
   3. Mechanical sleeve seals.
   4. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

   1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified, at no cost to the Owner. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 15 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements for Joining Plastic Piping:
1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
2. PVC to ABS Piping Transition: ASTM D 3138.

I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

1. Available Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Dresser Industries, Inc.; DMD Div.
c. JCM Industries.
d. Smith-Blair, Inc.

2. Underground Piping NPS 1-1/2 (DN 40) and Smaller: Manufactured fitting or coupling.
3. Underground Piping NPS 2 (DN 50) and Larger: AWWA C219, metal sleeve-type coupling.
4. Aboveground Pressure Piping: Pipe fitting.

B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

1. Available Manufacturers:

a. Eslon Thermoplastics.

C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

1. Available Manufacturers:

a. Thompson Plastics, Inc.

D. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

1. Available Manufacturers:

a. NIBCO INC.

E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

1. Available Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Fernco, Inc.
c. Mission Rubber Company.

2.5 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

1. Available Manufacturers:

a. Capitol Manufacturing Co.
b. Central Plastics Company.
c. Eclipse, Inc.
d. Watts Industries, Inc.; Water Products Div.
e. Zurn Industries, Inc.; Wilkins Div.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

1. Available Manufacturers:

a. Capitol Manufacturing Co.
b. Central Plastics Company.

c. Epco Sales, Inc.
d. Watts Industries, Inc.; Water Products Div.

E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Available Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.

2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (minimum working pressure at 225 deg F.

1. Available Manufacturers:

a. Calpico, Inc.
b. Lochinvar Corp.

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1. Available Manufacturers:

a. Perfection Corp.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Co., Inc.
d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Available Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D 1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.

F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw, and chrome-plated finish.

G. One-Piece, Floor-Plate Type: Cast-iron floor plate.

H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.9 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed hinge and set screw.
g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw.
h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Permanent sleeves are not required for holes formed by removable PE sleeves.

O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

T. Verify final equipment locations for roughing-in.

U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Alteration of permanent construction is not acceptable. For equipment above hard ceilings, provide access panels. For all equipment above ceilings, access shall be available within three feet of ceiling opening or lay-in tile. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

A. Painting of mechanical systems, equipment, and components is specified in Division 9 Section "Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.

2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."
8. Provide 6” high bases for air handling units and 4” bases for other equipment.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.8 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 230510

SECTION 230513

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.

B. Comply with NEMA MG 1 (2006) Table 12-12 unless otherwise indicated.

C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 104° F and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium Energy efficiency, as defined in NEMA MG 1 (2006) Table 12-12.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Rotor: Random-wound, squirrel cage.

F. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

G. Temperature Rise: Match insulation rating.

H. Insulation: Class F.

I. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel or cast iron for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 230529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Equipment supports.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 23 Section "Vibration Controls for HVAC Piping and Equipment" for vibration isolation devices.
3. Division 23 Section(s) "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.
4. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

D. Welding certificates.

1.5 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength and vapor barrier.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless-steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    b. NPS 4: 12 inches long and 0.06 inch thick.
    c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use coated carbon-steel pipe hangers and supports, metal trapeze pipe hangers, and metal framing systems and attachments for general service applications.

F. Use padded hangers for piping that is subject to scratching.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
4. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
5. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
7. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
8. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.

9. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
10. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
11. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
12. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
13. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.

12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION

SECTION 230548

VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Isolation mounts.
2. Restrained spring isolators.

1.3 DEFINITIONS

A. IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.

B. Welding certificates.

C. Qualification Data: For professional engineer under delegated designs requirements.

D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated in this specification or a comparable product by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Isolation.
6. Vibration Mountings & Controls, Inc.

B. Mounts (Mason Industries #ND): Double-deflection type, with molded, neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range. Select with minimum deflection of 0.35" for application.

1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.

C. Restrained Spring Isolators (Mason Ind. #SLR): Freestanding, steel, open-spring isolators with limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and wind-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Install Vibration control devices in accordance with schedule herein.

3.3 VIBRATION-CONTROL DEVICE INSTALLATION

A. Comply with requirements in Division 07 Section "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.

B. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.

C. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.

3. Brace a change of direction longer than 12 feet.

D. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

E. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

F. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

G. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Test to 90 percent of rated proof load of device.
3. Measure isolator restraint clearance.
4. Measure isolator deflection.
5. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust air-spring leveling mechanism.

D. Adjust active height of spring isolators.

E. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-mounting systems. Refer to Division 01 Section "Demonstration And Training."

3.7 HVAC VIBRATION-CONTROL DEVICE SCHEDULE

A. Air Handling Units

1. Equipment Location: Floor.
2. Isolator Type: Isolation Mount.
3. Minimum Deflection:0.35."

B. Piping at Mechanical Equipment with rotating components (Fans, etc.)

1. Equipment Location: Floor-mounted within 25 linear feet of connection.
2. Isolation Type: Restrained Spring Isolator.
3. Minimum Deflection: Same as for connected equipment isolators.

C. Rooftop Unit (>5 tons)

1. Equipment Location: Roof-top
2. Isolation Type: Restrained Spring Isolator
3. Minimum Deflection: 2.5”

END OF SECTION 230548

SECTION 230553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Duct labels.
5. Stencils.
6. Valve tags.
7. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

C. Valve numbering scheme.

D. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch Stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Red.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/2 inch for name of units for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 DUCT LABELS

A. General Requirements for Manufactured Duct Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Duct Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.5 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/2 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Fiberboard or metal.
2. Stencil Paint: Exterior, gloss, alkyd enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel in colors according to ASME A13.1 unless otherwise indicated.

2.6 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch, Stainless steel, 0.025-inch, or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.7 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Section 099123 "Interior Painting"

B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

D. Pipe Label Color Schedule:

1. Refrigerant Piping:

a. Background Color: Green.
b. Letter Color: White.

3.4 DUCT LABEL INSTALLATION

A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:
   a. Refrigerant: 1-1/2 inches round.

2. Valve-Tag Color:
   a. Refrigerant: Natural.

3. Letter Color:
   a. .
   b. Refrigerant: Black.

3.6 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Variable-air-volume systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 45 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.

B. TAB Conference: Meet with General Contractor and HVAC Engineer (and, if applicable Commissioning Authority) on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums return or relief air to verify that they meet the leakage class of connected ducts as specified in Section 233113 "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine operating safety interlocks and controls on HVAC equipment.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance are open.
5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," and Section 230719 "HVAC Piping Insulation."

C. Mark equipment and balancing devices, including damper-control positions, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

   a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
   b. Measure static pressure directly at the fan outlet or through the flexible connection.
   c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
   d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

   a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

   a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.

6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data.

C. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
3. Set terminal units at full-airflow condition.
4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Adjust terminal units for minimum airflow.
6. Measure static pressure at the sensor.
7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

3.7 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.8 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.9 TOLERANCES

A. Set HVAC system's air flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

3.10 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:
1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.

10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fanperformance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Fan drive settings including settings and percentage of maximum pitch diameter.
    e. Inlet vane settings for variable-air-volume systems.
    f. Settings for supply-air, static-pressure controller.
    g. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Balancing stations.
5. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches, and bore.
    i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    j. Number, make, and size of belts.
    k. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.

c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Preheat-coil static-pressure differential in inches wg.
g. Cooling-coil static-pressure differential in inches wg.
h. Heating-coil static-pressure differential in inches wg.
i. Outdoor airflow in cfm.
j. Return airflow in cfm.
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft.
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Refrigerant expansion valve and refrigerant types.
i. Refrigerant suction pressure in psig.
j. Refrigerant suction temperature in deg F.

G. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:

1. Unit Data:

    a. System identification.
    b. Location.
    c. Coil identification.
    d. Capacity in Btu/h.
    e. Number of stages.
    f. Connected volts, phase, and hertz.
    g. Rated amperage.
    h. Air flow rate in cfm.
    i. Face area in sq. ft.
    j. Minimum face velocity in fpm.

2. Test Data (Indicated and Actual Values):

    a. Heat output in Btu/h.
    b. Air flow rate in cfm.
    c. Air velocity in fpm.
    d. Entering-air temperature in deg F.
    e. Leaving-air temperature in deg F.
    f. Voltage at each connection.
    g. Amperage for each phase.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

    a. System identification.
    b. Location.
    c. Make and type.
    d. Model number and size.
    e. Manufacturer's serial number.
    f. Arrangement and class.
    g. Sheave make, size in inches, and bore.
    h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches, and bore.
    f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan rpm.

d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft.
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

K. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.

d. Dates of use.
e. Dates of calibration.

3.12 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
c. Verify that balancing devices are marked with final balance position.
d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made Engineers.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Project HVAC Engineer.
3. HVAC engineer randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.13 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

C. T & B contractor shall include 16 hours of time dedicated to verification of final Test and Balance Report. This shall be done on-site, with instruments, and in the presence of the Owner. Owner shall require random system testing. If more than 10% of tests are beyond reported value tolerances. The entire report is subject to re-test in its entirety.

END OF SECTION 230593

SECTION 230713

DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, concealed return and exhaust located in unconditioned space.
3. Indoor, exposed return and exhaust located in unconditioned space.

B. Related Sections:

1. Division 23 Section "HVAC Equipment Insulation."
2. Division 23 Section "HVAC Piping Insulation."
3. Division 23 Section "Metal Ducts" for duct liners.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

C. Qualification Data: For qualified Installer.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of

insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Sheet, K-Flex Gray Duct Liner, and K-FLEX LS.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290 Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.

H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; Commercial Board.
b. Johns Manville; 800 Series Spin-Glas.
c. Knauf Insulation; Insulation Board.
d. Manson Insulation Inc.; AK Board.
e. Owens Corning; Fiberglas 700 Series.

2.2 FIRE-RATED INSULATION SYSTEMS

A. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; FlameChek.
b. Johns Manville; Firetemp Wrap.
c. Nelson Fire Stop Products; Nelson FSB Flameshield Blanket.
d. Thermal Ceramics; FireMaster Duct Wrap.
e. 3M; Fire Barrier Wrap Products.
f. Unifrax Corporation; FyreWrap.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc.; 85-50.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc; CP-30.
b. Eagle Bridges - Marathon Industries; 501.
c. Foster Brand, Specialty Construction Brands, Inc.; 30-35.
d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; Encacel.
b. Eagle Bridges - Marathon Industries; 570.
c. Foster Brand, Specialty Construction Brands, Inc.; 60-95/60-96.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.

3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc.; CP-50 AHV2.
    b. Foster Brand, Specialty Construction Brands, Inc.; 30-36.
    c. Vimasco Corporation; 713 and 714.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.6 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc.; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc.; 95-44.
    d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric: Approximately 6 oz./sq. yd. with a thread count of 5 strands by 5 strands/sq. in. for covering ducts.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; Chil-Glas No. 5.

B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for ducts.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Foster Brand, Specialty Construction Brands, Inc.; Mast-A-Fab.
b. Vimasco Corporation; Elastafab 894.

2.9 FIELD-APPLIED CLOTHS

A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Alpha Associates, Inc.; Alpha-Maritex 84215 and 84217/9485RW, Luben 59.

2.10 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

2.11 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 491 AWF FSK.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
c. Compac Corporation; 110 and 111.
d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.

4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ABI, Ideal Tape Division; 488 AWF.
   b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   c. Compac Corporation; 120.
   d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.12 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. ITW Insulation Systems; Gerrard Strapping and Seals.
   b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

2. Stainless Steel: ASTM A 167 or ASTM A 240, Type 304 or Type 316; 0.015 inch thick, 3/4 inch wide with closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch diameter shank, length to suit depth of insulation indicated.

   a. Products: Subject to compliance with requirements, provide one of the following:

      1) AGM Industries, Inc.; CWP-1.
      2) GEMCO; CD.
      3) Midwest Fasteners, Inc.; CD.

4) Nelson Stud Welding; TPA, TPC, and TPS.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

   a. Products: Subject to compliance with requirements, provide one of the following:

      1) AGM Industries, Inc.; CHP-1.
      2) GEMCO; Cupped Head Weld Pin.
      3) Midwest Fasteners, Inc.; Cupped Head.
      4) Nelson Stud Welding; CHP.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

   a. Products: Subject to compliance with requirements, provide one of the following:

      1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
      2) GEMCO; Perforated Base.
      3) Midwest Fasteners, Inc.; Spindle.

   b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   c. Spindle: Aluminum, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

   a. Products: Subject to compliance with requirements, provide one of the following:

      1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
      2) GEMCO; Peel & Press.
      3) Midwest Fasteners, Inc.; Self Stick.

   b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

c. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
d. Adhesive-backed base with a peel-off protective cover.

5. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; RC-150.
2) GEMCO; R-150.
3) Midwest Fasteners, Inc.; WA-150.
4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch wide, stainless steel or Monel.

D. Wire: 0.062-inch soft-annealed, stainless steel.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. C & F Wire.

2.13 CORNER ANGLES

A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

B. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240, Type 304 or Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Division 07 Section "Penetration Firestopping"firestopping and fire-resistive joint sealers.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory-

or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not overcompress insulation during installation.
e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory-

or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.8 FIRE-RATED INSULATION SYSTEM INSTALLATION

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07 Section "Penetration Firestopping."

3.9 FINISHES

A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

B. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, concealed return and exhaust located in unconditioned space.
3. Indoor, exposed return and exhaust located in unconditioned space.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.12 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

B. Concealed, round and flat-oval, return-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

C. Concealed, round and flat-oval, outdoor-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

D. Concealed, round and flat-oval, exhaust-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

E. Concealed, rectangular, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

F. Concealed, rectangular, return-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

G. Concealed, rectangular, outdoor-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

H. Concealed, rectangular, exhaust-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

I. Concealed, supply-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

J. Concealed, return-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

K. Concealed, outdoor-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

L. Concealed, exhaust-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

M. Exposed, round and flat-oval, exhaust-air duct insulation shall be the following:

1. Pre-insulated double-wall duct.

N. Exposed, rectangular, exhaust-air duct insulation shall be the following:

1. Insulated double-wall duct.

O. Exposed, exhaust-air plenum insulation shall be the following:

1. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.

END OF SECTION 230713

SECTION 230719

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following HVAC piping systems:

1. Condensate drain piping.
2. Refrigerant suction and hot-gas piping.

B. Related Sections:

1. Section 230713 "Duct Insulation."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Aeroflex USA, Inc.; Aerocel.
    b. Armacell LLC; AP Armaflex.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Aeroflex USA, Inc.; Aeroseal.
    b. Armacell LLC; Armaflex 520 Adhesive.
    c. Foster Brand, Specialty Construction Brands, Inc.; 85-75.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Adhesive, and FSK ,and FSP, and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Childers Brand, Specialty Construction Brands, Inc.; CP-82.
   b. Foster Brand, Specialty Construction Brands, Inc.; 85-50.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Dow Corning Corporation; 739, Dow Silicone.
   b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc.; 30-80/30-90.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
2. Service Temperature Range: Minus 50 to plus 220 deg F.
3. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
4. Color: White.

D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 deg F.
3. Solids Content: 60 percent by volume and 66 percent by weight.
4. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-50 AHV2.
b. Foster Brand, Specialty Construction Brands, Inc.; 30-36.
c. Vimasco Corporation; 713 and 714.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc.; CP-76.
b. Foster Brand, Specialty Construction Brands, Inc.; 95-44.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene or polypropylene backing; complying with ASTM C 1136, Type II.
5. PVDC Jacket for Indoor Applications: 4-mil-thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perm when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.
6. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perm when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

7. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
8. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.

2.8 FIELD-APPLIED CLOTHS

A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd.

2.9 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSP Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with polyethylene or polypropylene jacketing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Adhesive: As recommended by jacket material manufacturer.
2. Color: White.
3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

    a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

D. Metal Jacket:

1. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

    a. Sheet and roll stock ready for shop or field sizing.
    b. Finish and thickness are indicated in field-applied jacket schedules.
    c. Moisture Barrier for Indoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.

d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
e. Factory-Fabricated Fitting Covers:

1) Same material, finish, and thickness as jacket.
2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3) Tee covers.
4) Flange and union covers.
5) End caps.
6) Beveled collars.
7) Valve covers.
8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.

a. Sheet and roll stock ready for shop or field sizing.
b. Material, finish, and thickness are indicated in field-applied jacket schedules.
c. Moisture Barrier for Indoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
e. Factory-Fabricated Fitting Covers:

1) Same material, finish, and thickness as jacket.
2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3) Tee covers.
4) Flange and union covers.
5) End caps.
6) Beveled collars.
7) Valve covers.
8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.10 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.
2. Thickness: 11.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Width: 3 inches.
2. Thickness: 6.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Width: 2 inches.
2. Thickness: 6 mils.
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Width: 2 inches.
2. Thickness: 3.7 mils.
3. Adhesion: 100 ounces force/inch in width.
4. Elongation: 5 percent.
5. Tensile Strength: 34 lbf/inch in width.

2.11 SECUREMENTS

A. Bands:

1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with closed seal.
2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with closed seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.

2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK or FSP jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.9 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 3/4 inch thick.

B. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 1 inch thick.

3.11 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 2 inches thick.

3.12 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. FSP-factory.

D. Piping, Exposed:

1. PVC: 20 mils thick.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. PVC: 20 mils thick.

D. Piping, Exposed:

1. Aluminum, Smooth 0.020 inch thick.

END OF SECTION 230719

SECTION 233113

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Single-wall rectangular ducts and fittings.
2. Single-wall round and flat-oval ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work. Scale: 1/4" =1'-0".
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to 1/4" = 1' -0" scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:

    a. Lighting fixtures.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).

C. Transverse Joints: Select joint types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

D. Longitudinal Seams: Select seam types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials

involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008, with oiled, matte finish for exposed ducts.

D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

E. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER – RECTANGULAR DUCTS

A. Mechanically fastened, 1-inch-thick, closed cell foam insulation complying with UL 181 erosion requirements, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.

10. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
11. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
12. Service: Indoor or outdoor.
13. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

D. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

G. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round and flat-oval ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300"Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with the latest edition of SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 1-1/2-Inch wg and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 1- 1/2-Inch wg: Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 1-1/2-Inch wg and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 1-1/2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. FIELD QUALITY CONTROL

B. Perform tests and inspections.

C. Leakage Tests:

1. Comply with the latest edition of SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

a. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 95 percent of total installed duct area for each designated pressure class.
b. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 95 percent of total installed duct area for each designated pressure class.
c. Exhaust Ducts with a Pressure Class of 3-Inch wg or Higher: Test representative duct sections totaling no less than 95 percent of total installed duct area for each designated pressure class.
d. Outdoor Air Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 95 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give five days' advance notice for testing.

3.7 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean flexible elastomeric liner with HEPA vacumming equipment.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Laboratory fume-hood: Stainless steel.

B. Supply Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units (Downstream):

   a. Pressure Class: Positive 1-inch wg.
   b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-C.

2. Ducts Connected to Constant-Volume Air-Handling Units:

   a. Pressure Class: Positive 1-inch wg.
   b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-C.

3. Ducts Connected to Variable-Air-Volume Air-Handling Units.

    a. Pressure Class: Positive 2-inch wg.
    b. Minimum SMACNA Seal Class: Unconditioned – A. Conditioned-B.

4. Ducts Connected to Equipment Not Listed Above:

    a. Pressure Class: Positive 1-inch wg.
    b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-C.

C. Return Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:

    a. Pressure Class: Positive or negative 1-inch wg.
    b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-None.

2. Ducts Connected to Air-Handling Units:

    a. Pressure Class: Positive or negative 1 inch wg.
    b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-None.

3. Ducts Connected to Equipment Not Listed Above:

    a. Pressure Class: Positive or negative 1-inch wg.
    b. Minimum SMACNA Seal Class: Unconditioned – B. Conditioned-None.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

    a. Pressure Class: Negative 1-inch wg.
    b. Minimum SMACNA Seal Class: C.

2. Ducts Connected to Equipment Not Listed Above:

    a. Pressure Class: Positive or negative 2-inch wg.
    b. Minimum SMACNA Seal Class: B.

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

F. Liner:

1. Return Air Boots and Transfer Ducts: Flexible elastomeric, 1” thick.

G. Elbow Configuration:

1. Rectangular Duct: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Velocity 1500 fpm or lower:

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Mitered Type RE 2 with vanes complying with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows." Type RE2 to be used only when types RE1 and RE3 are not physically allowed. Mitered elbows are only to be used on 90° angles and only when type RE1 fittings cannot be used.
3) Square throat, radius heel elbows will not be allowed under any circumstances.

b. Velocity 1500 fpm or Higher:

1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows." Type RE2 to be used only when types RE1 and RE3 are not physically allowed. Mitered elbows are only to be used on 90° angles and only when type RE1 fittings cannot be used.
3) Square throat, radius heel elbows will not be allowed under any circumstances.

2. Round Duct: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
1) Velocity 1500 fpm or lower: 1.0 centerline radius-to-diameter ratio and four segments for 90-degree elbow.
2) Velocity 1500 fpm or Higher: 1.5 centerline radius-to-diameter ratio and five segments for 90-degree elbow.

b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped, gored or pleated.
c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam, gored or Welded.

H. Branch Configuration:

1. Rectangular Duct: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch under 1000 fpm: Spin in.
c. Rectangular Main to Round Branch over 1000 fpm: Conical Spin in or 45-degree entry.

2. Round and Flat Oval: Comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.

    a. Velocity 1500 fpm or Lower: Conical tap.
    b. Velocity 1500 fpm or Higher: 45-degree lateral, 45-degree entry tap or conical tap with 4-inch larger base than tap.

END OF SECTION 233113

SECTION 233300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Counter balanced backdraft dampers.
3. Manual volume dampers.
4. Flange connectors.
5. Duct silencers.
6. Remote damper operators.
7. Duct-mounted access doors.
8. Flexible connectors.
9. Flexible ducts.
10. Duct accessory hardware.

B. Related Requirements:

1. Section 233423 "HVAC Power Ventilators" for roof-mounted ventilator caps.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Control-damper installations.
d. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to 1/4"=1'-0"scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653.

1. Galvanized Coating Designation: G90.
2. Exposed-Surface Finish: Mill phosphatized.

B. Stainless-Steel Sheets: Comply with ASTM A 480 Type 304, and having a No. 2 finish for concealed ducts and No. 4D finish for exposed ducts.

C. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

D. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Ruskin# S3G or comparable product by one of the following:
   1. Cesco Products.
   2. Greenheck Fan Corporation.
   3. Nailor Industries Inc.

B. Description: Gravity balanced.

C. Maximum Air Velocity: 3000 fpm.

D. Maximum System Pressure: 2-inch wg.

E. Frame: Hat-shaped, 20 gauge, galvanized sheet steel, with welded corners or mechanically attached and mounting flange.

F. Blades: Multiple single-piece blades, end pivoted, maximum 4-inch width, 28 guage galvanized steel with sealed edges.

G. Blade Action: Parallel.

H. Blade Seals: Extruded vinyl, mechanically locked.

I. Blade Axles:

   1. Material: Nonmetallic up to 42" wide. O/W, stainless steel.

J. Tie Bars and Brackets: Galvanized steel.

K. Return Spring: Adjustable tension.

L. Bearings: synthetic pivot bushings.

M. Accessories:

   1. Adjustment device to permit setting for varying differential static pressure.
   2. Counterweights and spring-assist kits for vertical airflow installations.

2.4 COUNTERBALANCED BACKDRAFT DAMPERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Ruskin # CBD2 or comparable product by one of the following:
   1. Cesco Products.
   2. Greenheck Fan Corporation.
   3. Nailor Industries Inc.

B. Suitable for horizontal or vertical mounting.

C. Maximum Air Velocity: 1000 fpm.

D. Maximum System Pressure: 2-inch wg.

E. Frame: Hat-shaped, 0.090-inch thick extruded aluminum with welded corners or mechanically attached and mounting flange.

F. Blades:

1. Multiple, 0.025-inch thick, roll-formed aluminum.
2. Maximum Width: 6 inches.
3. Action: Parallel.
4. Balance: Gravity.
5. Eccentrically pivoted.

G. Blade Seals: Vinyl.

H. Tie Bars and Brackets:

1. Material: Aluminum.
2. Rattle free with 90-degree stop.

I. Counterbalance: Zinc plated steel weights.

J. Bearings: Synthetic.

K. Accessories:

1. Flange on intake.
2. Adjustment device for setting varying differential static pressures adjustable to 0.01"wg.

2.5 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Ruskin #MD25 (rectangular) or #MDRS25 (round) or comparable product by one of the following:
   a. Flexmaster U.S.A., Inc.
   b. Nailor Industries Inc.

2. Standard leakage rating, with linkage outside airstream.
3. Suitable for horizontal or vertical applications.
4. Frames:

   a. Frame: Hat-shaped, 20 gauge, galvanized sheet steel.
   b. Mitered corners.
   c. Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:

   a. Multiple or single blade.
   b. Parallel- or opposed-blade design.
   c. Galvanized-steel, 20 gauge.

6. Blade Axles: Galvanized steel.
7. Bearings:

    a. Molded synthetic.
    b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Tie Bars and Brackets: Galvanized steel.

2.6 FLANGE CONNECTORS

A. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

B. Material: Galvanized steel.

C. Gage and Shape: Match connecting ductwork.

2.7 DUCT SILENCERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Price.
2. Vibro-Acoustics.

B. General Requirements:

1. Factory fabricated.
2. Fire-Performance Characteristics: Adhesives, sealants, packing materials, and accessory materials shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E 84.
3. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

C. Shape:

1. Rectangular straight with splitters or baffles.
2. Round straight with center bodies or pods.
3. Rectangular elbow with splitters or baffles.
4. Round elbow with center bodies or pods.
5. Rectangular transitional with splitters or baffles.

D. Rectangular Silencer Outer Casing: ASTM A 653, G90, galvanized sheet steel, thick.

E. Round Silencer Outer Casing: ASTM A 653, G90, galvanized sheet steel 20 gauge.

1. Sheet Metal Thickness for Units up to 24 Inches in Diameter: 0.034 inch thick.
2. Sheet Metal Thickness for Units 26 through 40 Inches in Diameter: 0.040 inch thick.
3. Sheet Metal Thickness for Units 42 through 52 Inches in Diameter: 0.05 inch thick.
4. Sheet Metal Thickness for Units 54 through 60 Inches in Diameter: 0.064 inch thick.

F. Inner Casing and Baffles: ASTM A 653/A 653M, G90 (Z275) galvanized sheet metal, 0.034 inch thick, and with 1/8-inch diameter perforations.

G. Connection Sizes: Match connecting ductwork unless otherwise indicated.

H. Principal Sound-Absorbing Mechanism:

1. Controlled impedance membranes and broadly tuned resonators without absorptive media.
2. Dissipative type with fill material.

    a. Fill Material: Fiberglass
    b. Erosion Barrier: Polymer bag enclosing fill, and heat sealed before assembly.

3. Lining: None.

I. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations. Do not use mechanical fasteners for unit assemblies.

1. Joints: flanged connections.
2. Suspended Units: Factory-installed suspension hooks or lugs attached to frame in quantities and spaced to prevent deflection or distortion.
3. Reinforcement: Cross or trapeze angles for rigid suspension.

J. Source Quality Control: Test according to ASTM E 477.
1. Record acoustic ratings, including dynamic insertion loss and generated-noise power levels with an airflow of at least 2000-fpm (10-m/s) face velocity.
2. Leak Test: Test units for airtightness at 200 percent of associated fan static pressure or 6-inch wg (1500-Pa) static pressure, whichever is greater.

2.8 REMOTE DAMPER OPERATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Roto-twist.
2. Young Regulator Company.

B. Description: Cable system designed for remote manual damper adjustment.

C. Tubing: Copper.

D. Cable: Stainless steel.

E. Wall-Box Mounting: Recessed.

F. Wall-Box Cover-Plate Material: Stainless steel.

2.9 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
1. Cesco Products.

2. Ductmate Industries, Inc.
3. Flexmaster U.S.A., Inc.
4. Greenheck Fan Corporation.
5. Nailor Industries Inc.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."

1. Door:

a. Double wall, rectangular.
b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
c. Vision panel.
d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
e. Fabricate doors airtight and suitable for duct pressure class.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
b. Access Doors up to 18 Inches Square: Continuous and two sash locks.
c. Access Doors up to 24 by 48 Inches: [Three hinges] Continuous and two compression latches with outside and inside handles.
d. Access Doors Larger Than 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.

2.10 FLEXIBLE CONNECTORS

A. Materials: Flame-retardant or noncombustible fabrics.

B. Coatings and Adhesives: Comply with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 22 gauge galvanized sheet steel or 20 gauge aluminum sheets. Provide metal compatible with connected ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd.
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd.
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

2.11 FLEXIBLE DUCTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Flexmaster #8M or comparable product by one of the following:
1. McGill AirFlow LLC.
2. Thermaflex.
3. Flexmaster.

B. The duct shall be constructed of a CPE fabric supported by helical wound galvanized steel. The fabric shall be mechanically locked to the steel helix without the use of adhesives or chemicals.

C. The internal working pressure rating shall be at least 6" w.g. positive and 4" w.g. negative with a bursting pressure of at least 2 ½ time the working pressure

D. The duct shall be rated for a velocity of at lease 4000 feet per minute.

E. The duct must be suitable for continuous operation at a temperature range of -20° F to +250° F.

F. Acoustical performance, when tested by an independent laboratory in accordance with the Air Diffusion Council's Flexible Air Duct Test Code FD 72-R1, Section 3.0, Sound Properties, shall be as follows:

1. The insertion loss (dB) of a 10 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	7	31	40	38	40	27
8" diameter	13	29	36	35	38	22
12" diameter	21	28	29	33	26	12

2. The radiated noise reduction (dB) of a 10 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	5	8	7	8	11	15
8" diameter	10	7	7	8	10	13
12" diameter	9	6	6	5	9	13

3. The self generated sound power levels (LW) dB re 10^{-12} Watt of a 10 foot length of straight duct for an empty sheet metal duct when tested in accordance with ASTM E477, at a velocity of 1000 feet per minute, shall not exceed:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	42	31	23	18	17	21

8” diameter	41	34	27	19	18	21
12” diameter	54	45	38	31	27	23

G. Factory insulate the flexible duct with fiberglass insulation. Provide insulation as required by ASHRAE 90.1. Minimum R-value of 6.0 for insulation.

H. Cover the insulation with a fire retardant metalized vapor barrier jacket reinforced with crosshatched scrim having a permeance of not greater than 0.05 perms when tested in accordance with ASTM #96, Procedure A.

I. Flexible Duct Connectors:

1. Clamps: Nylon strap in sizes 3 through 18 inches, to suit duct size.

2.12 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Connect ducts to duct silencers rigidly.

H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. Upstream and downstream from duct filters.
3. At outdoor-air intakes and mixed-air plenums.
4. At drain pans and seals.
5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
6. Upstream or downstream from duct silencers.
7. Control devices requiring inspection.
8. Elsewhere as indicated.

I. Install access doors with swing against duct static pressure.

J. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.
4. Head and Shoulders Access: 21 by 14 inches.
5. Body Access: 25 by 14 inches.
6. Body plus Ladder Access: 25 by 17 inches.

K. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

L. Install flexible connectors to connect ducts to equipment.

M. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

N. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

O. Connect diffusers to ducts with maximum 72 inches lengths of flexible duct clamped or strapped in place.

P. Connect flexible ducts to metal ducts with draw bands.

Q. Install duct test holes where required for testing and balancing purposes.

R. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.

2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Inspect turning vanes for proper and secure installation.
4. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233423

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Centrifugal roof ventilators.
2. Centrifugal wall ventilators.
3. Ceiling-mounted ventilators.
4. Propeller fans.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on sea level.

B. Operating Limits: Classify according to AMCA 99.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Material thickness and finishes, including color charts.
5. Dampers, including housings, linkages, and operators.
6. Roof curbs.
7. Fan speed controllers.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans and other details, drawn to 1/4" = 1'-0" scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Roof framing and support members relative to duct penetrations.
   2. Ceiling suspension assembly members.
   3. Size and location of initial access modules for acoustical tile.
   4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Belts: One set for each belt-driven unit.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

1.9 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 CENTRIFUGAL ROOF VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Greenheck Fan Corporation.
   2. Loren Cook Company.

B. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
   1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains and grease collector.
   2. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.

C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

D. Belt Drives:
   1. Resiliently mounted to housing.
   2. Fan Shaft: Turned, ground, and polished cast iron; keyed to wheel hub.
   3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
   4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
   5. Fan and motor isolated from exhaust airstream.
   6. Provide belt drive fans with automatic belt tensioner.

E. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent for direct drive fans.
   2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
   3. Bird Screens: Removable, 1/2-inch mesh, aluminum wire.
   4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.

F. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
   1. Configuration: As required.
   2. Overall Height: 12 inches minimum.
   3. Sound Curb: Curb with sound-absorbing insulation.
   4. Pitch Mounting: Manufacture curb for roof slope.
   5. Metal Liner: Galvanized steel.
   6. Mounting Pedestal: Galvanized steel with removable access panel.

2.2 CENTRIFUGAL WALL VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Greenheck Fan Corporation.
   2. Loren Cook Company.

B. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle; venturi inlet cone.

C. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.

D. Belt Drives:
   1. Resiliently mounted to housing.
   2. Fan Shaft: Turned, ground, and polished cast iron; keyed to wheel hub.
   3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
   4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
   5. Fan and motor isolated from exhaust airstream.
   6. Provide belt drive fans with auto belt tensioner.

E. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent for direct drive fans.
   2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through internal aluminum conduit.
   3. Bird Screens: Removable, 1/2-inch mesh, aluminum wire.
   4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in wall sleeve; factory set to close when fan stops.

2.3 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Broan-NuTone LLC.
   2. Greenheck Fan Corporation.
   3. Loren Cook Company.

B. Housing: 20 gauge galvanized steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Metal, louvered grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
   2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
   3. Isolation: Rubber-in-shear vibration isolators.
   4. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.4 PROPELLER FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1.
   2. Greenheck Fan Corporation.
   3. Loren Cook Company.

B. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.

C. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.

D. Fan Wheel: Replaceable, cast-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.

E. Fan Drive: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.

F. Fan Drive:
1. Resiliently mounted to housing.
2. Statically and dynamically balanced.
3. Selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
4. Extend grease fitting to accessible location outside of unit.
5. Service Factor Based on Fan Motor Size: 1.4.
6. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
7. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
   a. Ball-Bearing Rating Life: ABMA 9, L_{10} of 100,000 hours.
8. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
9. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
10. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
11. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.

G. Accessories:
1. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
3. Wall Sleeve: Galvanized steel to match fan and accessory size.
4. Weathershield Hood: Galvanized steel to match fan and accessory size.
5. Weathershield Front Guard: Galvanized steel with expanded metal screen.
6. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
7. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

2.5 MOTORS

A. Premium Efficiency. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

B. Enclosure Type: Totally enclosed, fan cooled.

2.6 SOURCE QUALITY CONTROL

A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Support units using spring isolators having a static deflection of 1 inch. Vibration-control devices are specified in Section 230548 "Vibration Controls for HVAC Piping and Equipment."

C. Secure roof-mounted fans to roof curbs with cadmium-plated hardware. See Section 077200 "Roof Accessories" for installation of roof curbs.

D. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

E. Install units with clearances for service and maintenance.

F. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:
   1. Verify that shipping, blocking, and bracing are removed.
   2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
   3. Verify that cleaning and adjusting are complete.
   4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
   5. Adjust belt tension.
   6. Adjust damper linkages for proper damper operation.
   7. Verify lubrication for bearings and other moving parts.
   8. Verify that manual and automatic volume control in connected ductwork systems are in fully open position.
   9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
   10. Shut unit down and reconnect automatic temperature-control operators.
   11. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

END OF SECTION

SECTION 233600

AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Shutoff, single-duct air terminal units.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1.4 SUBMITTALS

A. Product Data: For each type of the following products, including rated capacities, furnished specialties, sound-power ratings, and accessories.

1. Air terminal units.
2. Liners and adhesives.
3. Sealants and gaskets.

B. Shop Drawings: For air terminal units. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Hangers and supports, including methods for duct and building attachment and vibration isolation.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Size and location of initial access modules for acoustic tile.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

D. Field quality-control reports.

E. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Instructions for resetting minimum and maximum air volumes.
2. Instructions for adjusting software set points.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

PART 2 - PRODUCTS

2.1 SHUTOFF, SINGLE-DUCT AIR TERMINAL UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Nailor Industries Inc.
2. Price Industries.
3. Titus.

B. Configuration: Volume-damper assembly inside unit casing with control components inside a protective metal shroud.

C. Casing: Minimum 22 gauge galvanized steel single wall.

1. Casing Lining: Mechanically fastened, 3/4-inch-thick, closed cell foam insulation complying with UL 181 erosion requirements, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

2. Air Inlet: Round stub connection or S-slip and drive connections for duct attachment.
3. Air Outlet: S-slip and drive connections.
4. Access: Removable panels for access to parts requiring service, adjustment, or maintenance; with airtight gasket.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.

1. Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 6-inch wg inlet static pressure.
2. Damper Position: Normally open.

E. Electric-Resistance Heating Coils: Nickel-chromium heating wire, free of expansion noise and hum, mounted in ceramic inserts in a galvanized-steel housing; with primary automatic, and secondary manual, reset thermal cutouts. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware.

1. Access door interlocked disconnect switch.
2. Downstream air temperature sensor with local connection to override discharge-air temperature to not exceed a maximum temperature set point (adjustable.)
3. Nickel chrome 80/20 heating elements.
4. Airflow switch for proof of airflow.
5. Fan interlock contacts.
6. Fuses in terminal box for overcurrent protection.
7. Magnetic contactor for each step of control (for three-phase coils).

F. Controller shall be capable of maintaining design flow plus 5% regardless of inlet static pressure from minimum specified to 6” wg. Utilizing a multi-port sensing device (4 minimum radially distributed points) connected to center averaging chamber.

G. Digital Control Package: Digital control package shall include an RJ45 connection back lighted LCD thermostat, mounted in the occupied zone and an actuator assembly consisting of an actuator, transducer, and termination board for connection to heat accessories. The control package shall also include a 35 foot plenum rated plug and play thermostat cable. The configurable controller shall be a dedicated, flash microprocessor based, pressure independent VAV Proportional-Integral controller mounted on the terminal unit. The controller shall be configurable in the field with the LCD thermostat. The LCD thermostat will allow setup and balancing of the digital controller, without the need to access the ceiling or plenum space. It will include zone temperature sensor, set point adjust, and character LCD display and service port for controller.
1. Controller shall be configured as shown per single duct terminal unit controls diagram
2. The thermostat service port shall allow for the connection of a personal computer via a custom USB interface. Connection at the service port will allow for the full display of all VAV control parameters and Inputs/Outputs.
3. Interface Requirements for HVAC Instrumentation and Control System – This is designed as a stand-alone DDC system – no interface required. System shall be

capable of future integration into a Building Automation System via LON, BACNet and MODBus

2.2 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Steel Cables: Galvanized steel complying with ASTM A 603.

C. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

D. Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

E. Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test assembled air terminal units according to ARI 880.

1. Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, coil type, and ARI certification seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

B. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

C. Install wall-mounted thermostats.

3.2 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes and for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes and for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hangers Exposed to View: Threaded rod and angle or channel supports.

D. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.3 CONNECTIONS

A. Connect ducts to air terminal units according to Section 233113 "Metal Ducts."

3.4 IDENTIFICATION

A. Label each air terminal unit with plan number, nominal airflow, and maximum and minimum factory-set airflows. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for equipment labels and warning signs and labels.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Air terminal unit will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.6 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
3. Verify that controls and control enclosure are accessible.
4. Verify that control connections are complete.
5. Verify that nameplate and identification tag are visible.
6. Verify that controls respond to inputs as specified.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air terminal units.

END OF SECTION 233600

SECTION 233713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Rectangular and square ceiling diffusers.
2. Drum louvers.
3. Adjustable bar registers and grilles.

B. Related Sections:

1. Section 089000 "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to 1/4" = 1'-0" scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Rectangular and Square Ceiling Diffusers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Nailor Industries Inc.
   b. Price Industries.
   c. Titus.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Aluminum.
4. Finish: Baked enamel, white unless otherwise specified.
5. Face Size: 24 by 24 inches for layin and surface-mount 12 by 12 inches for surface-mount. Refer to plans and schedules.
6. Face Style: cone or Plaque. Refer to schedule.
7. Mounting: Surface T-bar. Refer to schedule.
8. Pattern: Fixed.
9. Dampers: None.
10. Accessories: As scheduled.

2.2 HIGH-CAPACITY DIFFUSERS

A. Drum Louver:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Nailor Industries Inc.
   b. Price Industries.
   c. Titus.

2. Airflow Principle: Extended distance for high airflow rates.
3. Material: Aluminum, heavy gage extruded.
4. Finish: White baked acrylic, unless otherwise scheduled.

5. Border: 1-1/4-inch width with countersunk screw holes.
6. Gasket between drum and border.
7. Body: Drum shaped; adjustable vertically.
8. Blades: Individually adjustable horizontally.
9. Mounting: As scheduled.
10. Accessories:

    a. Opposed-blade steel damper, where noted.
    b. Duct-mounting collars with countersunk screw holes.

2.3 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Nailor Industries Inc.
    b. Price Industries.
    c. Titus.

2. Material: Aluminum.
3. Finish: Baked enamel, white unless otherwise scheduled.
4. Face Blade Arrangement: As scheduled.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: As scheduled.
7. Frame: 1-1/4 inches wide.
8. Mounting: As scheduled.
9. Damper Type: None.

B. Adjustable Bar Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Nailor Industries Inc.
    b. Price Industries.
    c. Titus.

2. Material: Aluminum.
3. Finish: Baked enamel, white unless otherwise scheduled..
4. Face Blade Arrangement: As scheduled.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: As scheduled.
7. Frame: 1-1/4 inches.
8. Mounting: As scheduled.

2.4 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 237413

PACKAGED, OUTDOOR AIR-HANDLING (ROOF-TOP) UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged, outdoor air-handling units (rooftop units) with the following components and accessories:

1. Direct-expansion cooling.
2. Hot-gas reheat.
3. Economizer outdoor- and return-air damper section.
4. Integral, space temperature controls.
5. Roof curbs.

1.3 DEFINITIONS

A. DDC: Direct-digital controls.

B. ECM: Electrically commutated motor.

C. Outdoor-Air Refrigerant Coil: Refrigerant coil in the outdoor-air stream to reject heat during cooling operations and to absorb heat during heating operations. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.

D. Outdoor-Air Refrigerant-Coil Fan: The outdoor-air refrigerant-coil fan in RTUs. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.

E. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, outdoor, central-station air-handling units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.

F. Supply-Air Fan: The fan providing supply air to conditioned space. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

G. Supply-Air Refrigerant Coil: Refrigerant coil in the supply-air stream to absorb heat (provide cooling) during cooling operations and to reject heat (provide heating) during heating operations. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

H. VAV: Variable-air volume.

1.4 ACTION SUBMITTALS

A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and other details, drawn to 1/4” = 1’-0” scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Structural members to which RTUs will be attached.
2. Roof openings
3. Roof curbs and flashing.

B. Field quality-control test reports.

C. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fan Belts: One set for each belt-driven fan.
2. Filters: One set of filters for each unit.

1.8 QUALITY ASSURANCE

A. ARI Compliance:

1. Comply with ARI 210/240 and ARI 340/360 for testing and rating energy efficiencies for RTUs.
2. Comply with ARI 270 for testing and rating sound performance for RTUs.

B. ASHRAE Compliance:

1. Comply with ASHRAE 15 for refrigeration system safety.
2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
3. Comply with applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.

E. UL Compliance: Comply with UL 1995.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
2. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.
3. Warranty for all other components: Manufacturer's standard, but not less than three years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AAON, Inc.
2. Carrier Corporation.

3. McQuay International.
4. Trane; American Standard Companies, Inc.
5. YORK International Corporation.

2.2 CASING

A. General Fabrication Requirements for Casings: Formed and reinforced double-wall insulated panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.

B. Exterior Casing Material: Galvanized steel with factory-painted finish, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs.

1. Exterior Casing Thickness: 0.0626 inch thick.
2. Finished Surface shall withstand minimum 750 hour salt spray test in accordance with ASTM B117 standard.

C. Inner Casing Fabrication Requirements:

1. Inside Casing: Galvanized steel, 0.034 inch thick.

D. Casing Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.

1. Materials: ASTM C 1071, Type I.
2. Thickness: 1 inch thick, 1-1/2 pound density.
3. Liner Adhesive: Comply with ASTM C 916, Type I.

E. Condensate Drain Pans: Formed sections of stainless-steel sheet, a minimum of 2 inches deep**,** and complying with ASHRAE 62.1.

1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
2. Drain Connections: Threaded nipple.

F. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.3 FANS

A. Belt-Driven Supply-Air Fans: Single width, airfoil, centrifugal; with permanently lubricated, single-speed motor installed on an adjustable fan base resiliently mounted in the casing. Aluminum wheels, and galvanized- or painted-steel fan scrolls. Supply fan assembly to be mounted on spring isolated base frame, or entire unit is to be mounted on spring isolation curbs.

B. Condenser-Coil Fan: Propeller, mounted on shaft of permanently lubricated motor.

C. Exhaust Fan: Propeller, shaft mounted on permanently lubricated motor.

D. Fan Motor: Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.4 COILS

A. Evaporator Refrigerant Coil:

1. Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
3. Coil Split: Interlaced.

B. Condenser Refrigerant Coil:

1. Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor or cast aluminum microchannel.
2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
3. Cathodic epoxy coating per ASTM-B117, 5000 hour salt spray rating and UV resistant.

C. Modulating Hot-Gas Reheat Refrigerant Coil:

1. Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.

2.5 REFRIGERANT CIRCUIT COMPONENTS

A. Number of Refrigerant Circuits: Two with minimum stages as indicated on schedule.

B. Compressor: Hermetic, scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief**,** and crankcase heater.

C. Refrigeration Specialties:

1. Refrigerant: R-410A.
2. Thermal expansion valve capable of modulation from 100% to 25% of its rated capacity.
3. Refrigerant filter/dryer.
4. Manual-reset high-pressure safety switch.
5. Automatic-reset low-pressure safety switch.
6. Minimum off-time relay.
7. Automatic-reset compressor motor thermal overload.
8. Brass service isolation valves installed in compressor suction and discharge sides.

9. Low-ambient kit to operate unit down to 20ºF.
10. Hot-gas reheat solenoid valve with a replaceable magnetic coil.

2.6 AIR FILTRATION

A. Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.

1. Pleated: 2" Minimum 90 percent arrestance, and MERV 8.

2.7 ECONOMIZER

A. Unit shall be provided with an outdoor air economizer section. The 0 to 100% outside air economizer section shall include outdoor, return, and exhaust air dampers. The economizer shall be equipped with a variable air volume powered exhaust fan for building static pressure control. The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable paint finish as the main unit. The hood shall include moisture eliminator filters to drain water away from the entering air stream. The outside and return air dampers shall be sized to handle 100% of the supply air volume. The dampers shall be opposed blade design. Damper blades shall be gasketed with side seals to provide an air leakage rate of 4 cfm / square foot of damper area at 1" differential pressure per ASHRAE 90.1 Energy Standard . Leakage rate to be tested in accordance with AMCA Standard 500. An exhaust damper shall be provided to exhaust air out of the back of the unit. A bird screen shall be provided to prevent infiltration of rain and foreign materials. Exhaust damper blades shall be lined with vinyl gasketing on contact edges. Control of the dampers shall be by a factory installed direct coupled actuator. Damper actuator shall be of the modulating, spring return type. A comparative enthalpy control shall be provided to sense and compare enthalpy in both the outdoor and return air streams to determine if outdoor air is suitable for "free" cooling. If outdoor air is suitable for "free" cooling, the outdoor air dampers shall modulate in response to the unit's temperature control system.

2.8 ELECTRICAL POWER CONNECTION

A. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with the unit shall be number and color-coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a single point power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Supply fan motors shall have contactors and external overload protection. Knockouts shall be provided in the bottom of the main control panels for field wiring entrance. A GFI receptacle shall

be unit mounted. The receptacle shall be powered by a factory installed and wired 120V, 15 amp power supply. The power supply shall be wired to the line side of the unit's main disconnect, so the receptacle is powered when the main unit disconnect is off. This option shall include a GFI receptacle, 2.0 KVA transformer and a branch circuit disconnect. The electrical circuit shall be complete with primary and secondary overload protection.

B. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.

2.9 CONTROLS

A. Provide a complete integrated microprocessor based Direct Digital Control (DDC) system to control all unit functions including temperature control, relative humidity control, demand control ventilation, economizer control, building static pressure control, scheduling, monitoring, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall consist of all required temperature sensors, pressure sensors, controller and keypad/display operator interface. All MCBs and sensors shall be factory mounted, wired and tested.

B. The stand-alone DDC controllers shall not be dependent on communications with any on-site or remote PC or master control panel for proper unit operation. The microprocessor shall maintain existing set points and operate stand alone if the unit loses either direct connect or network communications. The microprocessor memory shall be protected from voltage fluctuations as well as any extended power failures. All factory and user set schedules and control points shall be maintained in nonvolatile memory. No settings shall be lost, even during extended power shutdowns.

C. The DDC control system shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.

D. All digital inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip.

E. The DDC controller shall have a built-in time schedule. The schedule shall be programmable from the unit keypad interface. The schedule shall be maintained in nonvolatile memory to insure that it is not lost during a power failure. There shall be one start/stop per day and a separate holiday schedule. The controller shall accept up to sixteen holidays each with up to a 5-day duration. Each unit shall also have the ability to accept a time schedule via BAS network communications.

F. The keypad interface shall allow convenient navigation and access to all control functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease

of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:

1. Return air temperature
2. Return air enthalpy, high/low
3. CO2 ppm
4. Discharge air temperature
5. Outdoor air temperature
6. Space air temp
7. Outdoor enthalpy, high/low
8. Dirty filter indication
9. Airflow verification
10. Cooling status
11. Control temperature (Changeover)
12. VAV box output status
13. Cooling status/capacity
14. Unit status
15. All time schedules
16. Active alarms w/time and date
17. Previous alarms with time and date
18. Optimal start
19. System operating hours
    a. Fan
    b. Exhaust fan
    c. Cooling
    d. Individual compressor
    e. Heating
    f. Economizer
    g. Tenant override

G. The user interaction with the keypad shall provide the following setpoints as a minimum:

1. Controls mode
    a. Off manual
    b. Auto
    c. Heat/cool
    d. Cool only
    e. Heat only
    f. Fan only
2. Occupancy mode
    a. Auto
    b. Occupied
    c. Unoccupied
    d. Tenant override
3. Unit operation changeover control
    a. Return air temperature
    b. Space temperature
    c. Network signal
4. Cooling and heating change-over temperature with dead band
5. Cooling discharge air temperature (DAT)

6. Supply reset options (this function to be used as humidity control sequence)
   a. Return air temperature
   b. Outdoor air temperature
   c. Space temperature
   d. Airflow (VAV)
   e. Network signal
   f. External (0-10 vdc) – factory provided, field installed duct mounted humidity sensor required.
   g. External (0-20mA)
7. Temperature alarm limits
   a. High supply air temperature
   b. Low supply air temperature
   c. High return air temperature
8. Lockout control for compressors
9. Demand control ventilation.
10. Compressor inter-stage timers
11. Night setback and setup space temperature
12. Building static pressure
13. Economizer changeover
    a. Enthalpy
    b. Drybulb temperature
14. Current time and date
15. Tenant override time
16. Occupied/unoccupied time schedule
17. One event schedule
18. Holiday dates and duration
19. Service mode
    a. Timers normal (all time delays normal)
    b. Timers fas (all time delays 20 sec)

H. If the unit is to be programmed with a night setback or setup function (refer to sequence of operations for requirements), a space sensor shall be provided. Space sensors shall be available to support field selectable features.
   1. Zone sensor with tenant override switch plus heating and cooling set point adjustment. (Space Comfort Control systems only)

I. Interface Requirements for HVAC Instrumentation and Control System – This is designed as a stand-alone DDC system – no interface required. System shall be capable of future integration into a Building Automation System via LON, BACNet and MODBus.

2.10 ACCESSORIES

A. Duplex, 115-V, ground-fault-interrupter outlet with 15-A overcurrent protection. Include transformer if required. Outlet shall be energized even if the unit main disconnect is open.

B. Filter differential pressure switch with sensor tubing on either side of filter. Set for final filter pressure loss.

C. Coil guards of cross wire welded steel with PVC coating.

D. Louvered hail guards of galvanized steel, painted to match casing if vertical face condenser coils are provided..

E. Provide one spare supply fan and exhaust fan VFD for each frame size. VFD to be mounted to unit or shipped loose to the owner.

F. Duct static pressure sensor, factory mounted. Installing contractor to provide and install tubing from location in duct to sensor as indicated on the drawings.

G. Humidity Sensor compatible with supply air reset function of controller to be used for humidity control sequence of operations.

H. Compressor isolation valves.

2.11 ROOF CURBS

A. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.

1. Non-insulated curb to be insulated by roofing contractor

B. Curb Height: 14 inches.

C. Wind Restraints: Metal brackets compatible with the curb and casing, painted to match RTU, used to anchor unit to the curb, and designed for loads at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.

B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.

C. Examine roofs for suitable conditions where RTUs will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Roof Curb: Install on roof structure, level and secure, according to **NRCA's "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised**

Curb Detail for Rooftop Air Handling Units and Ducts." Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 077200 "Roof Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing with anchor bolts.

3.3 CONNECTIONS

A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.

B. Install piping adjacent to RTUs to allow service and maintenance.

C. Duct installation requirements are specified in other HVAC Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:

1. Install ducts to termination at top of roof curb.
2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 233300 "Air Duct Accessories."
4. Install return-air duct continuously through roof structure.
5. Install normal-weight, 3000-psi, compressive strength (28-day) concrete mix inside roof curb, 4 inches thick. Concrete, formwork, and reinforcement are specified with concrete.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing. Report results in writing.

C. Tests and Inspections:

1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

3.5 STARTUP SERVICE

A. Engage a factory service representative (not an authorized agent or manufacturer's representative) to perform startup service.

B. Complete installation and startup checks according to manufacturer's written instructions and do the following:

1. Inspect for visible damage to unit casing.
2. Inspect for visible damage to furnace combustion chamber.
3. Inspect for visible damage to compressor, coils, and fans.
4. Inspect internal insulation.
5. Verify that labels are clearly visible.
6. Verify that clearances have been provided for servicing.
7. Verify that controls are connected and operable.
8. Verify that filters are installed.
9. Clean condenser coil and inspect for construction debris.
10. Remove packing from vibration isolators.
11. Inspect operation of barometric relief dampers.
12. Verify lubrication on fan and motor bearings.
13. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
14. Adjust fan belts to proper alignment and tension.
15. Start unit according to manufacturer's written instructions.

    a. Start refrigeration system.
    b. Do not operate below recommended low-ambient temperature.
    c. Complete startup sheets and attach copy with Contractor's startup report.

16. Inspect and record performance of interlocks and protective devices; verify sequences.
17. Operate unit for an initial period as recommended or required by manufacturer.

18. Calibrate thermostats.
19. Adjust and inspect high-temperature limits.
20. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
21. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:

    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.

22. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.

23. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.

    a. Supply-air volume.
    b. Return-air volume.
    c. Relief-air volume.
    d. Outdoor-air intake volume.

24. Simulate maximum cooling demand and inspect the following:

    a. Compressor refrigerant suction and hot-gas pressures.
    b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.

25. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:

    a. High-temperature limit on gas-fired heat exchanger.
    b. Low-temperature safety operation.
    c. Filter high-pressure differential alarm.
    d. Economizer to minimum outdoor-air changeover.
    e. Relief-air fan operation.
    f. Smoke and firestat alarms.

26. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

3.6 CLEANING AND ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site during other-than-normal occupancy hours for this purpose.

B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain RTUs. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 237413

SECTION 238126

SPLIT-SYSTEM AIR-CONDITIONING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes split-system air-conditioning units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 3 Section "Cast-in-Place Concrete."

B. Coordinate size, location, and connection details with equipment supports.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion on compressors.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Filters: One set of filters for each unit.
2. Fan Belts: One set of belts for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carrier Air Conditioning.
2. Lennox Industries.
3. Trane Company.

2.2 EVAPORATOR-FAN COMPONENTS (FIVE TONS AND BELOW)

A. Cabinet: Enameled steel with removable panels on front and ends in manufacturer standard color.

1. Insulation: 1” high density, R 4.2.

2. Drain Pans: Polycorbonate, with connection for drain; insulated.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Centrifugal, FC.

E. Fan Motors: ECM type, pressure independent, soft start, multi-speed operation.

F. Filters: Disposable 2” pleated media.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS (FIVE TONS AND BELOW)

A. Casing: Galvanized steel, finished with baked enamel in manufacturer-standard color, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
   1. Compressor Type: Scroll, two stage.
   2. Rubber vibration isolator mounting.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240.

D. Fan: Propeller type, directly connected to motor.

E. Motor: Permanently lubricated, totally enclosed with integral thermal-overload protection.

2.4 ACCESSORIES

A. Thermostat: Low voltage 7-day, programmable with subbase to control compressor and evaporator fan.
   1. Compressor time delay.
   2. 24-hour time control of system stop and start.
   3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
   4. Fan-speed selection, including auto setting.

B. Automatic-reset timer to prevent rapid cycling of compressor.

C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4-inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 3 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

D. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch. Refer to Division 23 Section "Mechanical Vibration Controls."

E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Install piping adjacent to unit to allow service and maintenance.

B. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Duct Accessories."

C. Ground equipment according to Division 26 Section "Grounding and Bonding."

D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 238126

SECTION 238127

DUCT LESS SPLIT-SYSTEM AIR-CONDITIONING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes duct less split-system air-conditioning units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed mounting, and include the following type of units:

1. Wall mounted units (high-wall).

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 3 Section "Cast-in-Place Concrete."

B. Coordinate size, location, and connection details with equipment supports.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion on compressors.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of filters for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carrier Air Conditioning.
2. EMI.
3. Mitsubishi.
4. Daikin.

2.2 EVAPORATOR-FAN COMPONENTS (HIGH WALL)

A. Cabinet: Enameled steel with removable panels on front and ends in manufacturer standard color. Discharge and inlet grilles shall be attractively styled, high-impact polystyrene.

1. Insulation: 1” high density, R 4.2.

2. Drain Pans: Galvanized steel with anti-corrosion coating.

3. Provide with factory mounted condensed pump.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Fan: 3-speed direct drive Centrifugal, FC.

D. Fan Motors: Manufacture standard with overload protection.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Galvanized steel, finished with baked enamel in manufacturer-standard color, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Scroll.

2. Rubber vibration isolator mounting.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240.

D. Fan: Propeller type, directly connected to motor.

E. Motor: Permanently lubricated, totally enclosed with integral thermal-overload protection

F. Refrigerant: R-410A.

2.4 ACCESSORIES

A. Thermostat: Low voltage 7-day subbase to control compressor and evaporator fan.

1. Compressor time delay.

2. 24-hour time control of system stop and start.

3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.

4. Fan-speed selection, including auto setting.

B. Automatic-reset timer to prevent rapid cycling of compressor.

C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

D. Condensate Pump, field or factory installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Install piping adjacent to unit to allow service and maintenance.

B. Ground equipment according to Division 26 Section "Grounding and Bonding."

C. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 238127

SECTION 238238

PROPELLER UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes propeller unit heaters with electric-resistance coils.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each unit type and configuration.

B. Shop Drawings: Submit the following for each unit type and configuration:
   1. Plans, elevations, sections, and details.
   2. Details of anchorages and attachments to structure and to supported equipment.
   3. Wiring Diagrams: Power, signal, and control wiring.
   4. Equipment schedules to include rated capacities, operating characteristics, furnished specialties, and accessories.

C. Coordination Drawings: Plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Suspended ceiling components.
   2. Structural members to which unit heaters will be attached.
   3. Other items, including but not limited to the following:
      a. Lighting fixtures.
      b. Sprinklers.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For propeller unit heaters to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Airtherm; a Mestek Company.
   2. Rosemex Products.
   3. Reddi.

2.2 UNIT HEATERS

A. Description: An assembly including casing, coil, fan, and motor in horizontal discharge configuration with adjustable discharge louvers.

B. Comply with UL 2021.

C. Comply with UL 823.

2.3 CASING

A. Cabinet: Cabinet shall be fabricated of die formed heavy gauge steel. An internal shroud is provided around the heating element to ensure uniform airflow delivery across the entire face of heating elements. The enclosed motor and fan are isolated to minimize vibration and noise level. The control compartment is provided with a hinged and latched access door for easy installation and maintenance.

B. Cabinet Finish: Manufacturer's standard baked enamel or durable power coated paint applied to factory assembled and -tested propeller unit heater before shipping.

C. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.

2.4 ELECTRIC-RESISTANCE HEATING ELEMENTS

A. Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch (4 mm). Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg F (288 deg C) at any point during normal operation.
   1. Circuit Protection: One-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
   2. Wiring Terminations: Stainless-steel or corrosion-resistant material.

2.5 FAN

A. Propeller type, aluminum wheel directly mounted on motor shaft in the fan venturi.

2.6 FAN MOTORS

A. Motors shall be totally enclosed, all angle industrial rated. Motor is single phase with voltage rating same as heater primary voltage. Single speed permanently lubricated thermal protected unit bearing motor on 3-10 KW units. Two speed thermally protected motors with sleeve bearings on 12.5 – 48 KW units. Sleeve bearing motors are lubricated for 5 years continuous or 10-year intermittent use.

2.7 **WIRING**

A. Heaters shall be designated for a single circuit with elements, motor and control circuits wired in accordance with the latest national electric code or applicable local codes and listed under UL Standard 2021. All three-phase heaters shall have balanced equal phases.

2.8 **LIMIT CONTROLS**

A. All units shall have built in automatic reset thermal cutouts to shut down motor and elements if safe operating temperatures are exceeded. Include fan purge to dissipate residual heat from elements on heater shut down.

2.9 **CONTROLS**

A. Contactors and controls circuit transformers, where required, are factory installed and wired. Single stage control on 3-20 KW units. 2-stage control on 25 KW through 48 KW units.Retain this Article if Project has only one type or size propeller unit heater; if Project has more than one type or size, delete Article and schedule propeller unit heaters on Drawings.

PART 3 - EXECUTION

3.1 **EXAMINATION**

A. Examine areas to receive propeller unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping and electrical connections to verify actual locations before propeller unit-heater installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 **INSTALLATION**

A. Install propeller unit heaters level and plumb.

B. Install propeller unit heaters to comply with NFPA 90A.

C. Suspend propeller unit heaters from structure with all-thread hanger rods and elastomeric hangers. Hanger rods and attachments to structure are specified in Division 23 Section "Hangers and Supports." Vibration hangers are specified in Division 23 Section "Mechanical Vibration."

D. Install wall-mounting thermostats and switch controls in electrical outlet boxes at heights to match lighting controls.

3.3 **CONNECTIONS**

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.

C. Ground equipment according to Division 26 Section "Grounding and Bonding."

D. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing and report results in writing:
   1. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
   3. Test and adjust controls and safeties.

B. Remove and replace malfunctioning units and retest as specified above.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain propeller unit heaters. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 238238

SECTION 238239

CABINET UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes cabinet unit heaters.

1.3 SUBMITTALS

A. Product Data: Include specialties and accessories for each unit type and configuration.

B. Shop Drawings: Submit the following for each unit type and configuration:

1. Plans, elevations, sections, and details.
2. Details of anchorages and attachments to structure and to supported equipment.
3. Power, signal, and control wiring diagrams. Differentiate between manufacturer-installed and field-installed wiring.
4. Equipment schedules to include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

C. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Size and location of access panels in hard ceilings to provide access to concealed units.
5. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

D. Field Test Reports: Written reports of tests specified in Part 3 of this Section.

E. Maintenance Data: For cabinet unit heaters to include in maintenance manuals specified in Division 1. Include the following:

1. Maintenance schedules and repair parts lists for motors, coils, integral controls, and filters.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate layout and installation of cabinet unit heaters and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Airtherm Manufacturing Company.
2. Rosemex Products.
3. Redd-i.

2.2 CABINET UNIT HEATERS

A. Description: An assembly including chassis, coil, fan, and motor in blow-through configuration with heating coil.

2.3 CONSTRUCTION

A. Heavy Gauge welded steel cabinet with powder coated finish and control compartment with a hinged and latched access door, simplifying wiring installation and maintenance.

2.4 ELECTRIC-RESISTANCE HEATING ELEMENTS

A. Circular copper clad steel sheath element with continuously brazed steel fins formed to match the air delivery pattern of the fan blade.

2.5 FAN AND MOTOR

A. Totally enclosed, single phase, permanently lubricated, thermally protected motors with unit bearings on 3KW-10KW models and sleeve bearings on 12.5 KW-48K models-mounted with

rubber insulators to minimize vibration and noise. Fan assembly enclosed by a heavy gauge, close spaced, chrome plated wire guard.

2.6 OVERHEAT PROTECTION

A. All units come equipped with automatic resetting type limit controls to de-energize the heater should an over-temperature situation occur.

2.7 LOUVER ASSEMBLY

A. Louvers are individually adjustable for directional control of air flow and the entire assembly can be reposition in the field from down flow to up flow or left/right directional air flow.

2.8 ACCESSORIES

A. Integral disconnect switch.

B. Unit mounted thermostat.

C. Wall/Ceiling mounting bracket.

2.9 CONTROLS

A. Control Devices: Unit-mounted thermostat.

2.10 SOURCE QUALITY CONTROL

A. Test cabinet unit heater coils according to ASHRAE 33.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive cabinet unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping and electrical connections to verify actual locations before cabinet unit heater installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install cabinet unit heaters level and plumb.

B. Install cabinet unit heaters to comply with NFPA 90A.

C. Suspend cabinet unit heaters from structure with rubber-in-shear vibration isolators (rubber hangers). Vibration isolators are specified in Division 23 Section "Mechanical Vibration Controls."

D. Install wall-mounting switch controls in electrical outlet boxes at heights to match lighting controls.

3.3 CONNECTIONS

A. Ground equipment.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing and report results in writing:

1. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
3. Test and adjust controls and safeties.

B. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

3.5 CLEANING

A. After installing units, inspect unit cabinet for damage to finish. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. After installing units, clean cabinet unit heaters internally according to manufacturer's written instructions.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain cabinet unit heaters.

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment.
2. Review data in maintenance manuals. Refer to Division 1 Section "Closeout Procedures."
3. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."

4. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 238239

SECTION 260519

CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

B. Related Sections include the following:

1. Division 16 Section "Voice and Data Communication Cabling" for cabling used for voice and data circuits.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Statement of infrared testing schedule.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Senator Wire & Cable Company.
4. Southwire Company.
5. Encore.

C. Copper Conductors: Comply with NEMA WC 70.

D. Conductor Insulation: Comply with NEMA WC 70 for Types THW THHN-THWN and SO.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Illsco

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.4 SLEEVE SEALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

D. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26 Section "Electrical Supports and Seismic Restraints."

F. Identify and color-code conductors and cables according to Division 26 Section "Electrical Identification."

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 7 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 7 Section "Through-Penetration Firestop Systems."

K. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 7 Section Firestopping.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports. Provide schedule for testing.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.

    a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1. Underground distribution grounding.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Ground rods.
2. Grounding arrangements and connections for separately derived systems.
3. Grounding for sensitive electronic equipment.

B. Field quality-control test reports.

C. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals.

D. Submit tentative schedule of ground testing to engineer. Follow up after project is underway.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
4. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
5. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by10 feet (19 mm by 3 m) in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.

2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
3. Connections to Structural Steel: Welded connectors.

D. Install 2 parallel ground rods if resistance to ground by a single, ground-rod electrode exceeds 25 ohms.

E. Drive ground rods until tops are 12 inches (300 mm) below finished grade in undisturbed earth.

F. Ground-Rod Connections: Install bolted connectors for underground connections and connections to rods.

G. Secondary Neutral and Transformer Enclosure: Interconnect and connect to grounding conductor.

H. Protect grounding conductors running on surface of wood poles with molding extended from grade level up to and through communication service and transformer spaces.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

G. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in PVC conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

B. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).

D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

E. Submit reports to engineer prior to energizing system.

END OF SECTION 260526

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Allied Tube & Conduit.
    b. Cooper B-Line, Inc.; a division of Cooper Industries.
    c. ERICO International Corporation.
    d. GS Metals Corp.
    e. Thomas & Betts Corporation.
    f. Unistrut; Tyco International, Ltd.
    g. Wesanco, Inc.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slottedsupport system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3 Section "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 9 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 2 Section “Site Work”

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. NBR: Acrylonitrile-butadiene rubber.

G. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:

a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.

c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

C. Rigid Steel Conduit: ANSI C80.1.

D. EMT: ANSI C80.3.

E. FMC Flexible metallic conduit:.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Fittings for EMT: Steel, set-screw type.

H. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Square D; Schneider Electric.
3. Walker, Wiremold

C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 unless otherwise indicated.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

E. Wireway Covers: Screw-cover type.

F. Finish: Manufacturer's standard enamel finish.

2.3 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Thomas & Betts Corporation.
b. Walker Systems, Inc.; Wiremold Company (The).
c. Wiremold Company (The); Electrical Sales Division.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.

3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Metal Floor Boxes: Sheet metal, fully adjustable, rectangular. (As indicated on plans.)

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Firestopping"

2.6 SLEEVE SEALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide or a comparable product by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

C. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic. Include two for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried, except at riser.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R, or in wet locations.
6. Application of Handholes and Boxes for Underground Wiring:

    a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
    b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Heavy-duty fiberglass units with polymer-concrete frame and cover, SCTE 77, Tier 8 structural load rating.
    c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: Rigid steel conduit.
6. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
7. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.
9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel with meyers hubs in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

F. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

G. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from PVC to rigid steel conduit before elbow and before rising above the floor. Tape conduit elbow and riser contact with earth to above slab. Tape to be 2” width with 1” overlap.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

K. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and, as follows:

1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).

2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).

3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

N. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC in damp or wet locations not subject to severe physical damage.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

P. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Division 2 Section "Earthwork."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."
4. Install manufactured elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes and boxes with bottom below the frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated.

Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 7 Section "Through-Penetration Firestop Systems."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

3.8 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway and metal-clad cable.
2. Identification for conductors and communication and control cable.
3. Underground-line warning tape.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

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A. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

2.2 UNDERGROUND-LINE WARNING TAPE

A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.

1. Not less than 6 inches (150 mm) wide by 4 mils (0.102 mm) thick.
2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend shall indicate type of underground line.

2.3 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Warning label and sign shall include, but are not limited to, the following legends:

1. Where Multiple Power Sources are available indicate Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR MINIMUM 36 INCHES (915 MM)."

2.4 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.5 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Black letters on a white background. Minimum letter height shall be 3/8 inch (10 mm).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:

1. Fire Alarm System: Red.
2. Fire-Suppression Supervisory and Control System: Red and yellow.
3. Combined Fire Alarm and Security System: Red and blue.
4. Security System: Blue and yellow.
5. Mechanical and Electrical Supervisory System: Green and blue.
6. Telecommunication System: Green and yellow.
7. Control Wiring: Green and red.

B. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.

C. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.

D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.

F. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply baked-enamel warning signs. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.

b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

G. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for.

H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where 2 lines of text are required, use labels 2 inches (50 mm) high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

a. Panelboards, electrical cabinets, and enclosures.
b. Access doors and panels for concealed electrical items.
c. Electrical switchboards.
d. Transformers.
e. Emergency system boxes and enclosures.
f. Disconnect switches.
g. Enclosed circuit breakers.
h. Motor starters.
i. Push-button stations.
j. Power transfer equipment.
k. Contactors.
l. Remote-controlled switches, dimmer modules, and control devices.
m. Television/audio components, racks, and controls.
n. Fire-alarm control panel and annunciators.
o. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.
p. Monitoring and control equipment.
q. Uninterruptible power supply equipment.

r. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded feeder, and branch-circuit conductors.

1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
2. Colors for 208/120-V Circuits:

    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.

3. Colors for 480/277-V Circuits:

    a. Phase A: Brown.
    b. Phase B: Orange.
    c. Phase C: Yellow.

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.

I. Painted Identification: Prepare surface and apply paint according to Division 9 painting Sections.

END OF SECTION 260553

SECTION 260572

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. All conditions imposed by these documents shall be applicable to all portions of the work under this Division. Certain specific paragraphs of said references may be referred to hereinafter in this Division. These references are intended to point out specific items to the Contractor, but in no way relieve him of the responsibility of reading and complying with all relevant parts of the entire Specification.

B. The Contractor shall examine and coordinate with all Contract Drawings and Specifications, and all Addenda issued. Failure to comply shall not relieve him of responsibility. The omission of details of other portions of the work from this Division shall not be used as a basis for a request for additional compensation.

C. The specific features and details for other portions of the work related to the construction in progress or to the existing building(s) shall be determined by examination at the site.

1.2 SUMMARY

A. The requirements contained in this Section apply to all work performed under Division 16 of these Specifications.

B. The work covered by this Division of the Specifications comprises the furnishing of labor, material, equipment, transportation, tools and services, and performing operations required for, and reasonably incidental to, the installation of the work in accordance with the applicable Contract Documents, and subject to the terms and conditions of the Contract.

C. Refer to other Divisions of the Specifications for related work.

1.3 DEFINITION OF “CONTRACTOR”

A. Where the word “Contractor” is used under any Section of this Division of the Specifications, it shall mean the Contractor engaged to execute the work included under that Section.

1.4 SUBMITTALS

A. Process shop drawings and submittal data to insure that the proposed materials, equipment and devices conform to the requirements of the Contract Documents, and that there are no omissions or duplications. Provide layouts, fabrication information and data for systems, materials, equipment and devices proposed for the project.

B. Shop drawings shall be drawn on a scale not less than 1/4 inch equals 1 foot showing actual dimensions. Shop drawings shall include, but not be limited to:

1. Switchboard.
2. Distribution panelboards.
3. Lighting/appliance panelboards.
4. Transformers.
5. Disconnect switches.
6. Circuit breakers and fuses.
7. Engine generators.
8. Automatic transfer switches.
9. Materials: Conduit, conductors, connectors, supports, etc.
10. Lighting fixtures, lamps and control systems/devices.
11. Wiring devices.
12. Fire alarm system.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 QUALITY ASSURANCE

A. Materials, equipment and devices shall be new and of the quality specified, and shall be free from defects at the time of installation. Materials, equipment and devices damaged in shipment or otherwise damaged or found defective prior to acceptance by the Owner shall not be repaired at the job site, but shall be replaced with new materials, equipment or devices identical with those damaged, unless specifically approved otherwise by the Owner's Representative.

B. Wherever a UL standard has been established for a particular type of material, equipment or device, each item of such material, equipment or device provided on this project shall meet the requirements of the UL standard in every way, and shall be UL listed and labeled.

1.6 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

C. Coordinate electrical service connections to components furnished by utility companies.

1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."

1.7 RESPONSIBILITY OF THE CONTRACTOR

A. The Contractor shall be responsible for all work of every description in connection with this Division of the Specifications. The Contractor shall specifically and distinctly assume, and does so assume, all risk for damage or injury from whatever cause to property or person used or employed on or in connection with this work and of all damages or injury to any person or property wherever located, resulting from an action or operation under the Contract in connection with the work, and undertake the responsibility to defend the Owner against all claims on account of any such damage or injury.

B. The Contractor will be held responsible for the satisfactory execution and completion of the work in accordance with the true intent of the Contract Documents. The Contractor shall provide without extra charge all incidental items required as part of the work, even though it may not be specifically indicated. If the Contractor has reason for objecting to the use of any material, equipment, device or method of construction as indicated, he shall make report of such objections to the Owner's Representative, obtain proper approval and adjustment to the Contract, and shall proceed with the work.

1.8 TERMINOLOGY

A. Whenever the words "furnish," "provide," "furnish and install," "provide and install," and similar phrases occur, it is the intent that the materials, equipment and devices described be furnished, installed and connected under this Division, complete for operation, unless specifically noted to the contrary.

B. It is also the intent, unless specifically noted to the contrary, that all materials, equipment and devices described and specified under this Division of the Specifications be similarly furnished, installed and connected under this Division, whether or not a phrase as described in the preceding paragraph has been actually included.

1.9 ORDINANCES, PERMITS AND CODES

A. It shall be the Contractor's duty to perform the work and provide the materials covered by these Specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.

B. All work herein shall conform to all applicable laws, ordinances and regulations of the local utility companies.

C. The Contractor shall obtain and pay for all permit and connection fees as required for the complete installation of the specified systems, equipment, devices and materials.

D. The Contractor shall obtain permits, plan checks, inspections and approvals applicable to the work as required by the regulatory authorities. Fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor. The pro-rata costs, if any, for utilities serving this property will be paid for by the Owner and shall not be included as part of this Contract.

E. The work shall be in accordance with, but shall not be limited to, the requirements of:

1. National Fire Protection Association.
2. National Electrical Code.
3. National Safety Code.
4. State of International Building Codes.
5. City of La Joya Building Codes.
6. International Energy Conservation Code.

F. Codes and standards referred to are minimum standards. Where the requirements of the Drawings or Specifications exceed those of the codes and regulations, the Drawings and Specifications govern.

1.10 MATERIALS, EQUIPMENT AND DEVICE DESCRIPTION

A. Materials, equipment and devices shall be of the best quality customarily applied in quality commercial practice, and shall be the products of reputable manufacturers. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

B. Materials, equipment and devices furnished under this Division of the Specifications shall be essentially the standard product of the specified manufacturer, or where allowed, an alternate manufacturer. Where two or more units of the same kind or class of a specific item are required, these shall be the products of a single manufacturer; however, the component parts of the item need not be the products of one manufacturer.

C. In describing the various materials, equipment and devices, in general each item will be described singularly, even though there may be a multiplicity of identical items. Also, where the description is only general in nature, exact sizes, duties, space arrangements, horsepower requirements and other data shall be determined by reference to the Contract Documents.

D. Space allocations for materials, equipment and devices have been made on the basis of present and know future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. The Contractor shall verify that all materials, equipment and devices proposed for use on this project are within the constraints of the allocated space.

1.11 REFERENCE STANDARDS

A. Materials, equipment, devices, and workmanship shall comply with applicable local, county, state and national codes, laws and ordinances, utility company regulations and industry standards.

B. In case of differences between building codes, state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Owner’s Representative in writing of any such difference. Should the Contractor perform any work that does not comply with local codes, law and ordinances, industry standards or other governing regulations, the work shall be corrected of noncompliance deficiencies with the Contractor bearing all costs.

C. In addition to the aforementioned ordinances, industry standards published by the following organizations shall apply.

1. AABM - American Association of Battery Manufacturers.
2. AIA - American Institute of Architects.
3. ANSI - American National Standards Institute.
4. ASTM - American Society for Testing and Materials.
5. CBM - Certified Ballast Manufacturers Association.
6. ETL - Electrical Testing Laboratories.
7. FM - Factory Mutual.
8. ICEA - Insulated Cable Engineers Associated.
9. IEEE - Institute of Electrical and Electronic Engineers.
10. IES - Illuminating Engineering Society.
11. IRI - Industrial Risk Insurance.
12. NBS - National Bureau of Standards.
13. NEC - National Electrical Code.
14. NECA - National Electrical Contractors Association.
15. NEMA - National Electrical Manufacturers Association.
16. NESC - National Electrical Safety Code.
17. NETA - National Electrical Testing Association.
18. NFPA - National Fire Protection Association.
19. UL - Underwriters Laboratories.

D. Where the Contract Documents exceed the above requirements, the Contract Documents shall govern. In no case shall work be installed contrary to or below the minimum legal standards.

1.12 DRAWINGS AND SPECIFICATIONS

A. The interrelation of the Drawings (including the schedules) and the Specifications are as follows:

1. The Drawings establish quantities, locations, dimensions and details of materials, equipment and devices. The schedules on the Drawings indicate the capacities, characteristics and components.
2. The Specifications provide written requirements for the quality, standard and nature of the materials, equipment, devices and construction systems.

B. The Drawings and Specifications shall be considered as being compatible; therefore, the work called for by one and not by the other shall be furnished and installed as though called for by both. Resolution of conflicts between Drawings and Specifications shall be as follows:

1. If the Drawings and Specifications disagree in themselves, or with each other, the Contractor's pricing shall be based on furnishing and installing the most expensive combination of quality and quantity of work indicated. In the event of this type of disagreement, the resolution shall be determined by the Architect/Engineer.
2. The Contractor shall be responsible for bringing any conflicts in the Drawings and the Specifications to the attention of the Architect/Engineer prior to any work being performed.
3. In general, if there is conflict between the Drawings and Specifications, the Drawings shall govern the Specifications.
4. Where the Specifications do not fully agree with schedules on the Drawings, the schedules shall govern. Actual numerical dimensions indicated on the Drawings govern scale measurements and large-scale details govern small-scale drawings.
5. Materials, equipment and devices called for on the Drawings and not indicated herein, shall be completely provided and installed as though it were fully described herein.
6. Materials, equipment and devices called for herein shall be completely provided and installed, whether or not it is fully detailed, scheduled or indicated on the Drawings.

C. The Contractor shall examine the Drawings and Specifications of the other portions of the work for fixtures and finishes in connection with this work. The Contractor shall carefully examine the Drawings to determine the general construction conditions, and shall familiarize himself with all limitations caused by such conditions.

D. When discrepancies exist between scale and dimension, or between the Drawings of the various portions of the work, they shall be called to the attention of the Architect/Engineer for further instruction, whose instructions shall be final and binding and work promptly resumed without any additional cost to the Owner.

E. Review the construction details of the building(s) as illustrated on the Drawings of the various portions of the work and be guided thereby. Route conduits and set all boxes as required by the pace of the general construction.

F. The Drawings diagrammatically show the sizes and locations of the various equipment and devices, and the sizes of the major interconnecting wires, without showing exact details as to elevations, offsets, control wiring and other installation requirements. Carefully layout the work at the site to conform to the architectural and structural conditions, to avoid obstructions and to permit proper grading of pipe associated with other portions of the work. Determine the exact location of equipment and devices and connections thereto by reference to the submittals and rough-in drawings, and by measurements at the site. Make minor relocations necessitated by the conditions at the site, or directed by the Architect/Engineer, without additional cost to the Owner.

G. The Drawings and Specifications are intended to describe and illustrate systems which will not interfere with the structure of the building(s), fit into the available spaces, and insure complete and satisfactory operating installations. Prepare installation drawings for all critical areas illustrating the installation of the work in this Division as related to the work of all other Divisions and correct all interferences with the other portions of the work or with the building structures before the work proceeds.

H. The Drawings do not indicate the existing electrical installations other than to identify modifications or extensions thereto. Visit the site and ascertain the conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work. Failure to comply with this shall not constitute grounds for any additional payment in connection with removing or modifying any part of the existing installation or installing any new or temporary work under this Division.

1.13 SUBSTITUTIONS

A. Where a single manufacturer is mentioned by trade name or manufacturer's name, unless specifically noted otherwise, it is the only manufacturer that will be accepted.

B. Where multiple manufacturers are listed, none other than those manufacturers will be accepted.

C. It shall be understood that space allocations have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. If any item of equipment or device is offered in substitution which differs substantially in dimension or configuration from that indicate don the Drawings or Specifications, provide as part of the submittal 1/4 equals 1 foot scaled drawing showing that the substitute can be installed in the space available without interfering with other portions of the work or with access for operations and maintenance in the completed project.

D. Where substitute equipment or devices requiring different arrangement or connections from that indicated is accepted by the Architect/Engineer, install the equipment or devices to operate properly and in harmony with the intent of the Contract Documents, making all incidental changes in piping, ductwork or wiring resulting from the equipment or device selection without any additional cost to the Owner. The Contractor shall pay all additional costs incurred by other portions of the work in connection with the substituted equipment or device.

E. The Architect/Engineer reserves the right to call for samples of any item of material, equipment or device offered in substitution, together with a sample of the specific item when, in their opinion, the quality of the item and/or the appearance is involved, and it is deemed that an evaluation of the item may be better made by visual inspection.

F. When any request for a substitution of material, equipment or device is submitted and rejected, the item named in the Contract Documents shall be furnished. Repetitive submittal of substitutions for the same item will not be considered.

1.14 INSTALLATION DRAWINGS

A. Prepare installation drawings for coordinating the work of this Division with the work of other Divisions, to illustrate its concealment in finished spaces, to avoid obstructions, and to demonstrate the adaptability of any item of material, equipment or device in the space upon which the Contract Documents are based.

B. Use these drawings in the field for the actual installation of this work. Provide three (3) copies, not for approval, to the Architect/Engineer for his information, review and record.

1.15 WORKMANSHIP AND INSTALLATION

A. In no case shall the Contractor provide a class of material, equipment, device or workmanship less than that required by the Contract Documents or applicable codes, regulations, ordinances or standards. All modifications which may be required by a local authority having legal jurisdiction over all or any part of the work shall be made by the Contractor without any additional charge. In all cases where such authority requires deviations from the requirements of the Drawings or Specifications, the Contractor shall report it to the Owner's Representative and shall secure his approval before the work is started.

B. The work shall be performed by properly licensed technicians skilled in their respective trades. All materials, equipment and devices shall be installed in accordance with the recommendations of the manufacturer and in the best standard practice to bring about results of a first class condition.

C. The NECA "Standards of Installation" as published by the National Electrical Contractors Association shall be considered a part of these Specifications, except as specifically modified by other provisions contained in these Specifications.

1.16 WARRANTY

A. All materials, equipment, devices and workmanship shall be warranted for a period of one year from the date of acceptance by the Architect/Engineer for beneficial use by the Owner, except that where specific equipment is noted to have extended warranties. The warranty shall be in

accordance with AIA Document A201. The Contractor shall be responsible for the registration of these warranties so that the Owner can make all proper claims should future need develop.

B. The Contractor shall furnish to the Architect/Engineer for transmittal to the Owner, the name, address and telephone number of those persons responsible for service on systems and equipment covered by the warranty.

1.17 OPERATION PRIOR TO ACCEPTANCE

A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, the Contractor may do so provided that he properly supervises the operation, and retains full responsibility for the equipment operated. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments and complete punch list items before final acceptance by the Owner.

1.18 INSTRUCTION OF OWNER'S PERSONNEL

A. Provide the services of competent engineers and/or technicians acceptable to the Architect/Engineer to instruct other representatives of the Owner in the complete and detailed operation of each item of equipment or device of all the various electrical systems. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.

B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.

C. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include wiring diagrams, manufacturer's operating and maintenance instructions, parts lists (with sources identified), and other data as appropriate for each system.

1.19 SCHEDULE AND SEQUENCE OF WORK

A. The Contractor shall meet and cooperate with the Owner and Architect/Engineer to schedule and sequence this work so as to insure meeting scheduled completion dates and avoid delaying other portions of the work. Work requiring special sequencing shall be at no additional cost to the Owner and shall have no impact on the schedule.

1.20 INSPECTIONS AND CERTIFICATIONS

A. Obtain timely inspections of the installation by the regulatory authorities. Remedy any deficiencies to the satisfaction of the inspecting official.

B. Upon final completion of the work, obtain certificates of acceptance from the regulatory authorities. Deliver the certificates to the Architect/Engineer for transmission to the Owner.

1.21 EQUIPMENT INSTALLATION

A. Install equipment and devices in a manner to permit access to all surfaces or components, requiring such access, without the need to disassemble other unrelated parts of the work.

B. Equipment specified to be factory assembled and tested prior to shipment shall not be dissembled at the job site and reassembled at its final location. Apparatus not so specified may be disassembled and reassembled in the proper location.

C. Furnish all scaffolding, rigging and hoisting required for the installation of all the work.

D. Large equipment assemblies and components which will be installed in the building, and which are too large to permit access through doorways, stairways or shafts, shall be brought to the site and placed in the appropriate spaces before the enclosing structure is complete.

1.22 EQUIPMENT FOUNDATIONS

A. Where indicated on the Drawings, provide foundations for electrical equipment. This shall consist of concrete housekeeping pads constructed in accordance with the details on the Drawings, these Specifications, manufacturer's recommendations and Division 3.

B. All pads shall be 4" high and extend a maximum 2" beyond that actual equipment size. Coordinate the proper size of the pad with the equipment furnished. Furnish all anchor bolts and other accessories required for casting the concrete pad. After the equipment is set on the pad, the equipment shall be fully grouted to the pad and all void spaces shall be filled with a non-shrinking grout.

1.23 ESCUTCHEONS

A. In each finished space, provided a chromium plated, sectional escutcheon on each conduit, or hanger rod penetrating a wall, floor or ceiling.

B. Size escutcheons and collars to fit snugly around conduit and rods.

C. Where required, provide escutcheons with set screws so that they fit snugly against the finished surface.

1.24 ACCESS PANELS

A. Provide wall and ceiling access panels for unrestricted access to all concealed electrical equipment items and devices installed behind furrings, chases or non-removable suspended ceilings.

B. Access panels shall be UL listed and labeled as required to suit the fire rating of the surface in which installed, with mounting straps, concealed hinges, screwdriver locks, 180 degree open door design, 16 gauge steel construction and door and frame finished in prime coat finish. Panels shall be 12-inch by 12-inch minimum size, but shall be larger as the access requirement of the concealed electrical equipment item or device increases.

PART 2 - SITE ELECTRICAL

A. The site electrical work shall include, but not be limited to, the furnishing and installation of necessary materials and making arrangements for the connection of electrical and telephone utilities and for underground conduit.

B. All site electrical work shall be in accordance with latest National Electrical Code (NEC), Article 300, and service installation standards of the serving utility company(s).

C. The location of the electrical service entrance shall be coordinated with the electric utility company and with all other trades. Provide materials and equipment required to connect the electrical service.

D. Provide materials in accordance with other sections of these Specifications.

E. The location of the telephone service entrance shall be coordinated with the telephone utility company and with all other trades. Provide materials and equipment required to connect the telephone service.

F. The location of all underground electrical work such as service for parking lot lighting, site lighting, site security, etc. shall be coordinated with all other trades.

G. Underground installation of more than one conduit shall be in a “ductbank” arrangement. All conduits shall be laid so joints are staggered.

H. Pour a red colored concrete envelope minimum 3” thick over electrical and telephone service conduit.

I. Where specifically indicated on the Drawings, a full concrete enclosed ductbank with reinforcing rods shall be installed.

J. Perform excavation, shoring, backfilling and concrete work in connection with electrical work in accordance with other Divisions of the Specifications.

K. All underground conduit shall be sloped away from the building to negate water entering the building through the conduit system.

L. Provide underground warning tape 6” to 12” below finished surface along entire length of underground conduit or ductbank. Provide a separate length of tape every 24” in width of ductbank. Interface installation of underground warning tape with backfilling.

M. The locations, elevations and voltage of electrical lines and the location of the telephone lines included within the area of this work are indicated on the Drawings or in the Specifications in accordance with information received by the Owner.

N. The Contractor shall examine the site and shall verify, to his own satisfaction, the location and elevation of all utilities and shall adequately inform himself as to their relation to the work.

O. The work associated with existing utility lines to be abandoned or removed, shown within the scope of this project, will be arranged by the Owner with the respective utility.

P. Existing utility lines not indicated but encountered during construction shall be protected, relocated or capped as directed by the Owner’s Representative. All precautions shall be exercised to prevent damage to existing lines not shown, but should work become necessary, it must be authorized prior to execution except in an emergency situation.

Q. Before beginning excavations of any nature whatsoever, the Contractor shall make an attempt to locate all underground utilities of every nature occurring within the bounds of the area to be excavated. The Contractor shall then proceed with caution in his excavation work so that no utility shall be damaged with a resultant loss of service.

R. Should damage result to any utility through the Contractor's negligence or failure to comply with the above directive, he shall be liable for such damage and for all expense incurred in the expeditious repair or replacement of such damaged utilities.

S. Repair of damaged utilities shall be to a condition equal to or better than the adjacent undamaged portion of such utility and to the complete satisfaction of the Owner.

PART 3 - EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILLING

A. All excavating, trenching and backfilling shall generally be performed in accordance with the procedures and using the materials as described in Division 2. Provide all excavation required in connection with the installation of the work under this Division. After the work has been installed, tested and approved, backfill all excavations with suitable material.

B. Bottoms of trenches shall be cut to grade. Should rock be encountered, same shall be excavated to a depth of six (6) inches below bottom of conduit and space shall be filled and tamped as specified hereinafter. Should it be required to lay conduit on fill, fill shall first be compacted.

C. All conduit shall be installed promptly after excavation has been done so as to keep excavations open as short a time as possible.

D. Trenches shall be excavated to the required depths. Depth of cover shall be as required by the NEC or as indicated on Drawings. Keep banks of trenches as nearly vertical as possible, and provide adequate shoring where required.

E. When excavation is below the shale or subgrade level, backfill with granular fill or approved backfill material from the site to a depth of 12 inches above top of conduit, but in no case less than 1'-0" below the subgrade surface. The remainder of backfill to the shale or subgrade surface shall be an impervious material and shall be compacted at not less than 95 percent of the maximum dry density as defined by ASTM D-698. At all times, the top of the subgrade shall be kept in such condition that it will drain readily and effectively. Backfill above the subsurface shall be granular fill or approved select backfill from site.

F. Beyond building walls or above the shale or subgrade level, backfill with sand or granular fill to a depth of 12 inches above top of conduit and remainder of trench filled with approved select backfill material from the site.

G. Bottoms of trenches shall be tamped hard and graded to secure the maximum fall. Where rock is excavated below the bottom of the conduit, and before laying the conduit, fill the space between the bottom of the conduit and the rock surface with sand, thoroughly tamped.

H. Trenches dug in fill shall have the conduit supported down to load-bearing soil. After conduits have been inspected and approved by the Owner's Representative, trenches shall be filled with

approved backfill material which shall be firmly compacted, flooded if necessary and thoroughly tamped. Do not backfill with any fill containing rocks, frozen earth or debris.

I. Include the cutting of all sidewalks, streets and other pavements and repairing the opening sin them to return the surface to approximately its original condition.

3.2 CUTTING AND PATCHING

A. Cut all openings required to install the work or to repair any defective work. This cutting shall be performed under the Architect's/Engineer's direction and due diligence exercised to avoid cutting openings larger than required or in the wrong locations.

B. No cutting or drilling of any sort will be permitted in the webs of prestressed, precast concrete structural elements. Use core drills or power driven saws to cut openings in the flanges of other such structural elements; the use of reciprocating drills will not be permitted. The cutting of structural members without first having received written permission from the Architect/Engineer is prohibited.

C. Where openings are cut in fire-rated walls or floors, seal the annular space between the work installed and the fire-rated construction. Sealant, as applied, shall be fire rated to maintain the fire rating of the construction penetrated. Sealant shall be re-enterable (before fire) to alter penetrations. Apply in strict accordance with manufacturer's instructions.

3.3 PROTECTION OF APPARATUS

A. At all times take every precaution to properly protect apparatus from damage due to dust, dirt, water, etc. or from damage due to physical forces. Include the erection of temporary shelters as required, to adequately protect any apparatus stored at the site, the cribbing of any apparatus directly above the construction, and the covering of apparatus in the incomplete building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above to the entire satisfaction of the Architect/Engineer will be sufficient cause for the rejection of the pieces of apparatus in question.

B. Responsibility for the protection of apparatus extend also to existing apparatus involved in this Division of the work, whether such apparatus is designated to be used temporarily and later removed, or is to be reused as a part of the permanent installation. Erect temporary sheltering structures, provide temporary bracing and supports, or cover equipment as required or directed to afford proper protection for that equipment.

C. The Contractor shall protect this work and the work of all other Contractors from damage by his work or workmen and shall make good any damage thus caused. He shall also be responsible for the proper protection of his equipment, machinery, materials and accessories delivered and installed on the job.

3.4 INSTALLATION AND CONNECTION OF OTHER DIVISION'S EQUIPMENT

A. Verify the electrical requirements of all equipment furnished under other Divisions, separate contracts, or by the Owner. Install conduit, power wiring, control wiring, devices, etc. as require for complete operation of all equipment.

3.5 OPTION TO RELOCATE OUTLETS AND RELATED DEVICES

A. The location of power, data and telephone outlets, wall switches and other related devices may be relocated at the Owner's option, at no additional cost to the Owner, to a point within 10 feet of their present location provided the Contractor is notified prior to installation.

3.6 COOPERATION AND CLEAN-UP

A. It shall be the responsibility of the Contractor to cooperate fully to keep the job site in a clean and safe condition. Upon the completion of the job, the Contractor shall immediately remove all of his tools, equipment, surplus materials and debris.

B. After the installation is complete, and before the equipment is energized, clean the interior and exterior of all equipment thoroughly. Clean equipment, removing all debris, rubbish and foreign materials. Each component shall be cleaned and all dust and other foreign material removed. Components shall be cleaned of oxidation. The inside and outside of all switchgear shall also be wiped clean with a lemon-oil rag after other cleaning is complete.

C. Any portion of the work requiring touch-up finishing shall be so finished to equal the specified finish on the product.

3.7 RECORD DRAWINGS AND DOCUMENTATION FOR OWNER

A. The Contractor shall obtain at his own expense a complete set of blueline prints, or Xerox copies on which to keep an accurate record of the installation of all materials, equipment and devices covered by the Contract. The record drawings shall indicate the location of all equipment and devices, and the routing of all systems. All piping and conduit buried in concrete slabs, walls and below grade shall be located by dimension; both horizontally and by vertical elevation, unless a surface mounted device in each space indicates the exact location. Obtain one complete reproducible set of the original drawings on which to neatly, legibly and accurately transfer all project related notations and deliver these drawings to the Architect/Engineer at job completion before final payment and delivery to the Owner. The above data, with the exception of the record drawings, shall be delivered prior to final acceptance.

B. The Contractor shall accumulate in duplicate during the job progress, the following data prepared in indexed 3-ring looseleaf, hard-back binders sized for 8-1/2 inch by 11 inch sheets. No binder shall exceed 3-1/2 inches thick. This data shall be turned over to the Architect/Engineer for review and subsequent delivery to the Owner prior to final acceptance.

1. Warranties, guarantees and manufacturer's directions on material, equipment and devices covered by the Contract.
2. Approved lighting fixture brochures, wiring diagrams and control diagrams.
3. Copies of approved submittals and shop drawings.
4. Operating instructions for major apparatus and recommended maintenance procedures.
5. Copies of all other data and/or drawings required during construction.
6. Repair parts list of major apparatus, including name, address and telephone number of local supplier or representative.
7. Tag charts and diagrams hereinbefore specified.

3.8 FINAL OBSERVATION

A. The purpose of the final observation is to determine whether the Contractor has completed the construction in accordance with the Contract Documents and that in the Owner Representative's opinion the installation is satisfactory for final acceptance by the Owner.

B. It shall be the responsibility of the Contractor to assure that the installation is ready for final acceptance prior to calling upon the Architect/Engineer to make a final observation.

END OF SECTION 260572

SECTION 260573

POWER SYSTEM STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

1.3 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399. Furnish IEEE 399 Standard document.

C. Qualification Data: For coordination-study specialist.

D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals may be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and Equipment Evaluation Reports.
3. Coordination-Study Report.

E. Submittal review of overcurrent Protective Device Coordination and ARC Flash study shall be submitted with Electrical Gear Specifications sections, 262200, 262300, 262413, 262416, 262816, 263213, and 263600. Contractor is responsible for gathering of information required to complete power system study, such as utility transformer impedance, KVA, primary available short circuit rating etc. **(No Exeptions).**

1.4 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.

B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.

C. Comply with IEEE 242 for short-circuit currents and coordination time intervals. Furnish IEEE 242 Standard document Furnish IEEE 399 Standard document.

D. Comply with IEEE 399 for general study procedures.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Available Computer Software Developers: Subject to compliance with requirements, companies offering computer software programs that may be used in the Work include, but are not limited to, the following:

1. CGI CYME.
2. EDSA Micro Corporation.
3. ESA Inc.
4. Operation Technology, Inc.
5. SKM Systems Analysis, Inc.
6. Amtech Pro Design

2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

A. Comply with IEEE 399.

B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

A. Gather and tabulate the following input data to support coordination study:

1. Product Data for overcurrent protective devices specified in other Division 16 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Impedance of utility service entrance.
3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:

    a. Circuit-breaker and fuse-current ratings and types.
    b. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    c. Generator kilovolt amperes, size, voltage, and source impedance.
    d. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.

4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Time-current-characteristic curves of devices indicated to be coordinated.
    f. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    g. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    h. Panelboards, switchboards, motor starters ampacity, and interrupting rating in amperes rms symmetrical.

3.3 FAULT-CURRENT STUDY

A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:

1. Switchgear and switchboard bus.
2. Medium-voltage controller.
3. Motor-control center.
4. Distribution panelboard.
5. Branch circuit panelboard.

B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.

C. Calculate momentary and interrupting duties on the basis of maximum available fault current.

D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 141 and IEEE 242.

1. Transformers:

a. ANSI C57.12.10.
b. ANSI C57.12.22.
c. ANSI C57.12.40.
d. IEEE C57.12.00.
e. IEEE C57.96.

2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
3. Low-Voltage Fuses: IEEE C37.46.

E. Study Report:

1. Show calculated equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.

F. Equipment Evaluation Report:

1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

3.4 COORDINATION STUDY

A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.

1. Calculate the maximum and minimum 1/2-cycle short-circuits current.
2. Calculate the maximum and minimum ground-fault currents.

B. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.
b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

C. Motors served by voltages more than 600 V shall be protected according to IEEE 620.

D. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

E. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:

1. Tabular Format of Settings Selected for Overcurrent Protective Devices:

a. Device tag.
b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
d. Fuse-current rating and type.
e. Ground-fault relay-pickup and time-delay settings.
f. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices.

F. Completed data sheets for setting of overcurrent protective devices.

G. 3.5 ARC FLASH HAZARD

H. A. Comply with NFPA 70E-2000 Edition and IEEE standard 1584-2002.

I. 1. Identify the magnitude of the maximum and minimum short-circuit available with associated fault clearing time at each switchboard and panel.

J. 2. Identify the level of incident energy, the proper rating of personal protective equipment for levels of energy that are calculated.

K. 3. Personal protective equipment shall be identified in accordance with NFPA70 Table 130.7(c)(9)(a).

END OF SECTION 260573

SECTION 260923

LIGHTING CONTROL DEVICES

PART 1 – GENERAL

1.1. RELATED DOCUMENTS

A. Structured Cabling System 260700

1.2. SUMMARY

A. The lighting control system specified in this section shall provide time-based, sensor-based (both occupancy and daylight), and manual lighting control.
B. The system shall be capable of turning lighting loads on/off as well as dimming lights (if lighting load is capable of being dimmed)
C. All system devices shall be networked together enabling digital communication and shall be individually addressable.
D. The system architecture shall be capable of enabling stand-alone groups (rooms) of devices to function in some default capacity even if network connectivity to the greater system is lost.
E. The system architecture shall facilitate remote operation via a computer connection.
F. The system shall not require any centrally hardwired switching equipment.

1.3. DEFINITIONS

A. Refer to lighting control sheets for definitions.

1.4. SUBMITTALS

A. Product Datasheets (general device descriptions, dimensions, wiring details, nomenclature)
B. Riser Diagrams – typical per room type (detailed drawings showing device interconnectivity of devices)
C. Other Diagrams – as needed for special operation or interaction with other system(s)
D. Example Contractor Startup/Commissioning Worksheet – must be completed prior to factory start-up
E. Hardware and Software Operation Manuals
F. Other operational descriptions as needed

1.5. QUALITY ASSURANCE

A. All steps in sensor manufacturing process shall occur in the USA; including population of all electronic components on circuit boards, soldering, programming, wiring, and housing.

B. All components and the manufacturing facility where product was manufactured must be ROHS compliant.

C. In high humidity or cold environments, the sensors shall be conformably coated and rated for condensing humidity and -40 degree Fahrenheit (and Celsius) operation.

D. All applicable products must be UL / CUL Listed or other acceptable national testing organization.

1.6. **C**OORDINATION

A. Coordinate lighting control components to form an integrated interconnection of compatible components.

B. Coordinate lighting controls with BAS (if necessary) either through IP based intercommunication of system or hardwired auxiliary relay outputs.

C. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.

1.7. WARRANTY

A. All devices in lighting control system shall have a 5 year warranty.

PART 2 – PRODUCTS

2.1. MANUFACTURER**S**

A. This specification is based on the nLight® Network Control System from Sensor Switch, an Acuity Brands Company.

2.2. SYSTEM REQUIREMENTS

A. System shall have an architecture that is based upon three main concepts; 1) intelligent lighting control devices 2) standalone lighting control zones 3) network backbone for remote or time based operation.

B. Intelligent lighting control devices shall consist of one or more basic lighting control components; occupancy sensors, photocell sensors, relays, dimming outputs, manual switch stations, and manual dimming stations. Combining one or more of these components into a single device enclosure should be permissible so as to minimize overall device count of system.

C. Intelligent lighting control devices shall communicate digitally, require ~2 mA of current to function (Graphic WallPod excluded), and posses at least two RJ-45 connectors.

D. Lighting control zones shall consist of one or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.

E. Devices within a lighting control zone shall be connected with CAT-6A low voltage cabling, in a daisy-chain fashion, and in any order.

F. Lighting control zone shall be capable of automatically configuring itself for default operation without any start-up labor required.

G. Individual lighting zones must continue to provide a user defined default level of lighting control in the event of a system communication failure with the backbone network or the management software becoming unavailable.

H. Power for devices within a lighting control zone shall come from either resident devices already present for switching purposes (relay device), or from the network backbone. Standalone “bus power supplies” shall not be required in all cases.

I. All switching and dimming for a specific lighting zone shall take place within the devices located in the zone itself (i.e. not in a remotely located devices such as panels) to facilitate system robustness and minimize wiring requirements. Specific applications that require centralized or remote switching shall be capable of being accommodated.

J. System shall have a primary wall mounted network control “gateway” device that is capable of accessing and controlling all other system devices and linking into an Ethernet LAN.

K. System shall use “bridge” devices that route communication and distribute power for up to 8 lighting zones together for purposes of decreasing system wiring requirements.

L. System shall have a web-based software management program that enables remote system control, status monitoring, and creation of lighting control profiles.

M. Individual lighting zones shall be capable of being segmented into several channels of occupancy, photocell, and switch functionality for more advanced configurations and sequences of operation.

N. System shall be capable of operating a lighting control zone according to several sequences of operation:

a. Auto-On / Auto-Off (via occupancy sensors)
b. Manual-On / Auto-Off
c. Auto-to-Override On
d. Manual-to-Override On
e. Auto On/Predictive Off
f. Multi-Level On (multiple lighting levels per manual button press)

O. A taskbar style application shall be available for individual lighting control.

P. Control software shall enable logging of system performance data.

Q. Control software shall enable a basic level of integration with a BAS.

2.3. INDIVIDUAL DEVICE SPECIFICATIONS

A. Control Module (Gateway)

a. Module shall be a wall mounted user accessible device that is capable of communicating and controlling downstream system control devices and linking into an Ethernet.

b. Devices shall be powered by low voltage, fit within a two gang switch box, and have a backlit LCD panel.

c. User control shall be made available via finger-touch buttons with no moving parts. Buttons shall be capable of being locked for security.

d. Device shall have three RJ-45 ports for connection to other backbone devices (bridges) or directly to a lighting control zones devices.

e. Device shall automatically detect all devices downstream of it.

f. Device shall have a standard and astronomical internal time clock.

g. Device shall have one RJ-45 10/100 BaseT Ethernet connection.

h. Each control gateway device shall be capable of linking 400 devices to the management software.

i. Device shall be capable of using a dedicated or DHCP assigned IP address.

j. Network Control Gateway device shall be the following Sensor Switch model number: nGWY

B. Network System Occupancy Sensors

a. Occupancy sensors system shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.

b. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state; thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.

c. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.

d. Dual technology sensors shall have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) shall not be acceptable.

e. All sensing technologies shall be acoustically passive meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.

f. Sensors shall be available with zero, one, or two integrated Class 1 switching relays, and up to one 0-10 VDC dimming output. Senors shall be capable of switching 120 / 277 / 347 VAC. Load ratings shall be 800 W @ 120 VAC, 1200 W @ 277 VAC, 1500 W @ 347 VAC, and ¼ HP motor. Relays shall be dry contacts.

g. Sensors shall be available with one or two occupancy “poles”, each of which provides a programmable time delay.

h. Sensors shall be available in multiple lens options which are customized for specific applications.

i. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.

j. All sensors shall have two RJ-45 ports.

k. Every sensor parameter shall be available and configurable remotely from the software and locally via the device push-button.

l. Sensors shall be able to function together with other sensors in order to provide expanded coverage areas by simply daisy-chain wiring together the units with CAT-5 cabling.

m. Sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements.

n. Wall switch sensors shall recess into single-gang switch box and fit a standard GFI opening.

o. Wall switch sensors must meet NEC grounding requirements by providing a dedicated ground connection and grounding to mounting strap. Line and load wire connections shall be interchangeable. Sensor shall not allow current to pass to the load when sensor is in the unoccupied (Off) condition.

p. Wall switch sensors shall have optional features for photocell/daylight override, vandal resistant lens, and low temperature/high humidity operation.

q. Wall switch sensors shall be available in four standard colors (Ivory, White, Almond, Gray)

r. Wall switch sensors shall be the following Sensor Switch model numbers, with device color and optional features as specified:

nWSD (PIR, 1 Relay)

nWSD-PDT (Dual Technology, 1 Relay)

nWSD-2P (PIR, 2 Relays)

nWSD-PDT-2P (Dual Technology, 2 Relays)

nWSD-NL (PIR w/ Night Light, 1 Relay)

nWSD-PDT-NL (Dual Technology w/ Night Light, 1 Relay)

nWSD-LV (PIR, No Relay)

nWSD-PDT-LV (Dual Technology w/ Night Light, No Relay)

s. Network system shall also have ceiling, fixture, recessed, & corner mounted sensors available.

t. Sensors shall have optional features for photocell/daylight override, dimming control, and low temperature/high humidity operation.

u. Sensors with dimming can control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of Class 2 current (typically 40 or more ballasts).

v. Sensors shall be the following Sensor Switch model numbers, with device options as specified:

Model # Series	Occupancy Poles	# of Relays	Lens Type	Detection Technology
nCM(B)-9	1	-	Standard	PIR
nCM(B)-9-2P	2	-	Standard	PIR
nCMR(B)-9	1	1	Standard	PIR
nCMR(B)-9-2P	2	2	Standard	PIR
nCM(B)-PDT	1	-	Standard	Dual
nCM(B)-PDT-2P	2	-	Standard	Dual
nCMR(B)-PDT	1	1	Standard	Dual
nCMR(B)-PDT-2P	2	2	Standard	Dual
nCM(B)-10	1	-	Extended	PIR
nCM(B)-10-2P	2	-	Extended	PIR
nCMR(B)-10	1	1	Extended	PIR
nCMR(B)-10-2P	2	2	Extended	PIR
nCM(B)-PDT-10	1	-	Extended	Dual
nCM(B)-PDT-10-2P	2	-	Extended	Dual
nCMR(B)-PDT-10	1	1	Extended	Dual
nCMR(B)-PDT-10-2P	2	2	Extended	Dual
nWV-16	1	-	Wide View	PIR
nWV-PDT	1	-	Wide View	Dual
nHW-13	1	-	Hallway	PIR
nCM(B)-6	1	-	High Bay	PIR
nCMR(B)-6	1	1	High Bay	PIR
nCMR(B)-6-2P	2	2	High Bay	PIR
nCMR(B)-6-480	1	2	High Bay	PIR

Recessed mount versions of the above ceiling(fixture) mount versions also shall be available (e.g. nCMR(B) 9 => nRMR 9)

C. Network System Daylight (Photocell and or Dimming) Sensors

a. Photocell shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.

b. Photocell and dimming sensor's set-point and deadband shall be automatically calibrated through the sensor's microprocessor by initiating an "Automatic Set-point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.

c. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).

d. Dimming sensors shall control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of class 2 current (typically 40 or more ballasts).

e. Photocell and dimming sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements. (Note: This function should be performed prior to any dimming of the lamps including the "auto set-point" setting.)

f. Combination units that have all features of on/off photocell and dimming sensors shall also be available.

g. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The second zone shall be capable of being controlled as an "offset" from the primary zone.

h. Line voltage versions of the above described photocell and combination photocell/dimming sensors shall be capable of switching both 120 VAC, 277 VAC, and 347 VAC. Load ratings shall be 800 W @ 120 VAC, 1200 W @ 277 VAC, 1500 W @ 347 VAC, and ¼ HP motor load. Relays shall be dry c ontacts.

i. Sensor shall be the following Sensor Switch model numbers, with device options as specified:

- nCM(B) PC (on/off))
- nCM(B) ADC (dimming)
- nCM(B) PC ADC (on/off, 0-10 VDC dimming)
- nCMR(B) PC (on/off, single relay)
- nCMR(B) PC ADC (on/off, 0-10 VDC dimming, single relay)

Note: Recessed mount versions of the above ceiling(fixture) mount versions also shall be available (e.g. nCMR(B) PC => nRMR PC)

D. Networked Power (Relay) Packs

a. Power Pack shall incorporate one or more Class 1 relays and contribute low voltage power to the rest of the system. Slave Packs shall incorporate the relay(s), shall have an optional 2nd relay or 0-10 VDC dimming output, but shall not be required to contribute system power. Power Supplies shall provide system power only, but are not required to switch line voltage circuit. Auxiliary Relay Packs shall switch low voltage circuits only.

b. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC), be plenum rated, and provide Class 2 power to the system.

c. All devices shall have two RJ-45 ports.

d. Every Power Pack parameter shall be available and configurable remotely from the software and locally via the device push-button.

e. Power Pack shall securely mount to junction location through a threaded ½ inch chase nipple. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.

f. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.

g. Class 1 Relays used in Power (Slave) Packs shall provide 16 Amp switching of all load types, and be rated for 400,000 cycles.

h. Power (Relay) Packs and Supplies shall be the following Sensor Switch model numbers:

- nPP16 (Power Pack w/ relay)

- nSP16 (Slave Pack w/ relay)
- nSP5 2P (Slave Pack w/ two relays)
- nPS 80 (Power Supply)
- nAR 40 (Low voltage auxiliary relay pack)

E. Wall Switches & Dimmers

a. Devices shall recess into single-gang switch box and fit a standard GFI opening.
b. Devices shall be available with zero or one integrated Class 1 switching relay.
c. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
d. All sensors shall have two RJ-45 ports.
e. All devices shall provide toggle switch control. Dimming control and low temperature/high humidity operation are available options.
f. Devices shall be available in four colors (Ivory, White, Almond, Gray).
g. Devices with dimming control outputs can control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of Class 2 current (typically 40 or more ballasts).
h. Wall switches & dimmers shall be the following Sensor Switch model numbers, with device options as specified:
    - nPOD (single on/off, capacitive touch)
    - nPOD 2P (single on/off, capacitive touch)
    - nPODR (single on/off, one relay, capacitive touch)
    - nPODM (single on/off, mechanical buttons)
    - nPODM 2P (single on/off, mechanical buttons)

F. Graphic Wall Station

i. Device shall have a 3.5” full color touch screen for selecting up to 8 programmable lighting control presets or acting as up to 16 on/off/dim control switches.
j. Device shall enable configuration of lighting presets, switched, and dimmers via password protected setup screens.
k. Device shall enable user supplied .jpg screen saver image to be uploaded.
l. Device shall surface mount to single-gang switch box
m. Device shall have a micro-USB style connector for local computer connectivity.
n. Device shall have two RJ-45 ports for communication
o. Device shall be the following Sensor Switch model number: nPOD GFX

G. Scene Controller

p. Device shall have four buttons for selecting programmable lighting control profiles or acting as on/off switches.
q. Device shall recess into single-gang switch box and fit a standard GFI opening.

r. Device shall provide user control via touch sensitive buttons which have no mechanical parts.
s. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
t. All sensors shall have two RJ-45 ports.
u. Device shall have four touch sensitive buttons for selecting programmable lighting control profiles.
v. Device shall have four bi-color LEDs indicating current selection.
w. Scene Selector device shall be the following Sensor Switch model number:nPODS

2.3. Communication Bridges

a. Device shall surface mount to a standard 4” x 4” square junction box.
b. Device shall have 8 RJ-45 ports.
c. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to Control Gateway.
d. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply or delivered via a CAT-5 cabled connection.
e. Device shall be careful of redistributing power from its local supply and connect lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of power to a particular area to be less impactful on network lighting control system.
f. Communication Bridge devices shall be the following Sensor Switch model numbers: nBRG 8 (8 Ports)

2.4. LIGHTING CONTROL PROFILES

A. Changes to the operation of the system shall be capable of being made in real-time or scheduled via lighting control profiles. These profiles are outlines of settings that direct how a collection of devices function for a defined time period.
B. Lighting control profiles shall be capable of being created and applied to a single device, zone of devices, or customized group of zones.
C. All relays and dimming outputs shall be capable of being scheduled to track or ignore information regarding occupancy, daylight, and local user switches via lighting control profiles.
D. Every device parameter (e.g. sensor time delay and photocell set-point) shall be configurable via a lighting control profile.
E. All lighting control profiles shall be stored on the network control gateway device and on the software’s host server.
F. Lighting control profiles shall be capable of being scheduled to run according to the following calendar options: start date/hour/minute, end date/hour/minute, and sunrise/sunset +/- timed offsets.
G. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
H. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
I. Lighting control profile schedules shall be capable of being given the following recurrence settings: daily, weekday, weekend, weekly, monthly, and yearly.
J. Software shall provide a graphical tool for easily viewing scheduled lighting control profiles.

2.5. MANAGEMENT SOFTWARE

A. Every device parameter (e.g. sensor time delay and photocell set-point) shall be available and configurable remotely from the software
B. The following status monitoring information shall be made available from the software for all devices for which it is applicable: current occupancy status, current PIR Status, current Microphonics Status, remaining occupancy time delay(s), current photocell reading, current photocell inhibiting state, photocell transitions time remaining, current dim level, device temperature, and device relay state(s).
C. The following device identification information shall be made available from the software: model number, model description, serial number, manufacturing date code, custom label(s), and parent network device.
D. A printable network inventory report shall be available via the software.
E. Software shall require all users to login with a User Name and Password.
F. Software shall provide at least three permission levels for users.
G. All sensitive stored information and privileged communication by the software shall be encrypted.
H. All device firmware and system software updates must be available for automatic download and installation via the internet.

2.6. START-UP FEATURES

A. To facilitate start-up, all devices daisy-chained together (using CAT-6A) shall automatically be grouped together into a functional lighting control zone.
B. All lighting control zones shall be able to function according to default settings once adequate power is applied and before any system software is installed.
C. Once software is installed, system shall be able to auto-discover all system devices without requiring any commissioning.
D. All system devices shall be capable of being given user defined names.
E. All devices within the network shall be able to have their firmware reprogrammed remotely and without being physically uninstalled for purposes of upgrading functionality at a later date.
F. Contractor shall include in his bid to owner two days (8) hours each for owner training and walk through product demonstration.
G. Contractor shall include in his bid to owner one day (8) hours for installing contractor training.
H. Contractor shall include in his bid to owner one day (8) hours of follow-up training withing 60 days of start-up.

End of Section 260923

SECTION 262200

LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.
2. Buck-boost transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Source quality-control test reports.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Challenger Electrical Equipment Corp.; a division of Eaton Corp.
2. Eaton Electrical Inc.; Cutler-Hammer Products.
3. General Electric Company.
4. Magnetek Power Electronics Group.
5. Myers Power Products, Inc.
6. Siemens Energy & Automation, Inc.
7. Square D; Schneider Electric.
8. <Insert manufacturer's name.>

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Aluminum.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Enclosure: Ventilated, NEMA 250, Type 2.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

D. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: Gray.

E. Taps for Transformers Smaller Than 3 kVA: None.

F. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

G. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

H. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.

I. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.

1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor.
2. Indicate value of K-factor on transformer nameplate.

J. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.

1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
2. Include special terminal for grounding the shield.
3. Shield Effectiveness:

a. Capacitance between Primary and Secondary Windings: Not to exceed 33 picofarads over a frequency range of 20 Hz to 1 MHz.
b. Common-Mode Noise Attenuation: Minimum of minus 120 dBA at 0.5 to 1.5 kHz; minimum of minus 65 dBA at 1.5 to 100 kHz.
c. Normal-Mode Noise Attenuation: Minimum of minus 52 dBA at 1.5 to 10 kHz.

K. Wall Brackets: Manufacturer's standard brackets.

L. Fungus Proofing: Permanent fungicidal treatment for coil and core.

M. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.

N. Low-Sound-Level Requirements: Maximum sound levels, when factory tested according to IEEE C57.12.91, as follows:

1. 9 kVA and Less: 40dB
2. 30 to 50 kVA: 45dB
3. 51 to 150 kVA: 50dB
4. 151 to 300 kVA: 55dB
5. 301 to 500 kVA: 60dB
6. 501 to 750 kVA: 62dB
7. 751 to 1000 kVA: 64dB

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Electrical Identification."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."

B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Remove and replace units that do not pass tests or inspections and retest as specified above.

D. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform 2 follow-up infrared scans of transformers, one at 4 months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

E. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 262200

SECTION 262413

SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Comply with other Division 26 Sections, as applicable. Refer to other Division for coordination of the work.

1.2 SUMMARY

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of switchboard indicated, including all related systems and accessories.

1.3 REFERENCE STANDARDS

A. Switchboard and overcurrent protection devices referenced herein shall designed and manufactured according to the latest version of the following standards:

1. ANSI/NFPA 70 – National Electrical Code (NEC).
2. ANSI/IEEE C12.1 – Code for Electrically Metering.
3. ANSI C39.1 – Electrical Analog Indicating Instruments.
4. ANSI C57.13 – Instrument Transformers.
5. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
6. NEMA PB 2 – Deadfront Distribution Switchboards.
7. NEMA PB 2.1 – Proper Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
8. NEMA PB 2.2 – Application Guide for Ground Fault Protective Devices for Equipment.
9. UL 50 – Cabinets and Boxes.
10. UL 98 – Enclosed and Dead Front Switches.
11. UL 489 – Molded Case Circuit Breakers.
12. UL 891 – Dead-Front Switchboards.
13. UL 943 – Ground Fault Circuit Interrupters.
14. UL 977 – Fused Power Circuit Devices.
15. Federal Specification W-C-375B/Gen – Circuit breakers, molded case, branch circuit and service.
16. Federal Specification W-C-870 – Fuseholders (for plug and enclosed cartridge fuses).
17. Federal Specification W-S-865 – Enclosed Knife Switch.

1.4 SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 – PRODUCTS.

B. Shop Drawings shall indicate front and side enclosure elevations with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of horizontal bus bars per phase, neutral ground; one-line diagrams; equipment schedule; and switchboard instrument details.

1.5 QUALITY ASSURANCE

A. Furnish products listed and classified by Underwriters Laboratories Incorporated and in accordance with the reference standards previously indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products in conformance with manufacturer's recommended practices as outlined in applicable Installation and Maintenance Manuals.

B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.

C. Inspect and report concealed damage to carrier within their required time period for repair or replacement.

D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.

E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.7 PROJECT CONDITIONS

A. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

B. Provide one (1) set of installation and maintenance instructions with each switchboard. Instructions shall be easily identified and affixed within the incoming or main section of the line-up.

C. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for a period of one (1) year form date of final acceptance by the Owner.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Corp.; Cutler-Hammer Products.
2. Siemens Energy & Automation, Inc.
3. Square D Co.

2.2 FABRICATION AND FEATURES

A. Short Circuit Current Rating: Switchboards shall have a minimum short circuit current rating as indicated on the Drawings in RMS symmetrical amperes at the maximum AC voltage indicated.

B. Future Provisions: All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.

C. Switchboard enclosure shall be as shown on drawings.

1. Align switchboard sections at front and rear.
2. Switchboards shall be of deadfront construction.
3. Switchboard frames shall be of formed UL gauge steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
4. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
5. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
6. Switchboard enclosures shall be painted on all exterior surfaces. The paint finish shall be an ANSI standard medium light gray.
7. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.

D. Provide engraved laminated nameplates for each switchboard and each overcurrent protective device in accordance with Section 260573.

E. Bus composition shall be plated copper. Plating shall be applied continuously to all bus work. The switchboard bussing shall be based on 1000A per square inch. The phase and neutral (for 4-wire systems) through-bus shall have an ampacity as indicated. For 4-wire systems, the neutral shall be of equivalent ampacity as the phase bus bar. Full provisions for the addition of future sections shall be provided. Bussing shall include all necessary hardware to accommodate splicing for future additions.

F. Bus connections shall be bolted with Grade 5 bolts and conical spring washers.

G. Ground bus shall be copper and shall be sized per NFPA 70 and UL 891 and shall extend the entire length of the switchboard. Provisions for the addition of future sections shall be provided as previously indicated.

2.3 TVSS DEVICES

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of a high-energy power conditioning device(s) at the electrical power system service entrance equipment (switchgear, switchboard or panelboard) where indicated on the Drawings. The device shall incorporate transient voltage surge suppression (TVSS) and high-frequency electrical live noise filtering. The device shall provide effective high energy transient voltage suppression, surge current diversion, high-frequency attenuation, and line stabilization in ANSI/IEEE C62.41-1991 environments connected

downstream from the facility's main overcurrent protective device. The device shall be connected in parallel with the facility's wiring system.

B. Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the Contract Documents.

1. Include electrical characteristics and ratings for the specified equipment.
2. Include wiring diagrams indicating the internal connections of the specified equipment within its enclosure.
3. Drawings shall be provided indicating device dimensions, weights, mounting provisions, connection details and wiring diagrams.
4. Documentation of the specified device UL 1449 rating shall be included. All submittals without this documentation will be rejected.
5. The manufacturer shall make available upon request certified documentation of applicable location category testing in full compliance with ANSI/IEEE C62.41-1991 and ANSI/IEEE C62.45-1987 guidelines.

C. Submit a complete set of manufacturers' product data and shop drawings indicating all post bid revisions and field changes.

D. Provide a test report from a nationally recognized independent testing laboratory verifying that the suppression device can survive the published surge current rating on a per phase and per mode basis. The test wave shall be IEEE C62.41, 8 x 20 microsecond current wave. Test data on individual modules are not acceptable.

E. Provide a spectrum analysis of each unit based on MIL-STD-220A test procedures between 50 kHz and 200 kHz verifying the device's noise attenuation exceeds 45 dB at 100 kHz.

F. The device shall be designed, manufactured, tested and installed in compliance with the latest editions of:

1. American National Standards Institute (ANSI) and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.41-1991 and C62.45-1987).
2. Federal Information Processing Standards Publication 94 (FIPS Pub 94).
3. National Electrical Manufacturers Association (NEMA LS-1).
4. National Fire Protection Association (NFPA 70, National Electrical Code (NEC), 75 and 78).
5. Underwriters Laboratories UL 1449 Standard for Transient Voltage Surge Suppressors and UL 1283 Standard for Electro-Magnetic Interference Filters.

G. The device shall be warranted against defects in material and/or workmanship for a minimum of five (5) years from the date of shipment. The device shall be thoroughly factory-tested before shipment. Testing of the device shall include, but not be limited to, quality control checks, maximum continuous operating voltage (MCOV) check, and clamping voltage verification tests. The MCOV check shall consist of a minimum of one (1) hour burn-in at the applicable MCOV. Based on life expectancy testing, the device shall be capable of protecting against and surviving at lease 3,500 ANSI/IEEE C62.41-1991 and C62.45-1987 Category C3 surges without failing or degrading the UL 1449 surge suppression rating by more than ten percent (10%).

H. Provide the following environmental and electrical requirements for the system:

1. Storage temperature range shall be -40° to +185° F (-40° to +85° C).
2. Operating temperature range shall be -40° to +140° F (-40° to +60° C).
3. Operation shall be reliable in an environment with five percent (5%) to ninety-five percent (95%) non-condensing relative humidity.

4. The device shall be capable of operation in an altitude of 0-12,000 feet above sea level.
5. The device shall not generate any audible noise.
6. No appreciable magnetic fields shall be generated. The device shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.
7. The nominal operating voltage and configuration shall be [480Y/277] [208Y/120] plus ground.
8. The allowable maximum continuous operating voltage of all suppression components utilized in the unit shall not be less than one hundred fifteen percent (115%) of the nominal operating voltage.
9. The operating frequency range of the device shall be 47 to 63 hertz.
10. The device's primary mode of protection shall be line-to-neutral. The secondary modes of protection shall be line-to-ground and neutral-to-ground.
11. The device performance ratings shall be based on the UL 1449 listed suppression ratings. The UL 1449 voltage suppression rating for the required mode of protection at [480Y/277 volts shall be 1000 volts L-N and L-G and at 480Y/277 volts shall be 800 N-G with a fused disconnect switch as an integral part of the device.

I. Acceptable Manufacturers:

1. Service entrance equipment manufacturers utilizing integral TVSS devices manufactured by others shall retain full responsibility in the warranty, service and technical support of the TVSS device.

J. The device shall include a solid-state suppression system which includes arrays of fused non-linear voltage dependent metal oxide varistors (MOVs) with similar operating characteristics. The suppression system shall not utilize gas tubes, spark gaps, silicon avalance diodes or other components which might short or crowbar the line, thus leading to interruption of normal power flow to or system upset of connected loads. The suppression system shall not incorporate any other components which may degrade performance or reliability of the suppression system.

K. The device shall include a UL 1283 high frequency extended range tracking filter. The filter shall reduce fast rise-time, high-frequency, error-producing transients and electrical line noise eliminating disturbances which may lead to system upset. The filter shall provide minimum insertion loss of 45 dB at 100 kHz attenuation frequency utilizing the MIL-STD-E220A 50 ohm insertion loss methodology.

L. All internal wiring associated with the suppression/filter device and subject to surge currents shall utilize low-impedance copper bus bar and/or #2 AWG copper conductor or larger. All internal connections associated with the suppression/filter device and subject to surge currents shall be made with compression solderless-type lugs and shall be bolted to the bus bars in order to reduce overall system impedance.

M. The device shall include mechanical lugs for each phase, neutral and ground, as applicable. The lugs shall accommodate up to #2 AWG copper conductor.

N. The device shall include an integral fused and safety interlocked disconnect switch located in the device enclosure with an externally mounted manual operator. The switch shall disconnect all ungrounded circuit conductors from the distribution system to enable testing and/or maintenance without interruption of power to the facility's distribution system. The switch shall be rated for 600 volts AC. Each current carrying ungrounded circuit conductor connected to the facility's wiring system shall be individually fused with 200,000 AIC rated fuses in order to provide maximum fault current protection. The device shall be UL 1449 listed with the integral fused disconnect switch.

O. The device shall be provided in a surface mounted NEMA 1 type hinged enclosure of minimum 14 gauge steel, painted inside and out. Enclosure width shall not be greater than 24 inches.

P. The device shall include solid-state, long-life externally mounted LED visual status indicators that indicate the on-line status of each phase of the unit.

Q. The device shall include Form C dry contacts (N.O. or N.C.) to facilitate future connection to a building management system in order to monitor the on-line status of the device. The contacts shall be normally open or normally closed and shall close or open upon failure of the suppression system and/or fuse.

R. The installation and testing of the system shall be in full accordance with the manufacturer's installation; operation and maintenance instructions, and all national and local codes.

S. The device shall be installed as close as practical to the facility's wiring system in accordance with applicable national/local electrical codes and the manufacturer's recommended installation instructions. Connection shall be with #2 AWG copper conductor and not be any longer than necessary, avoiding unnecessary bends. In no case shall conductors be longer than five feet (5') in length.

T. The system shall be field-tested in the presence of the Owner. At the same time, operational procedures shall be reviewed with the Owner.]

2.4 OVERCURRENT PROTECTIVE DEVICES

A. Main Circuit Breaker:

1. Electronic trip 100% rated molded case circuit breaker:

a. Main circuit breaker shall be fixed, individually mounted.
b. Power terminals shall be provided to accommodate either cable or bolted bus connections.

2.5 DISTRIBUTION DEVICES

A. Feeder Circuit Breakers:

1. Electronic trip 80% rated molded case circuit breaker(s):

a. Group mounted 100A through 1200A.

1) Branch circuit breaker(s) shall be group mounted on a common pan or rail assembly.
2) Circuit breaker(s) shall be mounted in the switchboard to permit installation, maintenance and testing without reaching over line side bussing.
3) The interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide insulation to the entire length of the bus.
4) There shall be one (1) continuous bus bar per phase; each bus bar having a pair of exposed longitudinal edge portions providing non-specific mounting means for branch circuit breaker(s).

5) The entire interleaved assembly shall be contained between the two (2) U-shaped steel channels, permanently secured to a galvanized mounting pan by tamper-resistant fasteners.
6) Circuit breaker(s) shall not require additional external mounting hardware. Circuit breaker(s) shall be held in the mounted position by a self-contained bracket secured to the mounting pan by fasteners. Each individual circuit breaker shall be capable of being mounted independently. Circuit breaker(s) of different frame sizes shall be capable of being mounted across from each other without means of a common bucket.
7) Line side circuit breaker connections shall be jaw type.

2.6 ELECTRONIC TRIP MOLDED CASE CIRCUIT BREAKERS

A. 100% Rated Circuit Breakers:

1. Circuit protective devices shall be electronic trip 100% rated molded case circuit breakers.They shall be UL listed for 100% continuous current when switchboard installed. Frame/sensor/plug ampere ratings shall be as indicated on the Drawings.
2. Provide a fixed instantaneous (high level selective override) circuit. The circuit shall have a defeatable instantaneous adjustment to allow the breaker to remain closed for up to 30 cycles during overcurrents below the following RMS symmetrical short time withstand ratings. The circuit shall instantaneously trip when current levels exceed applicable withstand ratings.
3. All circuit breakers shall be constructed in accordance with the following standards:

    a. UL 489.
    b. NEMA AB1.
    c. Federal Specification W-C 375B/GEN.
    d. EC 157-1.

4. Circuit breaker(s) shall utilize a glass reinforced insulating material providing high dielectric strength. Current carrying components shall be completely isolated from the trip unit and accessory mounting area. Breaker(s) shall have common tripping of all poles and shall be trip free. The circuit breaker shall be UL listed for reverse connection without requiring special construction or labeling. The breaker(s) shall have quick-make, quick-break contacts with an overcenter toggle operating mechanism. All circuit breakers shall be equipped with electrical accessories as indicated on the Drawings.
5. Circuit breaker(s) shall be factory sealed and shall have a date code on the face of the circuit breaker. Poles shall be labeled with respective phase designations.
6. Breaker handle and faceplate shall indicate rated ampacity. Breaker faceplates shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIC ratings.
7. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking circuit breaker tripping mechanism.
8. Each circuit breaker shall be equipped with a push-to-trip button mechanically operate the circuit breaker tripping mechanism.
9. Electronic Trip System:

    a. The integral trip system shall be self-powered and shall contain electronic components to measure ampacity, time the output from internal current sensors and initiate automatic tripping actions.
    b. The entire trip system shall be a microprocessor-based, true RMS sensing design with sensing accuracy through the 13th harmonic.

c. The continuous ampere rating of the circuit breaker shall be determined by the combination of an interchangeable rating plug, the sensor size and the ampere rating switch on the circuit breaker. The ampere rating resulting from the rating plug/sensor/switch combination shall be clearly marked on the front of the circuit breaker.

d. Provide a means to seal the rating plug and trip unit adjustments to discourage unauthorized tampering in accordance with NEC 240-6.

e. Provide the following time/current curve profile adjustments to maximize system selective coordination. Each adjustment shall have discrete settings and shall be independent from all other adjustments.

1) LSIG:

a) Adjustable Long Time Ampere Rating and Delay.
b) Adjustable Short Time Pickup and Delay.
c) (Delay includes I^2t IN and I^2t OUT).
d) Adjustable Instantaneous Pickup
e) Adjustable Ground Fault Pickup and Delay.
f) (Delay includes I^2t IN and I^2t OUT).

f. Provide local visual trip indicators for overload, short circuit and ground fault trip functions.

g. Provide a local ammeter to individually display all phase currents flowing through the circuit breaker. If the circuit breaker is equipped with ground fault, provide the means to display percentage (%) of trip and inherent ground fault current flowing in the system. All current values shall be displayed in true RMS values with two percent (2%) accuracy.

h. Circuit breaker(s) shall be provided with Zone Selective Interlocking (ZSI) on both Short Time and Ground Fault function to provide maximum protection, yet permit optimum coordination with all other electronic trip circuit breakers.

i. Provide Long Time Pickup indication to signal when load approaches or exceeds the continuous current carrying capacity of the circuit breaker.

j. The trip system shall include a long time memory circuit to detect intermittent overcurrent conditions.

k. Each circuit breaker trip system is to include an externally accessible test port for use with a universal test set or shall have testing capabilities integral to the trip unit. No disassembly of the circuit breaker shall be required for testing.

l. Each circuit breaker trip unit shall be capable of communicating the following data via a high speed network:

1) Phase current of A, B, and C phases and ground fault in real-time.
2) Switch settings:

a) Long-time settings: pickup and delay.
b) Short-time settings: pickup and delay.
c) Instantaneous settings.
d) Ground fault settings: pickup and delay.

3) Trip History:

a) Last fault type.
b) Phase current of A, B, and C phases and ground fault at time of last trip.
c) Short circuit pickup.
d) Overload pickup.

e) Overload trips (cumulative).
f) Short circuit trips (cumulative).
g) Ground fault trips (cumulative).

10. Terminations:

a. All lugs shall be UL listed to accept solid and/or stranded copper conductors only. Lugs shall be suitable for 75°C rated wire. Lug body shall be bolted in place.
b. All circuit breakers shall be UL listed to accept field installable/removable mechanical type lugs.
c. All circuit breakers shall be suitable for bus connection.

2.7 ELECTRONIC POWER MONITORING

A. General:

1. Provide solid-state, multi-function power monitoring system/device with digital display.
2. Provide a display to monitor main circuit breaker only.

B. Power Monitor:

1. The electronic power monitor shall accept inputs from industry standard instrument transformers (120VAC secondary PTs and 5A secondary CTs).
2. All setup parameters required by the power monitors shall be stored in nonvolatile memory (no battery backup) and retained in the event of a control power interruption.
3. The power monitor shall also maintain in nonvolatile memory a maximum and minimum value for each of the instantaneous values reported as well as the time and date of the highest peak for all of the peak demand readings.
4. The following instantaneous readings shall be reported by the power monitor:

a. Current, per phase RMS $\pm$1.0%.
b. Current, 3-phase average RMS $\pm$1.0%.
c. Current, apparent RMS $\pm$1.0%.
d. Voltage, phase-to-phase and phase-to-neutral $\pm$1.0%.
e. Power factor, per phase $\pm$2.0%.
f. Power factor, 3-phase total $\pm$2.0%.
g. Real power, 3-phase total $\pm$2.0%.
h. Reactive power, 3-phase total $\pm$2.0%.
i. Apparent power, 3-phase total $\pm$2.0%.
j. Frequency $\pm$0.5%.

5. The following demand readings shall be reported by the power monitor.

a. Average demand current, per phase.
b. Peak demand current, per phase.
c. Average demand, real power.
d. Peak demand, real power.

6. The following energy readings shall be reported by the power monitor.

a. Accumulated energy.
b. Accumulated reactive energy.

C. Power Monitor Installation:

1. The power monitor shall be installed by the switchboard manufacturer.
2. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the switchboard lineup.

D. Certification Description:

1. All equipment included as part of the power monitoring shall be UL listed or UL recognized.

2.8 IDENTIFICATION

A. Mimic Bus: Show the entire single line switchboard bus work as depicted on the factory record drawing on a photo engraved nameplate. The nameplate plate shall be at least 0.032” thick anodized aluminum and located at eye level on the front cover of the switchboard.

PART 3 - EXECUTION

3.1 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

3.2 EXAMINATION

A. Examine area to receive switchboard to provide adequate clearance for switchboard installation.

B. Check that concrete housekeeping pads are level and free of irregularities.

C. Start work only after unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Install switchboards and accessories according to manufacturer’s written instructions and the NEC.

B. Support switchboards on concrete bases, 4-inch (100-mm) nominal thickness.

C. Comply with mounting and anchoring requirements specified in Division 26 Section "Seismic Controls for Electrical Work."

D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

E. Operating

F. Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame

of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section Basic Electrical Materials and Methods.

B. Switchboard Nameplates: Label each switchboard compartment with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.5 FIELD QUALITY CONTROL

A. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

B. Measure, using a megger, the insulation resistance of each bus section phase to phase and phase to ground for one minute each, at minimum test voltage of 1000 volts DC; minimum acceptable value for insulation resistance is 1 megohms. Refer to manufacturer's written instructions for specific testing procedures.

C. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturer's recommended torque values.

D. Test ground fault systems by operating push-to-test button.

3.6 ADJUSTING

A. Adjust all operating mechanisms for free mechanical movement per manufacturer's specifications.

B. Tighten bolted bus connections in accordance with manufacturer's instructions.

C. Adjust circuit breaker trip to time delay settings to values as directed by the Engineer.

3.7 CLEANING

A. On completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262413

SECTION 262416

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.
4. Transient voltage suppression panelboards.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. RFI: Radio-frequency interference.

D. RMS: Root mean square.

E. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

a. Enclosure types and details for types other than NEMA 250, Type 1.
b. Bus configuration, current, and voltage ratings.
c. Short-circuit current rating of panelboards and overcurrent protective devices.

d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

2. Wiring Diagrams: Power, signal, and control wiring.
3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

D. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section " Closeout Procedures," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of panelboards and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:

1. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2000 m).

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Six spares for each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:

a. Eaton Corporation; Cutler-Hammer Products.
b. General Electric Co.; Electrical Distribution & Protection Div.
c. Siemens Energy & Automation, Inc.
d. Square D.

2. Transient Voltage Suppression Panelboards:

a. Current Technology.
b. Liebert Corporation.
c. Siemens Energy & Automation, Inc.
d. Square D.

2.2 MANUFACTURED UNITS

A. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1.

1. Rated for environmental conditions at installed location.

a. Outdoor Locations: NEMA 250, Type 3R.
b. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
4. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.

B. Phase and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
3. Isolated Equipment Ground Bus: Adequate for branch-circuit equipment ground conductors; insulated from box.
4. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.

C. Conductor Connectors: Suitable for use with conductor material.

1. Main and Neutral Lugs: Mechanical type.
2. Ground Lugs and Bus Configured Terminators: Mechanical type.
3. Feed-Through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
4. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.

D. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.

E. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.4 DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault-type latch with tumbler lock; keyed alike. Omit for fused-switch panelboards.

B. Main Overcurrent Protective Devices: Circuit breaker.

C. Branch Overcurrent Protective Devices:

1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

2.5 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Mains: Circuit Breaker or lugs only.

B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

C. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.6 ELECTRONIC-GRADE PANELBOARDS

A. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

B. Main Overcurrent Devices: Thermal-magnetic circuit breaker.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers.

D. Bus: Copper phase and neutral buses; 200 percent capacity neutral bus and lugs.

2.7 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip-unit circuit breakers shall have RMS sensing; field-replaceable rating plug; and with the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
6. GFCI Circuit Breakers: Single- and two-pole configurations with 5 -mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
5. Multipole units enclosed in a single housing or factory-assembled to operate as a single unit.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

D. Fuses are specified in Division 26 Section "Fuses."

2.8 ACCESSORY COMPONENTS AND FEATURES

A. Furnish accessory set including tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Furnish portable test set to test functions of solid-state trip devices without removal from panelboard.

C. Fungus Proofing: Permanent fungicidal treatment for panelboard interior, including overcurrent protective devices and other components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mount top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.

C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Install overcurrent protective devices and controllers.

1. Set field-adjustable switches and circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."

B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scanning of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Wall-box motion sensors.
4. Isolated-ground receptacles.
5. Snap switches and wall-box dimmers.
6. Digital switches.
7. Wall-switch and exterior occupancy sensors.
8. Ceiling mounted sensors.
9. Digital time switch.
10. Floor service outlets, and multi outlet assemblies.

B. Related Sections include the following:

1. Division 26 Section "Voice and Data Communication Cabling" for workstation outlets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 5351 (single), 5352 (duplex).
b. Hubbell; HBL5351 (single), CR5352 (duplex).
c. Leviton; 5891 (single), 5352 (duplex).
d. Pass & Seymour; 5381 (single), 5352 (duplex).

B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Hubbell; CR 5253IG.
    b. Leviton; 5362-IG.
    c. Pass & Seymour; IG6300.

3. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Cooper; TR8300.
    b. Hubbell; HBL8300SG.
    c. Leviton; 8300-SGG.
    d. Pass & Seymour; 63H.

3. Description: Labeled to comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

2.3 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Cooper; GF20.
    b. Pass & Seymour; 2084.

2.4 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
    b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
    c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
    d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

C. Digital switches:

1. As shown on drawings.

D. Digital Time Switch:

1. As shown on drawings.

2.5 WALL-BOX DIMMERS

A. As shown on drawings.

B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.

C. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.

1. 600 W; dimmers shall require no derating when ganged with other devices.

D. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.6 OCCUPANCY SENSORS

A. Wall-Switch Sensors:

1. As shown on drawings.

B. Ceiling mounted sensors:

1. As shown on drawings.

2.7 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Smooth, high-impact thermoplastic
3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

2.8 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, dual-service units suitable for wiring method used. As shown on drawings.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.

D. Voice and Data Communication Outlet: As shown on drawings.

2.9 MULTIOUTLET ASSEMBLIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hubbell Incorporated; Wiring Device-Kellems.
2. Wiremold Company (The).

C. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

D. Raceway Material: Metal, with manufacturer's standard finish.

E. Wire: No. 12 AWG.

2.10 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.
2. TVSS Devices: Blue.
3. Isolated-Ground Receptacles: Orange

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Electrical Identification."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

SECTION 262813

FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Cartridge fuses rated 600 V and less for use in switches.
2. Spare-fuse cabinets.

1.3 SUBMITTALS

A. Product Data: Include the following for each fuse type indicated:

1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
2. Let-through current curves for fuses with current-limiting characteristics.
3. Time-current curves, coordination charts and tables, and related data.

B. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.

1. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
2. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

C. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Division 1 Section " Operation and Maintenance Data," include the following:

a. Let-through current curves for fuses with current-limiting characteristics.
b. Time-current curves, coordination charts and tables, and related data.
c. Ambient temperature adjustment information.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fuses from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA FU 1.

D. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Quantity equal to 10 percent of each fuse type and size, but no fewer than 3 of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Bussman, Inc.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

2.3 SPARE-FUSE CABINET

A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.

2. Finish: Gray, baked enamel.
3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
4. Fuse Pullers: For each size of fuse.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Service Entrance: Class RK1, time delay.

B. Feeders: Class RK1, time delay.

C. Motor Branch Circuits: Class RK1, time delay.

D. Other Branch Circuits: Class RK1, time delay.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare-fuse cabinet(s).

3.4 IDENTIFICATION

A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 262813

SECTION 262816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following individually mounted, enclosed switches and circuit breakers:

1. Fusible switches.
2. Nonfusible switches.
3. Enclosures.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. HD: Heavy duty.

C. RMS: Root mean square.

D. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current rating.
4. UL listing for series rating of installed devices.
5. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Qualification Data: For testing agency.

D. Field quality-control test reports including the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Manufacturer's field service report.

F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section " Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
2. Time-current curves, including selectable ranges for each type of circuit breaker.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

A. Manufacturers:

1. Eaton Corporation; Cutler-Hammer Products.
2. Square D/Group Schneider.

B. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type HD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Nonfusible Switch, 600 A and Smaller: NEMA KS 1, Type HD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.
3. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

2.3 ENCLOSURES

A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.

1. Outdoor Locations: NEMA 250, Type 4X Stainless Steel.
2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4X Stainless Steel.
4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.

B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification."

B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Electrical Identification."

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance testing as follows:

1. Inspect mechanical and electrical connections.
2. Verify switch and relay type and labeling verification.
3. Verify rating of installed fuses.
4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.

B. Perform the following field tests and inspections and prepare test reports:
1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Infrared Scanning:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Open or remove doors or panels so connections are accessible to portable scanner.
b. Follow-Up Infrared Scanning: Perform an additional follow-up infrared scan of each unit 11 months after date of Substantial Completion.
c. Instruments, Equipment and Reports:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2) Prepare a certified report that identifies enclosed switches and circuit breakers included and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.

B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 262816

SECTION 263213

PACKAGED ENGINE GENERATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged engine-generator sets for standby power supply with the following features:

1. Diesel engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Performance requirements for sensitive loads.
5. Load banks.
6. Outdoor enclosure.

B. Related Sections include the following:

1. Division 26 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. LP: Liquid petroleum.

1.4 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.
3. Tentative schedule for infrared and load tests.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

C. Qualification Data: For installer.

D. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

E. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles (321 km) of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing

Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with ASME B15.1.

G. Comply with NFPA 37.

H. Comply with NFPA 70.

I. Comply with NFPA 99.

J. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

K. Comply with UL 2200.

L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

M. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 5 to 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet (300 m).

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators. These items are specified in Division 7 Section "Roof Accessories."

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Generac Power Systems, Inc.
2. Kohler Co.; Generator Division.
3. Onan/Cummins Power Generation; Industrial Business Group.
4. MTU Onsite Energy.

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated.
2. Output Connections: Three-phase, four wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

    a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Fuel: ASTM D975 No. 2-D Grade diesel fuel.

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.

2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: Adjustable isochronous, with speed sensing.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

I. Cooling System: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump.

1. Configuration: Horizontal air discharge.
2. Radiator Core Tubes: Aluminum.
3. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
5. Fan: Driven by multiple belts from engine shaft.
6. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
7. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

J. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 23 feet (7 m) from exhaust discharge after installation is complete shall be 85 dBA or less.

K. Air-Intake Filter: Standard-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

L. Starting System: 24-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Day Tank: Comply with UL 142, freestanding, factory-fabricated fuel tank assembly, with integral, float-controlled transfer pump and the following features:

1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.

    a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.

2. Tank Capacity: As recommended by engine manufacturer for an uninterrupted period of 8 hours' operation at 100 percent of rated power output of engine-generator system without being refilled.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Low-Level Alarm Sensor: Liquid-level device operates alarm contacts at 25 percent of normal fuel level.
5. High-Level Alarm Sensor: Liquid-level device operates alarm and redundant fuel shutoff contacts at midpoint between overflow level and 100 percent of normal fuel level.
6. Piping Connections: Factory-installed fuel supply and return lines from tank to engine; local fuel fill, vent line, overflow line; and tank drain line with shutoff valve.
7. Redundant High-Level Fuel Shutoff: Actuated by high-level alarm sensor in day tank to operate a separate motor device that disconnects day-tank pump motor. Sensor shall signal solenoid valve, located in fuel suction line between fuel storage tank and day tank, to close. Both actions shall remain in shutoff state until manually reset. Shutoff action shall initiate an alarm signal to control panel but shall not shut down engine-generator set.

C. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for eight hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.

D. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Retain one of first two paragraphs and associated subparagraphs below to specify minimum control and monitoring panel features. First is for standardized panels for automatically starting units. Second is for a typical manually operated generator system. Coordinate with Drawings. See Editing Instruction No. 9 in the Evaluations.

E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Generator overload.

F. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

G. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals. Data system connections to terminals are covered in Division 26 Section "Electrical Power Monitoring and Control."

H. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil, low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil, low-pressure prealarm.
7. Fuel tank, low-fuel level.
8. Low coolant level.

I. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

J. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.

1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
2. Trip Settings: Selected to coordinate with generator thermal damage curve.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Generator Disconnect Switch: Molded-case type, 100 percent rated.

1. Rating: Matched to generator output rating.
2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

C. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:

1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: 12 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Description: Prefabricated or preengineered walk-in enclosure with the following features:

1. Construction: Galvanized-steel, metal-clad, integral structural-steel-framed building erected on concrete foundation.
2. Structural Design and Anchorage: Comply with ASCE 7 for wind loads.
3. Space Heater: Thermostatically controlled and sized to prevent condensation.
4. Louvers: Equipped with bird screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust, birds, and rodents.
5. Hinged Doors: With padlocking provisions.
6. Ventilation: Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.
7. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
8. Muffler Location: Within enclosure.

C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.
2. DC lighting system for operation when remote source and generator are both unavailable.

E. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

2.9 MOTORS

A. General requirements for motors are specified in Division 25 Section "Motors."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

2.10 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene.
2. Durometer Rating: 30.
3. Number of Layers: One.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.11 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 16 Section "Electrical Supports and Seismic Restraints."

D. Install remote radiator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on concrete base on grade.

E. Install Schedule 40, black steel piping with welded joints for cooling water piping between engine-generator set and heat exchanger. Piping materials and installation requirements are specified in Division 25 Section "Hydronic Piping."

F. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 25 Section "Hydronic Piping."

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 25 Section "Hydronic Piping."

G. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 25 Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect cooling-system water piping to engine-generator set and heat exchanger with flexible connectors.

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems outside the building are specified in Division 2 Section "Fuel Oil Distribution."
2. Diesel fuel piping, valves, and specialties inside the building are specified in Division 15 Section "Fuel Oil Piping."
3. Natural- and LP-gas piping, valves, and specialties for gas distribution outside the building are specified in Division 2 Section "Natural Gas Distribution."
4. Natural- and LP-gas piping, valves, and specialties for gas piping inside the building are specified in Division 25 Section "Fuel Gas Piping."

F. Ground equipment according to Division 26 Section "Grounding and Bonding."

G. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 IDENTIFICATION

A. Identify system components according to Division 25 Section "Mechanical Identification" and Division 26 Section "Electrical Identification."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. On site Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection (except those indicated to be optional) for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.

3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust Emissions Test: Comply with applicable government test criteria.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
9. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations on the property line, and compare measured levels with required values.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and retest as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

M. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 263213

SECTION 263600

TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches.
2. Bypass/isolation switches.
3. Nonautomatic transfer switches.
4. Remote annunciation systems.
5. Remote annunciation and control systems.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

C. Qualification Data: For manufacturer.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Features and operating sequences, both automatic and manual.
2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.

B. Source Limitations: Obtain automatic transfer switches bypass/isolation switches remote annunciator and control panels through one source from a single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NEMA ICS 1.

E. Comply with NFPA 70.

F. Comply with NFPA 99.

G. Comply with NFPA 110.

H. Comply with UL 1008 unless requirements of these Specifications are stricter.

1.5 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Contactor Transfer Switches:

a. Caterpillar; Engine Div.
b. Emerson; ASCO Power Technologies, LP.
c. Generac Power Systems, Inc.
d. Kohler Power Systems; Generator Division.
e. Onan/Cummins Power Generation; Industrial Business Group.
f. Russelectric, Inc.

2. Transfer Switches Using Molded-Case Switches or Circuit Breakers:

a. Eaton Electrical Inc.; Cutler-Hammer.
b. Hubbell Industrial Controls, Inc.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

G. Neutral Terminal: Solid and fully rated, unless otherwise indicated.

H. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.

I. Heater: Equip switches exposed to outdoor temperatures and humidity, and other units indicated, with an internal heater. Provide thermostat within enclosure to control heater.

J. Battery Charger: For generator starting batteries.

1. Float type rated 2 A.
2. Ammeter to display charging current.
3. Fused ac inputs and dc outputs.

K. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.

L. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations.

Color-coding and wire and cable tape markers are specified in Division 26 Section "Electrical Identification."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

C. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

D. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.

E. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters is through wiring external to automatic transfer switch. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated. Relay contacts handling motor-control circuit inrush and seal currents are rated for actual currents to be encountered.

F. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Pause is adjustable from 0.5 to 30 seconds minimum and factory set for 0.5 second, unless otherwise indicated. Time delay occurs for both transfer directions. Pause is disabled unless both sources are live.

G. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is not available.

2.4 BYPASS/ISOLATION SWITCHES

A. Comply with requirements for Level 1 equipment according to NFPA 110.

B. Description: Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:

1. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. While isolated, interlocks prevent transfer-switch operation, except for testing or maintenance.
2. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations.
3. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.

4. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
5. Operability: Constructed so load bypass and transfer-switch isolation can be performed by 1 person in no more than 2 operations in 15 seconds or less.
6. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
7. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.

C. Interconnection of Bypass/Isolation Switches with Automatic Transfer Switches: Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.

2.5 REMOTE ANNUNCIATOR SYSTEM

A. Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:

1. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
2. Switch position.
3. Switch in test mode.
4. Failure of communication link.

B. Annunciator Panel: LED-lamp type with audible signal and silencing switch.

1. Indicating Lights: Grouped for each transfer switch monitored.
2. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
3. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
4. Lamp Test: Push-to-test or lamp-test switch on front panel.

C. Malfunction of annunciator, annunciation and control panel, or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to stand-alone, self-contained operation. Automatic transfer-switch sensing, controlling, or operating function shall not depend on remote panel for proper operation.

D. Remote Annunciation and Control Panel: Solid-state components. Include the following features:

1. Controls and indicating lights grouped together for each transfer switch.
2. Label each indicating light control group. Indicate transfer switch it controls, location of switch, and load it serves.
3. Digital Communication Capability: Matched to that of transfer switches supervised.
4. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.

2.6 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for

compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.

1. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Division 26 Section "Electrical Supports and Seismic Restraints."

B. Annunciator and Control Panel Mounting: Flush in wall, unless otherwise indicated.

C. Identify components according to Division 26 Section "Electrical Identification."

D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Ground equipment according to Division 26 Section "Grounding and Bonding."

C. Connect wiring according to Division 26 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
    f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
    g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

    a. Verify grounding connections and locations and ratings of sensors.

D. Testing Agency's Tests and Inspections:

1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    c. Verify that manual transfer warnings are properly placed.
    d. Perform manual transfer operation.

4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

a. Verify grounding connections and locations and ratings of sensors.

E. Coordinate tests with tests of generator and run them concurrently.

F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

G. Remove and replace malfunctioning units and retest as specified above.

H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 1 Section "Demonstration and Training."

B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 264313

SURGE PROTECTIVE DEVICE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes TVSSs for low-voltage power, control, and communication equipment.

B. Related Sections include the following:

1. Division 26 Section "Switchboards" for factory-installed TVSSs.
2. Division 26 Section "Panelboards" for factory-installed TVSSs.

1.3 DEFINITIONS

A. ATS: Acceptance Testing Specifications.

B. SVR: Suppressed voltage rating.

C. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.

B. Product Certificates: For transient voltage suppression devices, signed by product manufacturer certifying compliance with the following standards:

1. UL 1283.
2. UL 1449.

C. Qualification Data: For testing agency.

D. Field quality-control test reports, including the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Failed test results and corrective action taken to achieve requirements.

E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer.

C. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits."

F. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices."

G. Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Transient Voltage Surge Suppressors."

1.6 PROJECT CONDITIONS

A. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated:

1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
2. Operating Temperature: -40 to 140 deg F (-40 to 600 deg C).
3. Humidity: 5 to 95 percent, non-condensing.
4. Altitude: Up to 1300 feet above sea level.

1.7 COORDINATION

A. Coordinate surge protection devices with Division 26 Section "Electrical Power Monitoring and Control."

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within five years from date of Substantial Completion.

B. Special Warranty for Cord-Connected, Plug-in Surge Suppressors: Manufacturer's standard form in which manufacturer agrees to repair or replace electronic equipment connected to circuits protected by surge suppressors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advanced Protection Technologies, Inc.
2. Current Technology, Inc.
3. Cutler-Hammer, Inc.; Eaton Corporation.
4. Siemens Energy & Automation, Inc.
5. Square D; Schneider Electric.

2.2 SERVICE ENTRANCE SUPPRESSORS (Type 1)

A. Surge Protection Device Description: Factory mounted integral SPD unit. Modular design with field-replaceable modules, sine-wave-tracking type with the following features and accessories:

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Thermal cutout for low current faults.
5. Individually fused suppression modules.
6. Up to -50dB (100kHz to 100MHz) EMI/RFI Filtering.
7. LED indicator lights for power and protection status.
8. Audible alarm, with silencing switch, to indicate when protection has failed.
9. One set of dry contacts rated at 5 A and 250-V ac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
10. Surge-event operations counter.

B. Peak Single-Impulse Surge Current Rating: 400 kA per phase.

C. Connection Means: Internal and integral with switchboard or panelboard.

D. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 480Y/277, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 800 V for 480Y/277.
2. Line to Ground: 800 V for 480Y/277.
3. Neutral to Ground: 800 V for 480Y/277.
4. Line to Line: 1600 V for 480Y/277.

2.3 PANELBOARD SUPPRESSORS (Type 2)

A. Surge Protection Device Description: Factory mounted integral SPD unit. Modular design with field-replaceable modules, sine-wave-tracking type with the following features and accessories:.

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Thermal cutout for low current faults.
5. Individually fused suppression modules.
6. Up to -50dB (100kHz to 100MHz) EMI/RFI Filtering.
7. LED indicator lights for power and protection status.
8. Audible alarm, with silencing switch, to indicate when protection has failed.
9. One set of dry contacts rated at 5 A and 250-V, ac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
10. Surge-event operations counter.

B. Peak Single-Impulse Surge Current Rating: 240 kA per phase.

C. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 208Y/120, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 400 V for 208Y/120.
2. Line to Ground: 400 V for 208Y/120.
3. Neutral to Ground: 400 V for 208Y/120.
4. Line to Line: 800 V for 208Y/120.

2.4 SUPPRESSORS FOR ELECTRONIC-GRADE PANELBOARDS (Type 3)

A. Surge Protection Device Description: Sine-wave-tracking type, panel-mounted design with the following features and accessories:

1. LED indicator lights for power and protection status.
2. Audible alarm, with silencing switch, to indicate when protection has failed.
3. One set of dry contacts rated at 5 A and 250-V ac, for remote monitoring of protection status.
4. Arrangement with wire connections to phase buses, neutral bus, and ground bus.

B. Peak Single-Impulse Surge Current Rating: 120 kA per phase.

C. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 208Y/120, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 400 V for 208Y/120.
2. Line to Ground: 400 V for 208Y/120.
3. Neutral to Ground: 400 V for 208Y/120.

2.5 ENCLOSURES

A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 - EXECUTION

3.1 INSTALLATION OF SURGE PROTECTION DEVICES

A. Factory mounted integral with switchboard or panelboard.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust equipment installation, including connections, and to assist in field testing. Report results in writing.

1. Verify that electrical wiring installation complies with manufacturer's written installation requirements.

B. Testing: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports:

C. Testing: Perform the following field tests and inspections and prepare test reports:

After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.

D. Remove and replace malfunctioning units and retest as specified above.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices. Refer to Division 1 Section “Demonstration and Training."

END OF SECTION 264313

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.
5. Retrofit kits for fluorescent lighting fixtures.

B. Related Sections include the following:

1. Division 26 Section "Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
2. Division 26 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.
3. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Luminaire: Complete lighting fixture, including ballast housing if provided.

G. RCR: Room cavity ratio.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Ballast.
4. Energy-efficiency data.
5. Life, output, and energy-efficiency data for lamps.
6. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

    a. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

7. Submit a 4”x4” sample of all fluorescent lenses for review and comparison to lenses installed on the project.

B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.

1. Wiring Diagrams: Power and control wiring.

C. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Lighting fixtures.
2. Suspended ceiling components.
3. Structural members to which suspension systems for lighting fixtures will be attached.
4. Other items in finished ceiling including the following:

    a. Air outlets and inlets.
    b. Speakers.
    c. Sprinklers.
    d. Smoke and fire detectors.
    e. Occupancy sensors.
    f. Access panels.

5. Perimeter moldings.

D. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

E. Qualification Data: For agencies providing photometric data for lighting fixtures.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

D. FMG Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FMG.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.
2. Warranty Period for Electromagnetic Ballasts: Three years from date of Substantial Completion.

B. Special Warranty for T5 and T8 Fluorescent Lamps: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Basis-of-Design Product: The design for each lighting fixture is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers.

a. Cooper Lighting
b. Hubbell Lighting

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

D. Metal Parts: Free of burrs and sharp corners and edges.

E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

H. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless different thickness is indicated.
b. UV stabilized.

2. Glass: Annealed crystal glass, unless otherwise indicated.

I. Electromagnetic-Interference Filters: Factory installed to suppress conducted electromagnetic-interference as required by MIL-STD-461E. Fabricate lighting fixtures with one filter on each ballast indicated to require a filter.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. Electronic Ballasts: Comply with ANSI C82.11; instant-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.

1. Sound Rating: A.
2. Total Harmonic Distortion Rating: Less than 10 percent.

3. Transient Voltage Protection: IEEE C62.41, Category A or better.
4. Operating Frequency: 20 kHz or higher.
5. Lamp Current Crest Factor: 1.7 or less.
6. BF: 0.88 or higher.
7. Power Factor: 0.98 or higher.

B. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.

1. Ballast Manufacturer Certification: Indicated by label.

C. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

D. Ballasts for Low-Temperature Environments:

1. Temperatures 0 Deg F (Minus 17 Deg C) and Higher: Electronic or electromagnetic type rated for 0 deg F (minus 17 deg C) starting and operating temperature with indicated lamp types.
2. Temperatures Minus 20 Deg F (Minus 29 Deg C) and Higher: Electromagnetic type designed for use with indicated lamp types.

E. Ballasts for Low Electromagnetic-Interference Environments: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for consumer equipment.

F. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.

1. Dimming Range: 100 to 5 percent of rated lamp lumens.
2. Ballast Input Watts: Can be reduced to 20 percent of normal.
3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. Description: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher, unless otherwise indicated.
9. Power Factor: 0.98 or higher.
10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
11. Ballast Case Temperature: 75 deg C, maximum.

B. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.

1. Dimming Range: 100 to 5 percent of rated lamp lumens.
2. Ballast Input Watts: Can be reduced to 20 percent of normal.
3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.5 BALLASTS FOR HID LAMPS

A. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features, unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 22 deg F (Minus 30 deg C) for single-lamp ballasts.
3. Normal Ambient Operating Temperature: 104 deg F (40 deg C).
4. Open-circuit operation that will not reduce average life.
5. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.

B. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Sound Rating: A.
3. Total Harmonic Distortion Rating: Less than 15 percent.
4. Transient Voltage Protection: IEEE C62.41, Category A or better.
5. Lamp Current Crest Factor: 1.5 or less.
6. Power Factor: .90 or higher.
7. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
8. Protection: Class P thermal cutout.
9. Retain subparagraph and associated subparagraphs below for bi-level ballasts.
10. Minimum Starting Temperature: Minus 40 deg F (Minus 40 deg C).
11. Open-circuit operation shall not reduce average lamp life.

2.6 EXIT SIGNS

A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: Fluorescent, 2 for each fixture, 20,000 hours of rated lamp life.
2. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.

2.7 FLUORESCENT LAMPS

A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. T8 rapid-start low-mercury lamps, rated 32 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 75 (minimum), color temperature 4100 K, and average rated life 20,000 hours, unless otherwise indicated.

C. T8 rapid-start low-mercury lamps, rated 17 W maximum, nominal length of 24 inches (610 mm), 1300 initial lumens (minimum), CRI 75 (minimum), color temperature 4100 K, and average rated life of 20,000 hours, unless otherwise indicated.

D. T5 rapid-start low-mercury lamps, rated 28 W maximum, nominal length of 45.2 inches (1150 mm), 2900 initial lumens (minimum), CRI 85 (minimum), color temperature 4100 K, and average rated life of 20,000 hours, unless otherwise indicated.

E. T5HO rapid-start, high-output low-mercury lamps, rated 54 W maximum, nominal length of 45.2 inches (1150 mm), 5000 initial lumens (minimum), CRI 85 (minimum), color temperature 4100 K, and average rated life of 20,000 hours, unless otherwise indicated.

F. Compact Fluorescent Lamps: 4-Pin, low mercury, CRI 80 (minimum), color temperature 3500 K, average rated life of 10,000 hours at 3 hours operation per start, and suitable for use with dimming ballasts, unless otherwise indicated.

1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
6. 55 W: T4, triple tube, rated 4300 initial lumens (minimum).

2.8 HID LAMPS

A. Metal-Halide Lamps: ANSI C78.1372, with a minimum CRI 65, and color temperature 4000 K.

B. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000 K.

C. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI 80, and color temperature 4000 K.

2.9 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Electrical Supports and Seismic Restraints" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).

F. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

2.10 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

A. Comply with UL 1598 listing requirements.

1. Reflector Kit: UL 1598, Type I. Suitable for two- to four-lamp, surface-mounted or recessed lighting fixtures by improving reflectivity of fixture surfaces.
2. Ballast and Lamp Change Kit: UL 1598, Type II. Suitable for changing existing ballast, lamps, and sockets.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of two ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Air-Handling Lighting Fixtures: Install with dampers closed and ready for adjustment.

E. Adjust aimable lighting fixtures to provide required light intensities.

F. Connect wiring according to Division 26 Section "Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100

SECTION 265600

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior luminaires with lamps and ballasts.
2. Poles and accessories.

B. Related Sections include the following:

1. Division 26 Section "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.3 DEFINITIONS

A. CRI: Color-rendering index.

B. HID: High-intensity discharge.

C. Luminaire: Complete lighting fixture, including ballast housing if provided.

D. Pole: Luminaire support structure, including tower used for large area illumination.

E. Standard: Same definition as "Pole" above.

1.4 SUBMITTALS

A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.

a. For indicated luminaires, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
b. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

6. Ballasts, including energy-efficiency data.
7. Lamps, including life, output, and energy-efficiency data.
8. Materials, dimensions, and finishes of poles.
9. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
10. Anchor bolts for poles.

B. Shop Drawings:

1. Anchor-bolt templates keyed to specific poles and certified by manufacturer.

C. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.

D. Qualification Data: For agencies providing photometric data for lighting fixtures.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For luminaires and poles to include in emergency, operation, and maintenance manuals.

G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C2, "National Electrical Safety Code."

D. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package aluminum poles for shipping according to ASTM B 660.

B. Store poles on decay-resistant-treated skids at least 12 inches (300 mm) above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

C. Retain factory-applied pole wrappings on metal poles until right before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
2. Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.
3. Warranty Period for Color Retention: Five years from date of Substantial Completion.
4. Warranty Period for Lamps: Replace lamps and fuses that fail within 12 months from date of Substantial Completion; furnish replacement lamps and fuses that fail within the second 12 months from date of Substantial Completion.
5. Warranty Period for Poles: Repair or replace lighting poles and standards that fail in finish, materials, and workmanship within manufacturer's standard warranty period, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Basis-of-Design Product: The design for each lighting fixture is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers.
a. Cooper Lighting
b. Hubbell Lighting

2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

M. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

    a. Color: As selected from manufacturer's standard catalog of colors.

2.3 FLUORESCENT BALLASTS AND LAMPS

A. Low-Temperature Ballast Capability: Rated by its manufacturer for reliable starting and operation of indicated lamp(s) at temperatures 0 deg F (minus 18 deg C) and higher.

B. Ballast Characteristics:

1. Power Factor: 98 percent, minimum.
2. Sound Rating: A.
3. Total Harmonic Distortion Rating: Less than 10 percent.
4. Electromagnetic Ballasts: Comply with ANSI C82.1, energy-saving, high power factor, Class P, automatic-reset thermal protection.
5. Case Temperature for Compact Lamp Ballasts: 65 deg C, maximum.

6. Transient-Voltage Protection: Comply with IEEE C62.41 Category A or better.

C. Low-Temperature Lamp Capability: Rated for reliable starting and operation with ballast provided at temperatures 0 deg F (minus 18 deg C) and higher.

D. Fluorescent Lamps: Low-mercury type. Comply with the EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

2.4 BALLASTS FOR HID LAMPS

A. Comply with ANSI C82.4 and UL 1029 and capable of open-circuit operation without reduction of average lamp life. Include the following features, unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 22 deg F (Minus 30 deg C).
3. Normal Ambient Operating Temperature: 104 deg F (40 deg C).
4. Minimum Starting Temperature: Minus 40 deg F (Minus 40 deg C).

2.5 HID LAMPS

A. Metal-Halide Lamps: ANSI C78.1372, with a minimum CRI 65, and color temperature 4000 K.

B. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000 K.

C. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI 80, and color temperature 4000 K.

2.6 STEEL POLES

A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig (317 MPa); 1-piece construction up to 40 feet (12 m) in height with access handhole in pole wall.

1. Shape: Round, straight.
2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Brackets for Luminaires: Detachable, cantilever, without underbrace.

1. Adapter fitting welded to pole and bracket, then bolted together with stainless-steel bolts.
2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire.
3. Match pole material and finish.

C. Grounding and Bonding Lugs: Welded 1/2-inch (13-mm) threaded lug, complying with requirements in Division 26 Section "Grounding and Bonding," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

D. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.

E. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

a. Color: As indicated by manufacturer's designations.

2.7 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

A. Install lamps in each luminaire.

B. Fasten luminaire to indicated structural supports.

1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Adjust luminaires that require field adjustment or aiming.[Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources.]

3.2 POLE INSTALLATION

A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:

1. Fire Hydrants and Storm Drainage Piping: 60 inches (1520 mm).
2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet (3 m).
3. Trees: 15 feet (5 m).

C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Division 3 Section "Cast-in-Place Concrete."

D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.

1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
3. Install base covers, unless otherwise indicated.
4. Use a short piece of 1/2-inch- (13-mm-) diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

E. Poles and Pole Foundations Set in Concrete Paved Areas: Install poles with minimum of 6-inch- (150-mm-) wide, unpaved gap between the pole or pole foundation and the edge of adjacent concrete slab. Fill unpaved ring with pea gravel to a level 1 inch (25 mm) below top of concrete slab.

F. Raise and set poles using web fabric slings (not chain or cable).

3.3 BOLLARD LUMINAIRE INSTALLATION

A. Align units for optimum directional alignment of light distribution.

B. Install on concrete base with top 4 inches (100 mm) above finished grade or surface at bollard location. Cast conduit into base, and shape base to match shape of bollard base. Finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Division 3 Section "Cast-in-Place Concrete."

3.4 INSTALLATION OF INDIVIDUAL GROUND-MOUNTING LUMINAIRES

A. Install on concrete base with top 4 inches (100 mm) above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Division 3 Section "Cast-in-Place Concrete."

3.5 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Division 26 Section "Raceways and Boxes." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.6 GROUNDING

A. Ground metal poles and support structures according to Division 26 Section "Grounding and Bonding."

1. Install grounding electrode for each pole, unless otherwise indicated.

2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

B. Ground nonmetallic poles and support structures according to Division 26 Section "Grounding and Bonding."

1. Install grounding electrode for each pole.
2. Install grounding conductor and conductor protector.
3. Ground metallic components of pole accessories and foundations.

3.7 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain luminaire lowering devices. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 265600

SECTION 283111

FIRE ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

B. Related Sections include the following:

1. Division 8 Section "Hardware" for door closers/holders/smoke detectors, electric door locks, and release devices that interface with fire alarm systems.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. General: Noncoded, addressable-analog system with manual and automatic alarm initiation; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show details of graphic annunciator.

1. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.

2. Battery: Sizing calculations.

3. Floor Plans: Indicate final outlet locations and routings of raceway connections.

4. Device Address List: Coordinate with final system programming.

5. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually

and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.

C. Coordination Drawings: Plans, sections, and elevations drawn to scale and coordinating installation of smoke detectors in ducts and access to them. Show the following near each duct smoke provision of detector installation:

1. Size and location of ducts, including lining.

2. Size and location of piping.

3. Size and arrangement of structural elements.

4. Size and location of duct smoke detector, including air-sampling elements.

D. Operating Instructions: For mounting at the FACP.

E. Product Certificates: Signed by manufacturers of system components certifying that products furnished comply with requirements.

F. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Comply with NFPA 72.

H. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 1. Comply with NFPA 72.

I. Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals specified in Division 1 Section "Submittals," make an identical submission to authorities having jurisdiction. Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

J. Certificate of Completion: Comply with NFPA 72.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is an authorized representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than one unit.

2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than one unit.

3. Smoke Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than one unit of each type.

4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than one unit of each type.

5. Keys and Tools: One extra set for access to locked and tamper proofed components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Edwards Systems Technology; Unit of General Signal.

2. Honeywell, Inc.

3. Notifier; Div. of Pittway Corp.

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Control of System: By the FACP.

B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.

D. Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.

E. System Reset: All zones are manually resettable from the FACP after initiating devices are restored to normal.

F. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.

G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when a single ground occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.

H. Loss of primary power at the FACP initiates a trouble signal at the FACP and the annunciator. An emergency power light is illuminated at both locations when the system is operating on the secondary power supply.

I. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or flame or heat detector, or operation of a sprinkler flow device initiates the following:

1. Notification-appliance operation.

2. Identification at the FACP and the remote annunciator of the zone originating the alarm.

3. Transmission of an alarm signal to the remote alarm receiving station.

4. Unlocking of electric door locks in designated egress paths.

5. Release of fire and smoke doors held open by magnetic door holders.

6. Shutdown of fans and other air-handling equipment serving zone when alarm was initiated.

7. Closing of smoke dampers in air ducts of system serving zone where alarm was initiated.

8. Recording of the event in the system memory.

9. Recording of the event by the system printer.

J. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP and the remote annunciator.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.

2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.

3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

K. Water-flow alarm switch operation initiates the following:

1. Notification-appliance operation.

2. Flashing of the device location-indicating light for the device that has operated.

L. Smoke detection for zones or detectors with alarm verification initiates the following:

1. Audible and visible indication of an "alarm verification" signal at the FACP.

2. Activation of a listed and approved "alarm verification" sequence at the FACP and the detector.

3. Recording of the event by the system printer.

4. General alarm if the alarm is verified.

5. Cancellation of the FACP indication and system reset if the alarm is not verified.

M. Sprinkler valve-tamper switch operation initiates the following:

1. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.

2. Flashing of the device location-indicating light for the device that has operated.

3. Transmission of supervisory signal to remote alarm receiving station.

N. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:

1. A supervisory, audible, and visible "sprinkler trouble" signal indication at the FACP and the annunciator.

2. Flashing of the device location-indicating light for the device that has operated.

3. Transmission of trouble signal to remote central station.

O. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes are recorded in system memory and are printed out by the system printer.

P. Removal of an alarm-initiating device or a notification appliance initiates the following:

1. A "trouble" signal indication at the FACP and the annunciator for the device or zone involved.

2. Transmission of trouble signal to remote alarm receiving station.

Q. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

2.3 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color.

1. Double-action mechanism requires two actions, such as a push and a pull, to initiate an alarm.

2. Station Reset: Key or wrench operated; double pole, double throw; switch rated for the voltage and current at which it operates.

3. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm.

4. Integral Addressable Module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

2.4 SMOKE DETECTORS

A. General: Include the following features:

1. Operating Voltage: 24-V dc, nominal.

2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

3. Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.

4. Integral Visual-Indicating Light: LED type. Indicates detector has operated.

5. Sensitivity: Can be tested and adjusted in-place after installation.

6. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

7. Remote Controllability: Unless otherwise indicated, detectors are analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

B. Photoelectric Smoke Detectors: Include the following features:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.

2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Ionization Detector: Include the following features:

1. Responsive to both visible and invisible products of combustion.

2. Self-compensating for changes in environmental conditions.

D. Beam-Type Smoke Detector: Each detector consists of a separate transmitter and receiver with the following features:

1. Adjustable Sensitivity: More than a six-level range, minimum.

2. Linear Range of Coverage: 600 feet (180 m), minimum.

3. Tamper Switch: Initiates trouble signal at the central FACP when either transmitter or receiver is disturbed.

4. Separate Color-Coded LEDs: Indicate normal, alarm, and trouble status. Any detector trouble, including power loss, is reported to the central FACP as a composite "trouble" signal.

E. Remote Air-Sampling Detector System: Includes air-sampling pipe network, a laser-based photoelectric detector, a sample transport fan, and a control unit.

1. Pipe Network: Electrical metallic tubing connects control unit with designated sampling holes.

2. Control Unit: Single or multizone unit as indicated. Provides same system power supply, supervision, and alarm features as specified for the central FACP plus separate trouble indication for airflow and detector problems.

3. Signals to the Central FACP: Any type of local system trouble is reported to the central FACP as a composite "trouble" signal. Alarms on each system zone are individually reported to the central FACP as separately identified zones.

F. Duct Smoke Detector: Ionization type.

1. Sampling Tube: Design and dimensions as recommended by the manufacturer for the specific duct size, air velocity, and installation conditions, where applied.

2. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.5 OTHER DETECTORS

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate of rise of temperature that exceeds 15 deg F (8.3 deg C) per minute, unless otherwise indicated.

1. Mounting: Plug-in base, interchangeable with smoke detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.6 NOTIFICATION APPLIANCES

A. Description: Equip for mounting as indicated and have screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Bells: Electric-vibrating, 24-V dc, under-dome type; with provision for housing the operating mechanism behind the bell. When operating, bells provide a sound-pressure level of 94 dB, measured 10 feet (3 m) from the bell. 10-inch (254-mm) size, unless otherwise indicated. Bells are weatherproof where indicated.

C. Chimes, Low-Level Output: Vibrating type, 75 dB minimum rated output.

D. Chimes, High-Level Output: Vibrating type, 81 dB minimum rated output.

E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet (3 m) from the horn.

F. Visible Alarm Devices: Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Strobe Leads: Factory connected to screw terminals.

2.7 FIREFIGHTERS' TELEPHONES

A. Comply with NFPA 72 requirements for two-way telephone communication service.

B. Telephone Handsets: High-impact plastic handset, heavy-duty coil cord, and hook switch; connected to the FACP by dedicated, supervised communication lines. Handsets have a dynamic receiver and a carbon transmitter, operating on 24-V dc.

C. Cabinet: Flush or surface mounted as indicated, 0.05-inch- (1.3-mm-) minimum stainless steel with a latched hinged door with red trim.

1. Exterior Identification: "Firefighters' Telephone."

2. Interior Identification: Station number and location.

3. Size: To accommodate handset and cord.

2.8 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.

2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.

3. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

2.9 CENTRAL FACP

A. Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. If more than one unit is required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate components and to allow ample gutter space for field wiring and interconnecting panels.

1. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch (25 mm) high. Identify individual components and modules within cabinets with permanent labels.

2. Mounting: Surface.

B. Alarm and Supervisory Systems: Separate and independent in the FACP. Alarm-initiating zone boards consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.

C. Control Modules: Include types and capacities required to perform all functions of fire alarm systems.

D. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.

E. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.

F. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components, including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Display: Liquid-crystal type, 80 characters, minimum.

2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

G. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components, including annunciation, supervision, and control.

1. Display: A minimum of 80 characters; alarm, supervisory, and component status messages; and indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.

2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

H. Firefighters' Telephone Control Module: Controls firefighters' two-way telephone communication system. Arrange system to use dedicated, two-way, supervised voice communication links between the FACP and remote firefighters' telephone stations throughout the building. Supervised telephone lines shall be connected to talk circuits by controls in this module. Controls provide the ability to disconnect phones from talk circuits if too many phones are in use simultaneously. The module includes the following:

1. Audible Pulse and Tone Generator, and High-Intensity Lamp: When a remote telephone is activated, it causes the audible signal to sound and the high-intensity lamp to flash.

2. Selector panel controls simultaneous operation of telephones in selected zones and permits up to six phones to be operated simultaneously. Ground faults and open or shorted telephone lines are indicated on the panel front by individual LEDs. Zone-selector switches with associated LED indicators permit the firefighter to activate selected telephone zones. LED indicators display elevator recall status.

I. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.10 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, reset, and test.

1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

C. Graphic Display Panel for Remote Annunciator: Wall-mounted engraved panel indicating the building floor plan with a "You Are Here" designation. Engrave zone, area, and floor designations on the face of the panel.

1. Materials: Satin-finished stainless steel or brushed aluminum.

2. Floor Plan and Zone Boundary Lines: Engraved in the surface and filled with colored paint. Floor plan lines are black and 1/4 inch (6 mm) wide

3. Engraved Legends: 1/4-inch- (6-mm-) high minimum, in letters filled with red paint.

4. Mounting: Adjacent to remote annunciator.

2.11 EMERGENCY POWER SUPPLY

A. General: Components include nickel-cadmium battery, charger, and an automatic transfer switch.

1. Battery Nominal Life Expectancy: 20 years, minimum.

B. Battery Capacity: Comply with NFPA 72.

1. Magnetic door holders are not served by emergency power. Magnetic door holders are released when normal power fails.

C. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.

D. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

2.12 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.

2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled under UL 864 and NFPA 72.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP panel, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising two lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

D. Self Test: Conducted automatically every 24 hours with report transmitted to central station.

2.14 SYSTEM PRINTER

A. Description: Listed and labeled as an integral part of the fire alarm system.

2.15 WIRE

A. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.

2. Line-Voltage Circuits: No. 12 AWG, minimum.

B. Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Connect the FACP with a disconnect switch with lockable handle or cover.

B. Manual Pull Stations: Mount semiflush in recessed back boxes.

C. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.

D. Ceiling-Mounted Smoke Detectors: Not less than 4 inches (100 mm) from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet (9 m) apart in any direction.

E. Wall-Mounted Smoke Detectors: At least 4 inches (100 mm), but not more than 12 inches (300 mm), below the ceiling.

F. Smoke Detectors near Air Registers: Install no closer than 60 inches (1520 mm).

G. Duct Smoke Detectors: Comply with manufacturer's written instructions.

1. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

2. Install sampling tubes so they extend the full width of the duct.

H. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

K. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

L. Annunciator: Install with the top of the panel not more than 72 inches (1830 mm) above the finished floor.

3.2 WIRING INSTALLATION

A. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways and Boxes." Conceal raceway except in unfinished spaces and as indicated.

B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

D. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

E. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Basic Electrical Materials and Methods."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.4 GROUNDING

A. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

B. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 26 Section "Grounding."

C. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.

D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.

2. Test all conductors for short circuits using an insulation-testing device.

3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.

4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.

5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.

6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.

7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.

8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

3.6 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training.

2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.

3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

3.8 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION 283111

SECTION 31 00 00

EARTHWORK (UNDER BUILDING PAD)

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Protecting and preserving trees and vegetation to remain.

B. Clearing, stripping, and grubbing of portions of sites which are below the building pads.

C. Stockpiling stripped topsoil in approved locations.

D. Excavating for and otherwise providing stable and compact subgrade below the building pads.

F. Placing and compaction of select fill under improved areas to conform to elevations indicated on the drawings.

G. Filling and finish grading of area around buildings and other improvements using previously stripped topsoil and additional topsoil that must be purchased and delivered to the site.

H. Coordinating Work of other Sections affecting or affected by Work of this Section.

1.2 RELATED WORK

A. Section 02010 - Geotechnical Report

B. Division 2 - Site Work: Related earthwork, civil, paving, and landscaping sections of work.

1.3 INSPECTION OF SITE

A. By making a proposal on the Project, the Contractor acknowledges:
1. That the Owner and Architect do not guarantee the accuracy, completeness, or suitability of the contents of the Geotechnical Report or Topographic Survey.
2. That he/she has visited the site to investigate the conditions affecting the Work and has satisfied himself/herself of the character, quality and quantity of surface and subsurface materials or obstacles to be encountered.

B. The Contractor will be required to establish, maintain and be responsible for all reference points, hubs, grades, elevations, lines, and surface measurements. If any discrepancies in the documents are found, the Contractor shall promptly notify the Architect and await instructions before proceeding.

1.4 QUALITY ASSURANCE

A. Inspection and Testing Laboratory Services: Test results shall meet or exceed the standards referenced.

B. Refer to Geotechnical Report, Topographic Survey, and Civil Drawings.

1.5 REFERENCES

A. ASTM International (ASTM)
1. D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3) – Test for Moisture Unit Weight Relations of Soils and Soil Aggregate.
2. D2922, Tests for Density of Soil and Soil Aggregate in place by Nuclear Methods.

1.6 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01110 - Notification of Architect Requirements.

PART 2 - MATERIALS

2.1 MATERIALS

A. Structural Fill: Sandy clay soils free of organic or other deleterious materials, and have a maximum clay lump size of less than three (3) inches. See Construction Documents for Liquid Limit and Plasticity Index per soils report.

B. Earth Fill: Shall be excavated material approved by Architect prior to its use as earth fill around building and landscaped areas, but not under building.

C. Stabilization Materials: Refer to Division 2.

D. Topsoil: Shall be imported, and shall be free from clay, vegetation, debris, stumps, roots, stones larger than 3/4 inch diameter, or other objectionable matter.

PART 3 - EXECUTION

3.1 GENERAL

A. Unknown Utilities and Obstacles:
1. If any unknown or uncharted utilities or objects are encountered during excavation, promptly notify the Architect before proceeding. Arrange with utility and telephone companies for removal and relocation of their equipment, and capping of pipes and wiring as required.

B. Protection of Vegetation:
1. Rope or fence off areas of the site that are designated to remain with vegetation to prevent vehicular traffic and construction damage.
2. Provide wood barricades around trees and shrubs at their drip line in traffic areas to protect them from construction operations until Substantial Completion, or until barricade removal is directed by Architect.
3. Replace damaged trees and vegetation designated to remain with vegetation of equal kind and size. Follow supplier's recommended procedures for planting necessary replacement vegetation.

C. Clearing, Stripping and Grubbing (General):
1. Remove brush, vegetation, debris, and surplus materials from the jobsite. Removal of other remaining impediments as may be necessary to properly

execute the scope of this contract shall be included herein. Adhere to State and local code requirements for the disposal of trees and shrubs removed from the site.

2. Do not remove trees or shrubs without the specific approval of the Architect. Vegetation damaged, removed, killed, or constricted from normal growth patterns shall be replaced with a comparable item, or the full replacement amount credited to the Owner.

D. Drainage, Pumping and Grading:
   1. Proper drainage of site shall be maintained during construction so that ponding of surface runoff does not occur and cause construction delays and/or inhibit access to the site.
   2. Contractor shall control the grading around building so that ground is pitched to prevent water from running into the excavated areas of building or damaging other structures.
   3. Provide pumping required to keep excavated spaces clear of water during construction.
   4. If any subgrade is damaged due to flooding, damaged area shall be removed and filled with select fill. Placement and compaction of select fill shall meet the requirements for placing and compacting select fill as specified below.
   5. If the subgrade, due to any reason or cause, lose the required stability, density, or finish before the foundation structure is placed, it shall be re-compacted and refinished at the sole expense of the Contractor.

3.2 BUILDING FOUNDATION (PAD) PREPARATION

A. Site preparation area at buildings with and without adjacent sidewalks shall extend beyond the limits of the foundation area. See Construction Documents for Site Preparation limits.

B. Existing fill material, top soil vegetation, roots, debris, organic material and other miscellaneous debris shall be removed to a depth of 6 inches and legally disposed of. Actual removal depth may vary and will be determined at time of construction.

C. Over excavate the in-situ soils as required to allow the minimum amount of select structural fill to be placed beneath the slab to achieve the desired elevation. See Construction Documents for amount of select structural fill required per soils report.

D. After stripping, and excavating to the desired grade as indicated above, the exposed soil shall be proof-rolled to locate all soft or loose areas. Soils, which are observed to rut or deflect excessively under the moving load, shall be undercut and replaced with properly compacted structural fill. The proof-rolling and undercutting activities shall be witnessed by a representative of the geotechnical engineer and shall be performed during a period of dry weather.

E. Subsequent to proof-rolling, and just prior to placement of fill, the exposed subgrade within the construction areas shall be evaluated for moisture and density. The subgrade soils shall be at or above the optimum moisture content, and have an in-place dry density of at least 95 percent of the standard effort (ASTM D698) maximum dry density of the in-situ soils. If the moisture or density does not meet the above criteria, the subgrade shall be scarified to a minimum depth of 6 inches, and moisture adjusted to meet the requirements per the soils report as indicated on the Construction Documents.

D. If remediation is required, Contractor shall have any of the following remediation options:
   1. Disking and drying with natural means (if the construction schedule allows).

2. Dry the surface soils by chemically treatment.
3. Remove the unsuitably wet soils and replace the wet soil with select fill having an acceptable moisture content.

The option will be entirely up to the Contractor and no extra will be paid by the Owner.

E. After proof-rolling and undercutting has been completed, and the subgrade tested and adjusted as necessary, fill placement may begin. The first layer of fill shall be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped subgrade soils.

F. Refer to construction drawings for information regarding lime-stablized subgrade treatment.

3.3 FILL PLACEMENT

A. Structural fill materials shall be as specified in Paragraph 2.1, A above. Structural fill shall be placed in maximum lifts of eight (8) inches of loose material and shall have a moisture content as indicated on the Construction Documents. If water must be added, it shall be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of structural fill shall be tested by a representative of the geotechnical engineer prior to placement of subsequent lifts.

B. Each lift of structural fill shall be compacted as required per the soils report and as indicated on the Construction Documents. Care shall be taken to apply compactive effort throughout the fill and fill scope areas. The moisture content and the degree of compaction of the structural fill soils shall be maintained until the construction of structures above them.

C. Contractor shall be responsible for damage caused to structure because of over excavation or excavations left open during inclement weather. Should the subgrade, for any reason or cause, lose the required stability, density, or finish before the foundation structure is placed, it shall be re-compacted and refinished at the sole expense of the Contractor.

3.4 GRADING

A. Rough Grading: Contractor shall control the grading around building so that ground is pitched to prevent water from running into the excavated areas or damaging other structures. Furnish pumping required to keep excavated spaces clear of water during construction. If a foundation excavation must remain empty through a shut-down period, cover with boards and building paper and clean out immediately when work resumes. If any subgrade should be damaged due to flooding, damaged area shall be removed and filled with select fill.

B. Finish Grading:
1. After rough grading is completed, provide and place previously stripped material or imported top soil in the amounts required to bring the rough grade to within two (2) inches of finish grade. This earth fill shall be placed in lifts not to exceed 12 inches after compaction and shall be compacted to a dry density of at least 95 percent of the ASTM D698 maximum dry density.
2. Assure bonding of layers of fill material in compliance with the specifications.
3. Final and fine grading shall be done using a tractor pulled landscape rake and hand raking removing all debris immediately prior to landscaping. The final graded ground surface shall be relatively smooth, free of organic material and in suitable condition to commence landscaping work.

C. Topsoil:
1. Contractor shall furnish all topsoil that may be required to provide finish elevations. Topsoil material shall meet requirements of Paragraph 2.1 of this Section. Spread minimum two (2) inches of topsoil over graded areas after rough grading has been completed.
2. At the completion of finish grading, ground surface shall be relatively smooth, free of organic material and in suitable condition to commence landscaping work.

3.5 INSPECTION AND TESTING LABORATORY SERVICES

A. Refer to Section 01115, Inspection and Testing Laboratory Services for laboratory services to determine the liquid limit, plastic limit and plasticity index for soils and in-place density tests for compacted material.

B. The Contractor shall cooperate with the inspection and testing laboratory in all matters pertaining to the work.

END OF SECTION

SECTION 31 11 00

SITE CLEARING AND GRUBBING

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Clearing of site, consisting of removal and satisfactory disposal of trees, stumps, brush, roots, logs, vegetation, debris, rubbish and other objectionable weather from the entire project area.

B. Grubbing of site, consisting of complete uprooting, removal and satisfactory disposal of all stumps, brush, roots, logs, etc. to full depth, from the project area. All roots, branches, etc. greater than or equal to 1-1/2 inches in diameter shall be removed from the site. Stump hole pits shall be cleared of refuse and loose earth.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 CONDITIONS AT SITE

A. Execute all work in an orderly and careful manner with due consideration for any and all surrounding areas, planting or structures which are to remain. Periodically, water as required to allay dust and dirt. Protect any adjacent property and improvements from damage and replace any portions damaged through this operation.

B. Coordinate and comply with the following:
1. [Geotechnical Report.]
2. Local ordinances and requirements of authorities having jurisdiction.

C. The Contractor shall take proper precautions to protect adjacent or adjoining property from damage caused by clearing and grubbing activities. All damage shall be repaired or replaced at Contractor's expense.

3.2 DISPOSAL OF MATERIAL

A. Unless otherwise specified, cleared and grubbed material becomes the property of the Contractor to be removed off-site. On site burning of combustible is not acceptable unless permission from Owner, City of County is granted. The Contractor shall be responsible for obtaining all permits required by State and local governing agencies. The Contractor shall provide adequate fire protection to adjacent property. The Contractor will be held responsible for fire damage to adjacent trees and property. Upon completion of the burning process, the ashes are to be removed and disposed of off-site. The burn pit or pits shall be cleared of all debris and backfilled. The laboratory shall verify the removal of debris, preparation of the pit for backfill and backfill operation. The laboratory shall provide the Architect with a report verifying the preparation and backfill of the pit. The Contractor shall furnish to the Architect a location survey of the burn put or pits. This

location survey shall be performed and certified by a Registered Professional Land Surveyor.

3.3 FINAL SITE PREPARATION

A. Remove from the site all rubbish, debris, etc., resulting from Work of this Section, except as otherwise specified above.

B. After clearing, grubbing and discing the project site, rake and pick the entire site to remove all material as outlined in Section 1.1, B above.

END OF SECTION

SECTION 31 31 16

TERMITE CONTROL

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Chemical soil treatment

B. Termite Shields

1.2 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y – Federal Insecticide, Fungicide and Rodenticide Act; United States Code; 1947 (Revised 2001).

1.3 SUBMITTALS

A. See Section 01 3000 – Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Application Instructions: Indicate caution requirements.

E. Manufacturer's Certificate: Certify that toxicants meet or exceed specifies requirements.

F. Warranty: Submit warranty and ensure that forms have been completed in **Hidalgo County.**

1.4 QUALITY ASSURANCE

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for application, and comply with EPA regulations.

B. Provide certificate of compliance form authority having jurisdiction indicating approval of toxicants.

1.6 WARRANTY

A. See Section 01 78 00 – Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused by termites.

1.7 SUMMARY

A. Provide soil treatment for termite control, as herein specified, prior to placement of vapor barrier under concrete work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
   1. Bayer Environmental Science Corp; Product_____: www.nobugs.com.
   2. FMC Professional Solutions; Product____: www.fmcprosolutions.com.
   3. Syngenta Professional Products; Product____: www.syngentaprofessionalproducts.com.
   4. Substitutions: See Section 01 6000 – Product Requirements.

B. Toxicant Chemical: EPA approved; synthetically color dyed to permit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

D. Metal termite shields for structural components which come into contact with the ground below suspended concrete slabs (not applicable for slab-on-grade conditions).

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements of U.S. EPA and applicable state and local codes.

B. Spray apply toxicant in accordance with manufacturer's instructions.

C. Apply toxicant at following locations:

D. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

E. Install metal termite shields on foundation walls and footings at crawl spaces and basement areas.

F. Re-treat disturbed treated soil with same toxicant as original treatment.

G. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.2 PROTECTION

A. Do not permit soil grading over treated work.

3.3 APPROVAL

A. Completion of pesticide approval form attached hereto is required for the completion of job.

END OF SECTION

CIVIL SPECIFICATIONS

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HIDALGO COUNTY PRECINCT No. 4
CONSTRUCTION OF A NEW MULTI-PURPOSE FACILITY AND MECHANICAL SHOP
GENERAL NOTES

1. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE HIDALGO COUNTY PRECINCT No. 4.

2. THE CONTRACTOR SHALL REMOVE ALL FENCES LOCATED WITHIN THE R.O.W. INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCES SHALL BE REPLACED WITH A NEW FENCE OR UNDAMAGED ORIGINAL FENCING. REMOVAL AND REPLACEMENT OF EXISTING AND TEMPORARY FENCES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

3. CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT MR. RICHARD GARCIA WITH NORTH ALAMO WATER SUPPLY CORP. (N.A.W.S.C.) 48 HOURS PRIOR TO COMMENCEMENT OF WORK @ (956) 383-1618 TO COORDINATE AND MEET ANY ADDITIONAL REQUIREMENTS AND/OR SPECIFICATIONS.

4. CONTRACTOR SHALL BE RESPONSIBLE TO CALL DIG TESS 48 HOURS PRIOR TO COMMENCEMENT OF WORK FOR UTILITY SPOTTING @ (1-800-DIG-TESS).

5. LOCATIONS OF UNDERGROUND FACILITIES ARE FROM BEST INFORMATION AVAILABLE. NEITHER THE OWNER NOR ENGINEER, WARRANT THE ACCURACY OF THE INFORMATION PROVIDED. ANY DEVIATIONS SHALL BE CALLED TO THE ENGINEER'S ATTENTION IMMEDIATELY.

6. AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL INSTALL APPROPRIATE TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH THE TMUTCD LATEST EDITION, AND AS APPROVED BY THE ENGINEER.

7. ALL MATERIALS AND DEBRIS, EXCEPT HMAC AND CALICHE BASE, RESULTING FROM DEMOLITION IN PREPARATION FOR THE PROPOSED IMPROVEMENTS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. THESE MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED.

8. ANY DAMAGES TO FENCES, WALKS, MAIL BOXES, OR PRIVATE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

9. NO OPEN EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED. AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AND UNPAVED AREAS SUBJECT TO VEHICULAR LOADING; ¾ PLYWOOD, WOOD PLANKING WITH O.S.H.A. ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS NOT SUBJECT TO VEHICULAR LOADING, OR AS APPROVED BY THE ENGINEER.

10. THE PREPARATION OF THESE PLANS REFLECTS INFORMATION, PROVIDED BY OTHERS, ON THE APPROXIMATE LOCATION AND EXISTENCE OF EXISTING UTILITY AND ADJACENT PHYSICAL FEATURES. HOWEVER, THEY DO NOT IMPLY OR AFFIRM THAT ALL UTILITIES OR PHYSICAL FEATURES ARE SHOWN. GENERALLY, UTILITY SERVICE CONNECTIONS ARE NOT INDICATED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATIONS OF THE OWNER IMMEDIATELY UPON ENCOUNTERING UNFORESEEN CONFLICTS.

HIDALGO COUNTY PRECINCT No. 4
CONSTRUCTION OF A NEW MULTI-PURPOSE FACILITY AND MECHANICAL SHOP
GENERAL NOTES

11. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN, CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. CONTRACTOR TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES.

12. PUBLIC AND PRIVATE UTILITY LINES AND CUSTOMER SERVICE LINES MAY EXIST THAT ARE NOT SHOWN ON THE CONSTRUCTION DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE, MAINTAIN AND PROTECT THE INTEGRITY OF THESE LINES. HAND EXCAVATION MAY BE REQUIRED.

13. CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANY TO RELOCATE OR DIVERT ANY UTILITY IN CONFLICT WITH PROPOSED CONSTRUCTION SO AS NOT TO DISRUPT SERVICE OF IT. CONTRACTOR SHALL RESTORE, RELOCATED, OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION.

14. CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES FOR VERIFICATION OF LOCATION OF EXISTING FACILITIES PRIOR TO BEGINNING ANY EXCAVATION.

15. CONTRACTOR TO MAINTAIN ALL EQUIPMENT AND TRANSPORTATION OF SAID EQUIPMENT WITHIN THE EXISTING RIGHT-OF-WAYS OF THE CITY, COUNTY, OR STATE.

16. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY SURFACE IRREGULARITIES, AS DIRECTED BY THE ENGINEER, CAUSED BY THE CONTRACTOR'S WORKING OPERATIONS.

17. DURING EXCAVATION OPERATIONS FOR DRAINAGE AND/OR UTILITIES, THE CONTRACTOR SHALL NOT PILE ANY EXCAVATED MATERIAL OR EXCAVATE WITHIN THE DRIP LINE OF TREES THAT ARE TO BE PRESERVED.

18. WHERE NEW WATER LINES AND SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC 317 (DESIGN OF SEWAGE SYSTEMS) OR 30 TAC 290 (WATER HYGIENE).

19. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER AND SEWER CONNECTIONS TO ALL HOMES AND BUSINESS IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR CONNECTIONS TO BE REINSTALLED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT.

20. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE DRAINAGE AT ALL TIMES DURING CONSTRUCTION OF PROPOSED FACILITIES.

21. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AT ALL TIMES DURING THE INSTALLATION OF THE STRUCTURES, DRAINAGE, IRRIGATION AND ROAD IMPROVEMENTS.

22. THE CONTRACTOR SHALL CLEANUP AND RESTORE THE AREA OF OPERATIONS TO A CONDITION AS GOOD AS OR BETTER THAN THAT WHICH EXISTED PRIOR TO INSTALLATION OF ALL ITEMS TO BE CONSTRUCTED.

HIDALGO COUNTY PRECINCT No. 4
CONSTRUCTION OF A NEW MULTI-PURPOSE FACILITY AND MECHANICAL SHOP
GENERAL NOTES

23. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT AREA ALL SURPLUS MATERIAL. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED OTHERWISE. SURPLUS MATERIALS FROM EXCAVATION INCLUDING DIRT, TRASH, ETC., SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE TO HIDALGO COUNTY PRECINCT No 4 THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAYS WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE HIDALGO COUNTY PRECINCT No 4. IF THE CONTRACTOR PLACES EXCESS MATERIAL IN THE AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND CONTRACTOR SHALL REMOVE THE MATERIAL AT OWN COST.

24. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION AND SUBMITTAL OF THE TRENCH EXCAVATION PROTECTION PLAN IN THE EVENT A TRENCH BOX IS NEEDED. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS BEFORE CONSTRUCTING THE SHORING. THE ENGINEER RESERVES THE RIGHT TO REJECT DESIGNS NOT MEETING THE REQUIREMENTS OF SECTION 402 AND 403.

25. NEW CALICHE MATERIAL GRADATION SHALL BE ARGILLACEOUS LIMESTONE, CALCAREOUS OR CALCAREOUS CLAY PARTICLES, WITH OR WITHOUT STONE CONGLOMERATE GRAVEL, SAND OR GRANULAR MATERIAL: SEE GENERAL NOTES ON PLANS FOR TABLE OF CALICHE REQUIRED TO MEET SPEC.

26. COUNTY WILL PROVIDE CALICHE MATERIAL AND CONTROL POINTS (BENCHMARK AND PROPERTY CORNERS) FOR THE WORK TO BE PERFORMED BY THE CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING INCLUDING BUT NOT LIMITED TO HORIZONTAL & VERTICAL GRADE CUTS FOR ROADWAY AND PARKING AREA. BASE AND SUB GRADE SHALL HAVE A MINIMUM CROSS SLOPE OF 2% FOR THE ROAD AND SLOPE AS PER PLAN FOR THE PARKING AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY EXCESS CALICHE TO THE BASE THAT WOULD REQUIRED MORE THAN 8" OF CALICHE BASE DUE TO OVER EXCAVATIONS OF THE BASE & SUB GRADE OR NOT PROVIDING ADEQUATE FILL TO MEET FINISH GRADE ELEVATIONS. CONTRACTOR SHALL PROVIDE MATERIAL AND LABOR FOR ALL CONCRETE WORK (SIDE WALK, VALLEY GUTTER, CONCRETE SPILLWAYS, CONCRETE APRONS, AND CURB AND GUTTER) AND APPLICATION OF MC30 FOR ROADWAY AND PARKING AREA.

27. HIDALGO COUNTY WILL BE RESPONSIBLE FOR THE INSTALLATION OF MAIN SANITARY AND WATER LINES. BUILDING CONTRACTOR SHALL CONNECT ALL WATER AND SEWER SERVICE CONNECTIONS AND FIRE SPRINKLER SYSTEM TO MAIN SERVICE LINE.

28. EXISTING ACCESS ROAD CALICHE TO BE EXCAVATED AND STOCKPILED. SAID EXITING SECTION SHALL BE USED IN THE BOTTOM HALF OF THE ROAD AND SHALL BE CONSTRUCTED FROM EXCAVATED AND STOCKPILED CALICHE WITH THE COMBINATION OF EXISTING AND NEW TO ATTAIN THE REQUIRED 8 IN. DEPTH 8 IN. BASE SHALL HAVE A MINIMUM OF 4 IN. NEW CALICHE AT THE TOP OF THE BASE SECTION. THE PRODUCT OF THE CRUSHED ASPHALT PAVEMENT (MAX 2" PIECES IN SIZE) AND SALVAGE CALICHE SHALL BE TREATED WITH TWO (2) PERCENT LIME BY DRY WEIGHT OF SALVAGE MATERIAL. SAID FILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY. THE LIME TREATMENT OF THE EXISTING SECTION, SUB-GRADE FILL AND CROSS-SLOPE ROADSIDE DITCH GRADING ITEMS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM AND SHALL BE REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS IN THE PROPOSAL.

SECTION 00101

ABBREVIATIONS AND DEFINITIONS

PART 1 - ABBREVIATIONS

1.01 Wherever the following abbreviations or symbols are used, they are to be construed the same as the respective expressions represented:

AASHTO American Association of State Highway and Transportation Officials

AB ..... Aggregate Base
AC ..... Asphalt Concrete
ACB ..... Asphalt Concrete Institute
ACI ..... American Concrete Institute
ACP ..... Asbestos Cement Pipe
ACPA ..... American Concrete Pipe Association
AD ..... Assessment District
AGC ..... Associated General Contractors of America, Inc.
AIEE ..... American Institute of Electrical Engineers
AISC ..... American Institute of Steel Construction
ANSI ..... American National Standards Institute
APWA ..... American Public Work Association
AREA ..... American Railway Engineers Association
ASMI ..... American Society of Mechanical Engineers
ASCE ..... American Society of Civil Engineers
Asph ..... Asphalt
ASTM ..... American Society for Testing and Materials
AWG ..... American Wire Gage (Nonferrous Wire)
AWPA ..... American Wood Preservers Association
AWPI ..... American Wood Preservers Institute
AWS ..... American Welding Society
AWWA ..... American Water Works Association
BC ..... Beginning of Curb or Back of Curb
BCR ..... Beginning of Curve Return or Back of Curb Radius
BM ..... Bench Mark
BWG ..... Birmingham Wire Gage (Iron and Steel Wire)
CB ..... Catch Basin
C.C. or C/C ..... Center to Center
Cem. ..... Cement
CF ..... Curb Face
CI ..... Cast Iron
CIP ..... Cast-Iron Pipe
CIPP ..... Cast-in- Place Pipe
C.L. or CL. ..... Center Line
CMP ..... Corrugated Metal Pipe
CMPA ..... Corrugated Metal Pipe Arch
CO ..... Clean Out
Col ..... Column

Conc ..... Concrete
Const. ..... Construct
DF ..... Douglas Fir
DG ..... Decomposed Granite
DMH ..... Drop Manhole
D/W ..... Driveway
EC ..... End of Curve
EL. or Elev. ..... Elevation
Ex. or Exist. ..... Existing
F & C ..... Frame and Cover
FH ..... Fire Hydrant
FL ..... Flow Line
Fl. El. ..... Floor Elevation
FS ..... Federal Specification of Finished Surface
FHWA ..... Federal Highway Administration, Department of Transportation
Galv. ..... Galvanized
GL ..... Ground Line
Gr. ..... Grade
H ..... Height or High
HC ..... House Connection Sewer
Hor ..... Horizontal
ID ..... Inside Diameter
Inv. ..... Invert
IP ..... Iron Pipe
ITE ..... Institute of Transportation Engineers
Lin. ..... Liner
LL ..... Liquid Limit
Long ..... Longitudinal
Max. ..... Maximum
MH ..... Manhole
M ..... Thousand
m ..... meter or middle
Min. ..... Minutes or Minimum
Mon. ..... Monolithic or Monument
MTD ..... Multiple Tile Duct
NEC ..... National Electrical Code
NEMA ..... National Electrical Manufacturers Association
NFPA ..... National Fire Protection Association
NGS ..... National Geodetic Survey
OC ..... On Center
OD ..... Outside Diameter
PC ..... Point of Curvature
PCC ..... Point of Compound Curve or Portland Cement Concrete
PI ..... Point of Intersection or Plasticity Index
PL ..... Property Line or Plastic Limit
PP ..... Power Pole
ppm ..... Parts per Million
PRC ..... Point of Reverse Curve
Prop ..... Proposed or Property
psf ..... Point of Tangency

psi.....Pavement
PT.....Polyvinylchloride Pipe
Q.....Rate of Flow
R.....Radius
RC.....Reinforced Concrete
RCP.....Reinforced Concrete Pipe
Rdwy.....Roadway
Ret.Wall.....Retaining Wall
RGRCP.....Rubber Gasket-Reinforced Concrete Pipe
s.....Slope
SAE.....Society of Automotive Engineer
San.....Sanitary
SCCP.....Steel Cylinder Concrete Pipe
SD.....Storm Drain
Sdl.....Saddle
Sect.....Section
Spec.....Specification
San. S.....Sanitary Sewer
St.....Street
Sta.....Station
Std.....Standard
T.....Tangent Distance
TH.....Test Hole
THM.....Trap Manhole
UL.....Underwriters' Laboratories, Inc.
USA.....United States of America Standards Institute, Inc.
V.....Velocity
VC.....Vertical Curve
VCP.....Vitrified Clay Pipe
VCPI.....Vertical Curve Point of Intersection
Vert.....Vertical
W.I.....Wrought Iron

1.02 All abbreviations and symbols used on plans for structural steel construction shall conform to those given in the Steel Construction Manual of the American Institute of Steel Construction.

PART 2 - DEFINITIONS

2.01 Agreement-- The written agreement which constitutes a contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement.

2.02 Application for Payment-- The form furnished by ENGINEER which is to be used by CONTRACTOR in requesting progress payments and which is to include the schedule of values required by paragraph 14.1 and an affidavit of CONTRACTOR that progress payments theretofore received on account of the Work have been applied by CONTRACTOR to discharge in full all of CONTRACTOR'S obligations reflected in prior Applications for Payment.

2.03 Bid-- The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

2.04 Bidder-- Any person, firm, or corporation submitting a Bid for the Work.

2.05 Bonds-- bid, performance, and payment bonds and other instruments of security, furnished by CONTRACTOR and his surety in accordance with the Contract Documents.

2.06 Change Order-- A written order to CONTRACTOR signed by COUNTY authorizing an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Time issued after execution of the Agreement.

2.07 CITY -- A public body or authority or the contracting agency for whom the work is to be performed.

2.08 Contract Documents-- The Agreement, Addenda (whether issued prior to the opening of Bids of the execution of the Agreement), Instructions to Bidders, CONTRACTOR's Bid, the Bonds, the Certificate of Insurance, the Notice of Award, Notice to Proceed, these COUNTY of McAllen Standard Specifications, Plans and Drawings, and all Modifications.

2.09 Contract Price-- The total monies payable to CONTRACTOR under the Contract Documents.

2.10 Contract Time-- The number of days stated in the Agreement for the completion of the Work, computed of the Work, computed as provided in paragraph 17.2.

2.11 Contracting Agency-- (See COUNTY)

2.12 CONTRACTOR-- The person, firm, or corporation with whom OWNER has executed the Agreement.

2.13 Day-- A calendar day of twenty-four hours measured from midnight to the next midnight.

2.14 Drawings or Plans-- The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

2.15 ENGINEER-- The OWNER'S employee or agent responsible for the engineering design and construction inspection and supervision, acting directly or through duly authorized representatives.

2.16 Field Order-- A written order issued by ENGINEER which clarifies or interprets the Contract Documents in accordance with paragraph 9.3 or order minor changes in the Work in accordance with paragraph 10.2.

2.17 General Conditions -- Conditions which apply to all projects and which can be modified by Special conditions.

2.18 General Provisions-- A term having the same meaning as the term General Conditions.

2.19 Modification-- (a) A written amendment to the Contract Documents signed by both parties, (b) a Change Order, (c) a written clarification or interpretation issued by ENGINEER in accordance with paragraph 9.3, or (d) a written order for a minor change or alteration in the Work issued by ENGINEER pursuant to paragraph 10.2. A Modification may only be issued after execution of the Agreement.

2.20 Notice of Award-- The written notice by OWNER to the apparent successful Bidder stating that, upon compliance with the conditions precedent to be fulfilled by him within the time specified, OWNER will execute and deliver the Agreement to him.

2.21 Notice to Proceed-- A written notice given by COUNTY to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform his obligations under the Contract Documents.

2.22 Project-- The entire construction to be performed as provided in the Contract Documents.

2.23 Reference Specifications, Test Methods, and Applicable Codes-- All standard specifications and test methods of any society, association, or organization herein referred to are hereby made a part of these Contract Documents the same as if written in full. (Any reference to a paragraph or subparagraph within a section shall include all general provisions of the section to which reference is made.) Reference to such standards refer to the latest publiqhed issues as of the date of publication issues as of the date of Invitation to Bid. Reference to local or state codes and laws shall mean the latest adopted and published codes as of the date of the Invitation to Bid.

2.24 Resident Project Representative-- The authorized representative of ENGINEER who is assigned to the Project site or any part thereof.

2.25 Service Connections-- Service Connections shall be construed to mean all or any portion of the pipe, conduit, cable, or duct which connects a utility main or distribution line to a building, home, residence, or property.

2.26 Shop Drawings-- All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by CONTRACTOR, a Subcontractor, manufacturer, supplier, or distributor and which illustrate the equipment, material, or some portion of the Work.

2.27 Special Conditions-- Conditions which are written for a specific project and which modify any section or paragraph of the General Conditions.

2.28 Specifications, also Technical Specifications-- Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work. When Section Items 400, 402, 403, 420, 421, 440, 462, 464 make reference to the following Item numbers 132, 360, 404, 420, 424, 426, 427, 431, 437, 438, 441, 446, 448, 50, 522, 524, 526, 575, the CONTRACTOR shall use Texas Department of Transportation (TxDOT) Standard Specifications for Construction of Highways, Streets and Bridges Latest Edition for Specifications of the aforementioned Item Numbers.

2.29 Subcontractor-- An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

2.30 Substantial Completion-- The date as certified by ENGINEER when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with paragraph 14.13.

2.31 Supplementary Specifications-- which are written to modify any section or paragraph of the Technical Specifications of this document.

2.32 Utility--Overhead or underground wires, pipe lines, conduits, ducts, or structures, operated and maintained in or across a public right-of-way or easement or private easement.

A. Public Utility--Owned and operated by a municipality or another political subdivision of the State.

B. Private Utility--Owned and operated by a private company or corporation.

2.33 Work-- Any and all obligations, duties, and responsibilities necessary to the successful completion of the Project assigned to or undertaken by CONTRACTOR under the Contract Documents, including all labor, materials, equipment, and other incidentals, and the furnishing thereof.

*** * * END OF SECTION * * ***

SECTION 00102

PRELIMINARY MATTERS

PART 1 - EXECUTION OF AGREEMENT:

1.01 At least four (4) counterparts of the Agreement and such other Contract Documents as practicable will be executed and delivered by CONTRACTOR to COUNTY within fifteen days of the Notice of Award; and COUNTY will execute and deliver one counterpart to CONTRACTOR within ten days of receipt of the executed Agreement from CONTRACTOR. COUNTY will identify those portions of the Contract Documents not so signed and such identification will be biding on all parties. COUNTY, CONTRACTOR, and Project ENGINEER shall receive and executed counterpart of the Contract Documents and additional conformed copies as required.

PART 2 - DELIVERY OF BONDS

2.01 When he delivers the executed Agreements to COUNTY, CONTRACTOR shall also deliver to OWNER such Bonds as he may be required to furnish in accordance with the contract documents.

PART 3 - CONTRACT DOCUMENTS

3.01 COUNTY shall furnish to CONTRACTOR up to three (3) copies, unless otherwise provided in the Special Conditions, of the Contract Documents as are reasonably necessary for the execution of the work. Additional copies will be furnished upon request at the cost of reproduction.

PART 4 - CONTRACTOR'S ACKNOWLEDGMENT

4.01 CONTRACTOR represents that he has familiarized himself with and assumes full responsibility for having familiarized himself with the nature and extent of the CONTRACT DOCUMENTS, Work, locality, and will all local conditions and federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect performance of the Work and represents that he has correlated his study and observations with the requirement of the Contract Documents.

4.02 CONTRACTOR also represents that he has studied all surveys and investigation reports of subsurface and latent physical conditions referred to in the Specifications and made such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract Price in accordance with the requirements of the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.

PART 5 - COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED

5.01 The Contract Time will commence to run on the thirteenth day after the day on which the executed Agreement is delivered by COUNTY to CONTRACTOR or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed; but in no event shall the Contract Time commence to run later that the nineteeth day after the day on which COUNTY delivers the executed Agreement to CONTRACTOR. A Notice to Proceed may be given at any time within thirty days after the day on which COUNTY delivers the executed Agreement to CONTRACTOR.

PART 6 - PRE-COMMENCEMENT ACTIVITIES

6.01 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract documents and check and verify pertinent figures shows thereon and all applicable field measurements. He shall at once report in writing to ENGINEER any conflict, error or discrepancy which he may discover; however, he shall not be liable to ENGINEER for his failure to discover any conflict, error, or discrepancy in the Drawings of Specifications.

6.02 Within ten days after delivery of the executed Agreement by COUNTY to CONTRACTOR, CONTRACTOR shall submit to ENGINEER for approval an estimated progress schedule indicating the starting and completion dates of the various stages of the Work and a preliminary schedule of Shop Drawing submissions.

6.03 Before starting the work at the site, CONTRACTOR shall furnish ENGINEER certificates of insurance as required in the Contract Documents. Within twenty days after delivery of the executed Agreement by COUNTY to CONTRACTOR, but before starting the Work at the site, a conference will be held to review the above schedules, to establish procedures for handling Shop Drawings and other submissions and for processing Applications for Payment, and to establish a working understanding between the parties as to the Project. Present at the conference will be ENGINEER, Project Engineer, Project Inspector, CONTRACTOR and his Superintendent.

PART 7 - COMMENCEMENT

7.01 CONTRACTOR shall tart to perform his obligations under the Contract Documents on the date when the Contract Time commences to run. No Work shall be done at the site prior to the date on which the Contract time commences to run.

*** * * END OF SECTION * * ***

SECTION 00104

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 The Contractor shall be responsible for providing materials which meet the requirements indicated. For manufactured materials such as reinforcing steel, expansion joint materials, concrete pipe, cement, miscellaneous steel, cast iron materials, etc., the CONTRACTOR will be required to furnish a manufacturer's certificate that the material meets the requirements specified for this project.

1.02 The COUNTY shall monitor all materials incorporated into the project and their placement by testing at the COUNTY's expense. The COUNTY does not guarantee the accuracy or validity of the data nor does the COUNTY assume any responsibility for the CONTRACTOR'S interpretation of the data. Materials or work which do not meet the specifications shall be removed or modified.

1.03 All retesting for work rejected on the basis of the initial test results will be at the expense of the CONTRACTOR and the extent of the retesting shall be determined by the ENGINEER. The ENGINEER may require additional testing for failing tests and may require two passing retests acceptance will be made by the COUNTY.

1.04 The testing laboratory will be designated by the ENGINEER and shall perform all work in a professional manner and conform to the requirement of ASTM E 329.

1.05 Inspection, sampling and testing requirements, where applicable, are set forth in, but not necessarily limited to, the following Sections:

Section XXX Earthwork - Excavating, Backfilling and Compacting:

	Compaction Control and Testing.
Section	Sub-grade and Base Construction.
Section	Street Surface Courses.
Section	Concrete and Structures.
Section	Underground Piped Utilities.
Section	Incidental Construction.
Section	Soil Treatment, Termite Control.
Section	Pile Driving, Load Tests.
Section	Metal Fastening: Welding and Bolting.
Section	Structural Metal Framing.

PART 2 - LABORATORY DUTIES AND LIMITS OF AUTHORITY

2.01 Cooperate with ENGINEER and CONTRACTOR: provide qualified personnel as required promptly on notice.

2.02 Acquaint ENGINEER'S personnel with testing procedures and with all special conditions encountered at the site.

2.03 Perform specified inspections sampling and testing of materials and construction methods:

A. Comply with specified standards, ASTM and other recognized authorities.
B. Ascertain compliance with contract requirements.

2.04 Promptly notify the ENGINEER of irregularities or deficiencies of work which are observed during performance of services.

2.05 Promptly submit 3 copies of reports of observations and tests to the ENGINEER including but not limited to:

2.06 Perform additional services ordered by the ENGINEER.

2.07 Laboratory is not authorized to:
A. Release, revoke, alter or enlarge on contract requirements.
B. Approve or accept any portion of work.
C. Perform any duties of the CONTRACTOR.

PART 3 - CONTRACTOR'S RESPONSIBILITIES

3.01 Furnish product mix design together with the applicable design work sheets and data to meet or exceed contract requirements.

3.02 Cooperate with COUNTY's laboratory personnel, provide access to the work or to the manufacturer's operations.

3.03 Provide to laboratory preliminary representative samples of materials to be tested in specified quantities.

3.04 Furnish copies of mill test reports.

3.05 Furnish verification of compliance with contract requirements for materials and equipment.

3.06 Furnish casual labor and facilities:
A. To provide access to work to be tested.
B. To obtain and handle samples at site.
C. To facilitate inspections and tests.
D. For laboratory's exclusive use for storage and curing of test samples.

3.07 Notify ENGINEER 24 hours in advance of operations to allow for the assignment of personnel.

3.08 Notify laboratory 24 hours in advance of operations to allow for the assignment of personnel.

3.09 Correct work which is defective or which fails to conform to the Contract Documents. Corrective work shall not delay the project or the work of other CONTRACTORS.

3.10 Pay all costs of retesting when test results indicate non-compliance with contract requirements.

3.11 Patch all surfaces and areas disturbed by testing operation.

*** * * END OF SECTION * * ***

SECTION 00105

AVAILABILITY OF LAND, PHYSICAL CONDITIONS AND REFERENCE POINTS

PART 1 - AVAILABILITY OF LANDS

1.01 COUNTY shall furnish, as indicated in the Contract Documents and not later than the date when needed by CONTRACTOR, the lands upon which the Work is done, rights-of-way for access thereto, and such other lands which are designated for the use of CONTRACTOR.

1.02 Easement for permanent structures or permanent changes in existing facilities will be obtained and paid for by COUNTY, unless otherwise specified in the Contract Documents. If CONTRACTOR believes that any delay in COUNTY's furnishing these lands or easements entitles him to an extension of the Contract Time, he may make a claim therefore in the Contract Documents.

1.03 CONTRACTOR shall provide for all additional lands and access thereto may be required for temporary construction facilities or storage of materials and equipment.

PART 2 - PHYSICAL CONDITIONS; SURVEYS AND REPORTS

2.01 The COUNTY will, upon request, furnish to the CONTRACTOR copies of all boundary surveys, subsurface tests, and other pertinent reports and material which are available in ENGINEER'S office.

2.02 CONTRACTOR shall promptly notify ENGINEER in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents.

2.03 ENGINEER will promptly investigate those conditions and perform further surveys or subsurface tests deemed necessary. Promptly thereafter OWNER shall obtain the necessary additional surveys and tests and furnish copies to ENGINEER and CONTRACTOR.

2.04 If ENGINEER finds that the results of such surveys or tests indicate that there are subsurface or latent physical conditions which differ materially from those intended in the Contract Documents and which could not reasonably have been anticipated by CONTRACTOR, a Change Order shall be issued incorporating the necessary revisions.

PART 3 - REFERENCE POINTS

3.01 ENGINEER shall provide engineering surveys for construction to establish reference points which, in his judgment, are necessary to enable CONTRACTOR to proceed with the Work.

3.02 CONTRACTOR shall be responsible for surveying and laying out the Work (unless otherwise provided in the Special Conditions) and shall protect and preserve the established reference point and shall make no changes or relocations without the prior written approval of ENGINEER. He shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

3.03 CONTRACTOR shall replace and accurately relocate all reference points so lost, destroyed or moved.

*** * * END OF SECTION * * ***

SECTION 00106

SUSPENSION OF WORK AND TERMINATION

PART 1 - COUNTY SUSPENSION OF WORK

1.01 ENGINEER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR which shall fix the date on which work shall be resumed.

1.02 CONTRACTOR shall resume the work on the date so fixed.

1.03 CONTRACTOR will be allowed an extension of the contract time directly attributable to any suspension if he makes a claim therefore as provided in Section 107 and the contract documents.

PART 2 - COUNTY TERMINATION OF WORK

2.01 If CONTRACTOR is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act or to reorganize under the bankruptcy or similar laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to Subcontractors or for labor, materials, or equipment, or if he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction, or if he disregards the authority of ENGINEER, or if he otherwise violates any provision of the contract Documents, then ENGINEER may, without prejudice to any other right or remedy and after giving CONTRACTOR and his Surety seven day's written notice, terminate the services of CONTRACTOR and take possession of the project and of all materials, equipment, tools, construction equipment and machinery thereon owned by CONTRACTOR and finish the work by whatever method he may deem expedient.

2.02 In such case CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional service, such excess shall be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to COUNTY.

2.03 Such costs incurred by COUNTY shall be determined by ENGINEER and in corporate in a Change Order.

2.04 Where CONTRACTOR's services have been so terminated by ENGINEER, said terminations shall not affect any rights of COUNTY against CONTRACTOR then existing or which may thereafter accrue.

2.05 Any retention or payment of monies by COUNTY due CONTRACTOR will not release CONTRACTOR for liability.

2.06 Upon seven days written notice to CONTRACTOR, COUNTY may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the agreement. In such case, CONTRACTOR shall be paid for all work executed and any expense sustained plus a reasonable profit.

PART 3 - CONTRACTOR SUSPENSION OR TERMINATION OF WORK:

3.01 If, through no act or fault of CONTRACTOR, the work is suspended for a period of more than ninety days by COUNTY or under an order of court or other public authority, or ENGINEER fails to act on any application for payment within thirty days after it is submitted, or COUNTY fails to pay CONTRACTOR any sum approved by ENGINEER or awarded by arbitrators within thirty days written notice to ENGINEER, terminate the agreement and recover from COUNTY payment for all work executed and any expense sustained plus a reasonable profit.

3.02 In addition and in lieu of terminating the agreement, if ENGINEER has failed to act on an application for payment or COUNTY has failed to make any payment as a foresaid, CONTRACTOR may, upon seven days' notice to ENGINEER, stop the work until he has paid all amounts then due.

*** * * END OF SECTION * * ***

SECTION 00107

WORK BY OTHERS

PART 1 - GENERAL

1.01 COUNTY may perform additional work related to the Project by itself, or it may let other direct contracts therefore which shall contain General Conditions similar to these. CONTRACTOR shall afford the other contractors who are parties to such direct contracts (or COUNTY, if it is performing the additional work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work and shall properly connect and coordinate his work with theirs.

1.02 If any part of CONTRACTOR'S Work depends for proper execution or results upon the work of any such other contractor (or COUNTY,) CONTRACTOR shall inspect and promptly report to ENGINEER in writing any defects or deficiencies in such work that render it unsuitable for such proper execution and results. His failure so to report shall constitute an acceptance of the work as fit and proper for the relationship of his Work except as to defects and deficiencies which may appear in the other work after the execution of his Work.

1.03 CONTRACTOR shall do all cutting, fitting, and patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work with the written consent of ENGINEER and of the other contractors whose work will be affected.

1.04 If the performance of additional work by other contractors of COUNTY is not noted in the Contract Documents prior to the execution of the contract, written notice thereof shall be given to CONTRACTOR prior to starting any such additional work. If CONTRACTOR believes that the performance of such additional work by COUNTY or others involves him an additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore.

1.05 Work by the CONTRACTOR and work by others should be coordinated and expedited by the COUNTY of his representative to prevent time delays and additional cost to the CONTRACTORS. Any extension of time and/or additional costs caused by other contractors or utility service companies may be claimed.

*** * * END OF SECTION * * ***

SECTION 00108

CONTRACTOR'S RESPONSIBILITIES

PART 1 - SUPERVISION AND SUPERINTENDENCE

1.01 CONTRACTOR shall supervise and direct the work efficiently and with is best skill and attention. He shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction; but he shall not be solely responsible for the negligence of others in the design or selection of a specific means, method,technique,sequence, or procedure of construction which is indicated in and required by the contract documents. CONTRACTOR shall be responsible to see that the finished work complies accurately with the contract documents.

1.02 CONTRACTOR shall keep on the work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to the ENGINEER (Written Notice Only, Not Consent) except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

PART 2 - LABOR, MATERIALS AND EQUIPMENT

2.01 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the work and perform construction as required by the contract documents. He shall at all times maintain good discipline and order at the site.

2.02 CONTRACTOR shall furnish all material, equipment, labor, transportation,construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.

2.03 All materials and equipment shall be new, except as otherwise provided in the contract documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

2.04 All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, or processors, except asotherwise provided in the contract documents.

PART 3 - SUBCONTRACTORS

3.01 If the specifications, laws, ordinances, or applicable rules or regulations permit CONTRACTOR to furnish or use a substitute that is equal to any material or equipment specified, and if CONTRACTOR wishes to furnish or use a proposed substitute, he shall make written application to ENGINEER for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to the specified, and be suited to the same use and capable of performing the same function as that specified; stating whether or not its incorporation in or use in connection with the project is subject to the payment of any license fee or royalty; and

identifying all variations of the proposed substitute from that specified and indicating available maintenance service. No substitute shall be ordered or installed without the written approval of ENGINEER, who will be the judge of equality and may require CONTRACTOR to furnish such other data about the proposed substitute as he considers pertinent. No substitute shall be ordered or installed without such performance guarantee and bonds as ENGINEER may require which shall be furnished at CONTRACTOR's expense.

PART 4 - SUBCONTRACTORS

4.01 CONTRACTOR shall not employ and subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom COUNTY or ENGINEER may have reasonable objection. A subcontractor or other person or organization identified in writing to COUNTY and ENGINEER by CONTRACTOR prior to the notice of award and not objected to in writing by COUNTY or ENGINEER prior to the Notice of Award will be deemed acceptable to COUNTY and ENGINEER. Acceptance of any subcontractor, other person, or organization by COUNTY or ENGINEER shall not constitute a waiver of any right of COUNTY or ENGINEER to reject defective work or work not in conformance with the contract documents.

4.02 If COUNTY or ENGINEER, after due investigation, have reasonable objection to any subcontractor,other person, or organization proposed by CONTRACTOR after the notice of award, CONTRACTOR shall submit an acceptable substitute and the contract price shall be increased or decreased by the difference in cost occasioned by such substitution and on appropriate change order shall be issued. CONTRACTOR shall not be required to employ any subcontractor, other person, or organization against whom he has reasonable objection. CONTRACTOR shall not, without the consent of COUNTY and ENGINEER, make any substitution for any subcontractor, other person, organization who has been accepted by COUNTY and ENGINEER unless ENGINEER determines that there is good cause for doing so.

4.03 CONTRACTOR shall be fully responsible for all acts and omissions of his subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the contract documents shall create any contractual relationship between COUNTY or ENGINEER and any subcontractor or other person or organization having a direct contract with CONTRACTOR, nor shall it create any obligation on the part of COUNTY or ENGINEER to pay or to see to the payment of any monies due any subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR on account of specific work done in accordance with the schedule of values.

4.04 The sections of the specifications and the identifications of any drawings shall not control CONTRACTOR in dividing the work among subcontractors or delineating the work to be performed by any specific trade.

4.05 CONTRACTOR agrees to bind specifically every subcontractor to the applicable terms and conditions of the contract documents for the benefit of COUNTY.

PART 5 - PATENT FEES AND ROYALTIES

5.01 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the contract documents for use in the performance of two work and if, to the actual knowledge of COUNTY or ENGINEER, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by COUNTY in the contract documents.

5.02 CONTRACTOR shall indemnify and hold harmless COUNTY and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses, including attorneys' fees, arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, product, or device not specified in the contract documents and shall defend all such claims in connection with any alleged infringement of such rights.

PART 6 - PERMITS

6.01 CONTRACTOR shall obtain and pay for all construction permits and licenses and shall pay all governmental charges and inspection fees necessary for the prosecution of the work, which are applicable at the time of his bid. COUNTY shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACT, when necessary, in obtaining such permits and licenses. CONTRACTOR shall also pay all public utility charges.

PART 7 - LAWS, REGULATIONS AND ORDINANCE

7.01 Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the work. If CONTRACTOR observes that the specifications or drawings are at variance-therewith, he shall give ENGINEER prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If CONTRACTOR performs any work knowing it to be contrary to such law, ordinances, rules, and regulations and without such notice to ENGINEER, he shall bear all costs arising there from; however, it shall not be is primary responsibility to make certain that the specifications and drawings are in accordance with such laws, ordinances, rules and regulations.

PART 8 - TAXES

8.01 CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by him in accordance with the laws and ordinances.

PART 9 - USE OF PREMISES

9.01 CONTRACTOR shall confine his equipment, the storage of materials and equipment, and the operations of his workmen to areas permitted by law, ordinances, permits, or the requirements of the contract documents and shall not unreasonably encumber the premises with materials or equipment.

9.02 CONTRACTOR shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the work to stresses or pressures

that will endanger it.

PART 10 - RECORD DRAWINGS

10.01 CONTRACTOR shall keep one record copy of all specifications, drawings, addenda, modifications, and shop drawings at the site in good order and annotated to show all changes made during the construction process. These shall be available to ENGINEER and shall be delivered to him for COUNTY upon completion of the project.

PART 11 - SAFETY AND PROTECTION

11.01 CONTRACTOR shall be responsible for initiating maintaining, and supervising all safety precautions and programs in connection with work. He shall take all necessary precautions for the safety of and provide the necessary protection to prevent damage, injury, or loss to:

A. All employees on the work and other persons who may be affected thereby:

B. All the work and materials or equipment to be incorporated there-in whether in storage on or off the site; and

C. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

11.02 The CONTRACTOR shall conduct his operations in a manner which will minimize interference with the normal use of property adjacent to the construction work and shall give owners of such property at least 24 hours notice of the commencement of work in the area abutting their property. CONTRACTOR shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for its safety and protection. He shall notify owners of adjacent utilities at least 48 hours in advance when prospection of the work may effect them. All damage, injury, or loss to any property referred to above caused, directly or indirectly, in whole or in part, by CONTRACTOR, any subcontractor, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR, except damage or loss attributable to the fault of drawings or specifications or to the acts or omissions of ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault of negligence of CONTRACTOR.

11.03 CONTRACTOR's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and ENGINEER has issued a notice to CONTRACTOR that work is acceptable.

11.04 CONTRACTOR shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent, unless otherwise designated in writing by CONTRACTOR to OWNER.

PART 12 - EMERGENCIES

12.01 In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER, is obligated to act, at his discretion, to prevent threatened damage, injury, or loss. He shall give ENGINEER prompt written notice of any significant changes in the work or deviations from the contract documents caused thereby; and a change order shall thereupon be issued covering the changes and deviations involved.

12.02 If CONTRACTOR believes that additional work done by him in any emergency which arose from causes beyond his control entitles him to an increase in the contract price or an extension of the contract time, he may make a claim there for.

PART 13 - SHOP DRAWINGS AND SAMPLES

13.01 After checking and verifying all field measurements, CONTRACTOR shall submit to ENGINEER for approval, in accordance with the accepted schedule of shop drawing submissions, five copies (or, to ENGINEER's option, one reproducible copy) of all shop drawings which shall have been checked by and stamped with the approval of CONTRACTOR and identified as ENGINEER may require. The date shown on the shop drawing will be complete with respect to dimensions, design criteria, materials of construction, and the like to enable ENGINEER to review the information as required.

13.02 CONTRACTOR shall also submit to ENGINEER for approval, with such promptness as to cause no delay in work, all samples required by the contract documents. All samples will have been checked by and stamped with the approval of CONTRACTOR, identified clearly as to material, manufacturer, and pertinent catalog numbers and the use for which intended.

13.03 At the time of each submission, CONTRACTOR shall in writing call ENGINEER's attention to any deviations that the shop drawings or sample may have from the requirements of the contract documents.

13.04 ENGINEER will review and approve with reasonable promptness shop drawings and samples, but his review and approval shall be only for conformance with the design concept of the project and for compliance with the information given in the contract documents. The approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make any corrections required by ENGINEER and shall return the required number of corrected copies of shop drawings and resubmit new samples until approved. CONTRACTOR shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections called by the ENGINEER on previous submissions. CONTRACTOR's stamp of approval on any shop drawing or sample shall constitute a representation to ENGINEER that CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or he assumes full responsibility for doing so and that he has reviewed or coordinated each shop drawing or sample with the requirements of the work and the contract documents.

13.05 Where a shop drawing or sample submission is required by the specifications, no related work shall be commenced until the submission has been approved by ENGINEER. A copy of each approved shop drawing and each approved sample shall be kept in a good order by CONTRACTOR at the site and shall be available to ENGINEER.

13.06 ENGINEER approval of shop drawings or samples shall not relieve CONTRACTOR from his responsibility for any deviations from the requirements of the contract documents unless CONTRACTOR has in writing called ENGINEER's attention to such deviation at the time of submission and ENGINEER has given written approval to the specific deviation, nor shall any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the shop drawings.

PART 14- CLEANING

14.01 CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish, and debris from and about the premises, as well as all tools, construction equipment and machinery, and surplus materials and shall leave the site clean and ready for occupancy by COUNTY. CONTRACTOR shall restore to their original condition those portions of the site not designated for alterations by the contract documents, unless the completion of the work is directly affected by the item in dispute.

PART 15 - INDEMNIFICATION

15.01 CONTRACTOR shall indemnify and hold harmless COUNTY and ENGINEER and their agents and employees from and against all claims, damages, losses, and expenses including attorneys' fees arising out of or resulting from the performance of the work by the CONTRACTOR, provided that any such claim, damage, loss, or expense (a) is attributable to bodily injury, sickness, disease, or death or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there-from and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

15.02 In any and all claims against COUNTY or ENGINEER or any of their agents or employees by copy any employees of CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 15.01 shall not be limited in any way by any limitation on the amount of type of damages, compensation, or benefits payable by or for CONTRACTOR or any subcontractor under workmen's compensation acts, disability benefit acts, or other employee benefit acts.

15.03 The obligations of CONTRACTOR under paragraph 15.01 shall not extend to the liability of ENGINEER, his agents, or employees arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys change orders, designs, or specifications or (b) the giving of or giving or failure to give is the primary cause of injury or damage.

*** * * END OF SECTION * * ***

SECTION 00113

SOILS AND SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 Depending on the project requirements, the ENGINEER may have obtained geotechnical information, which may include subsurface date, logs of soil borings and recommendations from geotechnical consultants.

1.02 Any information obtained is solely for use by the ENGINEER in the design of the project and are not part of the contract. If soil borings have been prepared they will be included in the section or on the plans.

1.03 Any geotechnical information included is for information only. The COUNTY and the ENGINEER do not guarantee the accuracy or validity of the data, nor do they assume any responsibility for the CONTRACTOR'S interpretation or conclusions drawn from the data.

1.04 The CONTRACTOR may, at his option, perform additional subsurface investigations at his own expense.

*****END OF SECTION*****

SECTION 02101

PREPARATION OF RIGHT-OF-WAY

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Removal and disposal of all obstructions from the right-of-way and from designated easements, as noted in the plans.

B. Obstructions shall include:

1. Remains of houses not completely removed by others.
2. Concrete, foundations, floorslabs curb and gutter, driveways, and sidewalk.
3. Building materials such as brick, lumber and plaster.
4. Water wells, septic tanks, manholes, inlets , utility pipes and conduits.
5. Underground service station tanks, equipment or other foundations.
6. Fencing and retaining walls.
7. Paved parking areas.
8. Abandoned railroad tracks, ties, and scrap iron.
9. Ancillary structures such as shacks and outhouses.
10. Trees, stumps, bushes, shrubs, roots, limbs and logs.
11. All rubbish and debris whether above or below ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 GENERAL

A. Clear entire project right-of-way and such other areas, including public or corporate lands, specified in the plans of all structures and obstructions.

B. Trim carefully all trees and shrubs designated for preservation and protect from scarring or other injuries during construction operation.

C. Removal of all foundations and underground obstructions, unless otherwise specified, shall be removed to the following depths:

1. In embankment areas, two (2) feet below natural ground.
2. In excavation areas, two (2) feet below the lower elevation of excavation.
3. In all other areas, one (1) foot below natural grade.

D. Backfill all holes, as directed by the ENGINEER, resulting from all removals.

E. Complete the preparation of right-of-way such that prepared right-of-way is free of holes, ditches and other abrupt changes in elevations and irregularities to contours.

F. Plug the remaining ends of all abandoned storm sewers, culverts, sanitary sewers, conduits and utility pipes with concrete, as specified by the ENGINEER, to form a tight closure.

G. On existing concrete where only a portion is to be removed, care shall be exercised to avoid damage to remaining concrete. Where concrete reinforcement is encountered in removed portions, a minimum of one (1) foot of such reinforcement shall be cleaned of old concrete and left in place to tie into new construction. Concrete to be preserved, but subsequently destroyed by the CONTRACTOR'S operations, shall be replaced by the CONTRACTOR'S operations, shall be replaced by the CONTRACTOR at his expense in accordance with County Specifications, or as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PREPARATION OF RIGHT-OF-WAY

A. Preparation of right-of-way shall be measured on a lump-sum basis with measurement for payment made only on areas indicated and classified on the plans as preparation of right-of-way.

B. When not listed as a separate contract pay item, preparation of right-of-way shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*****END OF SECTION*****

SECTION 02210

SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of scarifying, blading and rolling the sub-grade to obtain a uniform texture and provide as nearly as practical a uniform density for the 6-inches of the sub-grade.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. All preparing of the right-of-way and/or clearing and grubbing shall be complete before starting the sub-grade preparation.

B. The sub-grade shall be scarified and shaped in conformity with the typical sections and the lines and grades indicated or as established by the ENGINEER by the removal of existing material or addition of approved material.

C. All unsuitable material shall be removed and replaced with approved material.

D. All foundations, walls or other objectionable material shall be removed to a minimum depth of 18-inches under all structures and 12-inches under areas to be vegetated. All holes, ruts and depressions shall be filled with approved material.

E. The surface of the sub-grade shall be finished to the lines and grades as established and be in conformity with the typical sections indicated.

F. Any deviation in excess of 1/2 inch cross section and in a length of 10 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and compacting by sprinkling and rolling.

G. Sufficient sub-grade shall be prepared in advance to insure satisfactory prosecution of the work.

H. The CONTRACTOR will be required to set blue tops for the sub-grade on centerline, at quarter points and curb lines or edge of pavement at intervals not exceeding 50 feet.

I. All suitable material removed may be utilized in the sub-grade with the approval of the ENGINEER. All other material required for completion of the sub-grade shall also be subject to approval by the ENGINEER.

J. Sub-grade materials on which structures shall be placed shall be compacted by approved mechanical tamping equipment to a dry density of the total material of not less than 95 percent nor more than 100 percent of the maximum dry density s determined in accordance with SDHPT test method tex-114-E.

K. Sub-grade materials on which planting or turf will be established shall be compacted to a minimum of 85 percent of the maximum dry density as determined in accordance with SDHPT test method tex-114-E.

L. Tests for density will be made as soon as possible after compacting operations are completed. If the material fails to meet the density specified, it shall be reworked as necessary to obtain the density required.

M. Just prior to placing any base materials, density and moisture content of the top 6-inches of compacted sub-grade shall be checked and if tests show the density to be more than 2 percent below the specified minimum or the moisture content to be more than 3 percent above or below the optimum, the sub-grade shall be reworked as necessary to obtain the specified compaction and moisture content.

N. When lime stabilization of the sub-grade is specified, the lime is to be added in accordance with Section 02240, Lime Stabilization.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. All acceptable sub-grade preparation will be measured by the square yard.

B. The measured area includes the entire width of the roadway for the entire length as indicated.

4.02 PAYMENT

A. The accepted quantities of sub-grade preparation will be paid for at contract unit bid price per square yard.

B. When not listed as a separate contract pay item, sub-grade preparation shall be considered as incidental work, and the cost thereof shall be included in such contract pay item (s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***

SECTION 02221

TRENCH EXCAVATION, BACKFILL AND COMPACTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Excavation, shoring, de-watering, pipe bedding, trench backfill, compaction, grading and cleanup of all pipeline trenching for the project.

B. All work must be done in accordance with these specifications and the safety requirements of the State and OSHA Standards.

1.02 JOB CONDITIONS:

A. Site Acceptance:

1. Accept site in condition existing during Contract time frame.
2. Ground water/surface water found during construction are conditions of the contract and responsibility of Contractor.

B. Adverse Weather:

1. Place no backfill that is excessively wet or frozen.
2. Place no backfill in excessively wet or frozen trenches.

PART 2 - PRODUCTS

2.01 PIPE BEDDING AND BACKFILL:

A. The type of bedding shall be stated on the Plans or in the Special Conditions of the contract document. Determination of source of materials for bedding and backfill to meet the stated conditions shall be responsibility of CONTRACTOR, but use of such materials shall be subject to approval of ENGINEER.

B. Excavated Material Backfill:
Excavated material may be used in the trench backfill, provided that all hard rock and stones having any dimensions greater than 6 inches and frozen earth debris and roots larger than 2 inches are removed for the initial backfill.

C. Select Backfill:
Select backfill shall be gravel, fine rock cuttings, sand, sandy loam or loam free from excessive clay. Rock cuttings shall have no dimension greater than 2 inches.

D. Sand Backfill:
Sand backfill shall be clean, hard, durable, un-coated grains, free from lumps and organic material. All materials must pass a No. 8 Sieve.

E. Granular Backfill:
Granular backfill shall be free flowing, such as sand or hydraulically graded shall be free from lumps, stones over 2 inches in diameter, clay and organic matter.

F. Controlled Density Fill:
Use high slump mixture of portland cement, fly ash and fine aggregate formulated, licensed and marketed as K-Krete or equal. Provide mixture with minimum 28-day compressive strength of 70 psi with no measurable shrinkage or surface settlement.

2.02 CRADLING ROCK:

A. Use crushed rock or stone with 70-100% passing 1> inch sieve and no more than 50% passing 1 inch sieve.

2.03 SHEETING, SHORING AND BRACING:

A. Use sound timber or structural steel.

B. Use shapes and sizes as required.

PART 3 - EXECUTION

3.01 GENERAL:

A. Dewatering:

1. Execute work "dry". No pipe or conduits shall be laid or concrete poured on excessively wet soil.
2. Prevent surface water from flowing into excavation.
3. Provide equipment for handling water encountered as required. Obtain approval of proposed method of dewatering.
4. No sanitary sewer shall be used for disposal of trench water.

B. Protection of Existing Utilities:

1. Notify all utilities of location and schedule of work.
2. Locations and elevations of utilities shown on plans are to be considered approximate only. Notify utility and ENGINEER of conflicts between existing and proposed facilities.
3. Repair, relay or replace existing utilities damaged, destroyed or disrupted during work. Unless specified otherwise, replacement will be at the CONTRACTOR's expense.

C. Sheeting, Shoring and Bracing:

1. Provide as necessary, to hold walls of excavation, prevent damage to adjacent structures, and to protect workmen and property.
2. Leave sheeting and shoring in place where removal might cause damage to work or otherwise indicated on drawings.
3. When movable trench shield is used below spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

D. Changes in Grade:

1. Grades may be adjusted 1.5 feet (plus or minus) from plan grades to suit unforeseen construction conflicts or conditions with approval of ENGINEER.
2. No additional compensation will be made for such changes.

3.02 EXCAVATION AND TRENCHING:

A. General:

1. Method of excavation at CONTRACTOR's option.
2. Excavate by hand under tree roots 3 inches and larger, and under and around structures and utilities.
3. Stockpile and replace topsoil to a minimum of 8 inches for surface restoration in grassed or agricultural areas.

B. Trench Characteristics:

1. Depth: as indicated for pipe installation to lines and grades required with proper allowance for thickness of pipe and type of bedding specified or indicated.
2. Width:
   a. Keep width of trench as narrow as possible and yet provide adequate room for backfilling and jointing.
   b. Maximum width as follows:

Pipe Size Inches	**Max. Trench Width**
4 &6	2' - 0"
8 & 10	2' - 4"
12	2' - 6"
15	2' - 9"
18	3' - 0"
Over 18	Pipe O.D. + 12"

3. Trench walls must be vertical below top of pipe and may be vertical or sloped above pipe to conform to excavating codes.
4. Provide bell holes for each pipe joint where pipe bears on undisturbed earth.
5. Trench bottom shall be free of large stones and other foreign material.

3.03 SOFT, SPONGY OR UNSTABLE MATERIALS:

A. Stop work and notify ENGINEER.

B. Perform remedial work as directed.

C. If material is judged unsuitable and removal is authorized, remove and replace with trench stabilizing material as directed by ENGINEER.

3.04 ROCK EXCAVATION:

A. Excavate any rock to maintain minimum 6-inch clearance around pipe.

B. Dispose of rock material not suitable for backfill as directed by ENGINEER.

C. Use of explosives not permitted without prior written authorization from OWNER and ENGINEER.

D. Provide Special Hazard Insurance covering liability for blasting operations.

3.05 BEDDING:

A. Place after bottom of trench has been excavated to proper depth and grade.

B. Place, compact and shape bedding material to conform to barrel o pipe to insure continuous firm bedding for fill length of pipe.

C. Provide bedding as described in following table unless indicated otherwise on Plans or in Special Conditions.

Pipe Material	Minimum Bedding Class
1. Vitrified Clay Pipe	Class C *
2. Non-reinforced Concrete Pipe	Class C *
3. Reinforced Concrete Pipe	Class D *
4. Ductile Iron Pipe	Class D *
5. Steel Cylinder	Class C *
6. Flexible or Composite Pipe	Class 1 * *

* Refers to standard detail, "Pipe Envelope Requirements ",Dwg. D-01.

** Refers to standard detail, "Flexible Pipe Bedding Requirements", Dwg. D-02.

3.06 TRENCH BACKFILL

A. Use excavated material backfill (2.01B) unless otherwise specified.

B. Use Sand Backfill for all trenches within 5 feet of buildings and beneath walks, parking areas, paved streets or existing exposed utilities.

C. Initial Backfill:

1. Place after pipe has been bedded and checked for alignment, grade and internal obstructions.
2. Carry out in an orderly fashion after authorization to cover pipe has been given.
3. Allow no more than 300 feet of trench to be open at one time.
4. Do not backfill until concrete or mortar has sufficiently cured.
5. Record location of connections and appurtenances before backfilling.
6. Place by hand and hand tamp to not less than 12-inches above top of pipe, in approximately 4-inch layers.
7. Backfill simultaneously on both sides of pipe to prevent displacement.
8. Place cushion of 4 feet above pipe envelope before using heavy compacting equipment.

D. Subsequent Backfill:

1. Place backfill into trench at an angle so that impact on installed pipe is minimized.
2. Compaction of all backfill material shall be performed in a manner that shall not crack, crush, and/or cause the installed pipe to be moved from the established grade and/or alignment.
3. Area under or within 5 feet of pavement; and under or within 2 feet of utilities, buildings, or walks shall be mechanically compacted to the top of the sub-grade in 6-inch lifts to a minimum of 95 percent Standard Proctor Density.
4. Areas not subject to vehicular traffic shall be backfilled in layers not more than 10-inches in depth.
5. Compaction method at discretion of CONTRACTOR with following exceptions:

    a. If in OWNER's opinion compaction method presents potential damage to pipe, it will not be allowed.
    b. Compaction of any backfill material by flooding or jetting will require prior written authorization of ENGINEER.

6. Mound excavated materials no greater than 6 inches in open areas only.

7. Fill upper portion of trench with topsoil as specified hereinbefore.

E. Controlled Density Fill:

1. Use where shown on plans.
2. Provide suitable forms to limit volume of control density fill material.
3. Prevent flow of material into existing drain lines.
4. Protect exposed utility lines during placement.
5. Place material in accordance with suppliers' written recommendations unless directed otherwise by ENGINEER.

3.07 EXCESS MATERIAL:

A. Waste excess excavated material where directed by ENGINEER.

3.08 TESTING:

A. Unless specified elsewhere, testing will be responsibility of OWNER.

B. Standard Proctor Density:

1. ASTM D698.
2. One (1) required for each type of material encountered.

C. In Place Density:

1. ASTM D1556 (Sand Cone)
2. ASTM D2167 (Balloon)
3. ASTM D3017 (Nuclear)

D. One (1) test per each 400 cubic yards of backfill placed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 TRENCH EXCAVATION:

A. Trench excavation shall be considered incidental to pipeline installation.

B. Payment shall be made at the contract unit price per cubic yard only if a bid item is established in the contract.

4.02 BACKFILL:

A. Payment for backfill shall be made at the contract unit price per cubic yard only if a separate bit item is established in the contract.

B. No allowance for waste shall be made.

C. If ENGINEER orders an initial backfill material other than that specified in contract, it shall be paid for as an extra in price per cubic yard as compacted in place, EXCEPT if a higher class embedment is ordered by ENGINEER because the CONTRACTOR has over-excavated the trench width.

D. If the CONTRACTOR over-excavates the trench width and the ENGINEER orders the next higher class of embedment to be used, the embedment for as if the original specified embedment was used.

E. If the ENGINEER orders the excavated material to be removed and disposed of and replaced with another material and a separate bid item is not established as a bid item, the material shall be paid as an extra.

F. If the CONTRACTOR fails to compact the backfill to the density requirements, the ENGINEER may order the material removed and replaced at no cost to the OWNER.

G. The disposal of rejected material shall be at no cost to the OWNER.

*** * * * END OF SECTION * * * ***

SECTION 02225

UNCLASSIFIED STREET EXCAVATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Perform all required excavation within the limits of right-of-way and adjacent thereto (except excavations specifically described and provided for elsewhere in the specifications).

B. Remove, properly use, or dispose of all excavated materials.

C. Shape and finish all earthwork in conformance with lines and grades as shown on the plans or as specified by the ENGINEER.

D. Schedule work to avoid property owner inconvenience as practical during construction.

E. Exercise care in operating applicable equipment beneath or adjacent to trees, sidewalks, poles, and other existing features to prevent damage.

F. Restore obstructions removed to accommodate construction equipment or to facilitate excavation.

1.02 CLASSIFICATION:

A. All street excavation shall be unclassified, regardless of material encountered.

B. Any reference to rock or any other material on the plans, or in these specifications, is not to be constructed as classification of the excavation.

PART 2 - PRODUCTS

2.01 SUBGRADE:

A. Use on-site material moved from cut areas to fill areas as approved by ENGINEER.

B. Use borrow materials from areas designated as needed.

2.02 DRAINAGE PROVISIONS:

A. Interruptions of natural surface drainage, or flow of artificial drains shall be mitigated by the CONTRACTOR by use of temporary drainage facilities, as approved by the ENGINEER, to prevent damage to public or private interest.

B. Restore original drainage as soon as the work shall permit.

C. The CONTRACTOR shall be held liable for all damages which may result from neglect to provide for either natural or artificial drainage which his work may have interrupted.

PART 3 - EXECUTION

3.01 UNCLASSIFIED STREET EXCAVATION:

A. Perform all excavation, embankment and grading required for pavement and/or curb and/or gutter as shown on plans.

B. Move suitable excavated material to areas requiring fill and place in accordance with these specifications. Determination of suitable material will be made by ENGINEER. Haul unsuitable material to waste sites.

C. Slope cut or fill sections uniformly from curb line to sidewalk or other controlling feature, as designated by ENGINEER. Smooth bank to provide a neat finished appearance.

D. Remove and replace unstable soils encountered during grading operations with suitable material. Notify ENGINEER of suspected unsuitable material before commencing removal. Authorized replacement with select material will be paid for by change order.

E. Replace gravel or rock driveway surfaces disturbed by grading with like material at no additional cost to OWNER.

F. Strip, salvage and stockpile topsoil in sufficient quantity to allow a uniform 6-inch lift over all disturbed areas not otherwise surfaced. Topsoil is included in unclassified excavation.

G. Removed existing culvert pipe where shown as part of incidental to unclassified excavation.

3.02 UNSTABLE OR UNSUITABLE SUBGRADE:

A. Excavate unstable subgrade at least 2 feet below grade where directed by ENGINEER.

B. Replace with suitable stable material approved by ENGINEER.

C. Compact to uniform density in 6-inch lifts.

D. Density of compacted subgrade to be equal to or greater than adjacent undisturbed grade.

E. Payment will be as specified for unclassified excavation.

F. Conduct operations in such a manner such that measurements may be taken before any backfill, as required above, is placed.

3.03 EXCESS OR UNSUITABLE EXCAVATION:

A. Dispose of excavation in excess of that needed or unsuitable for construction. As directed by the ENGINEER, excess or unsuitable excavation may be used for widening of embankments, or flattening of slopes, or as otherwise specified.

B. Obtain approval of the ENGINEER as to disposition and method for disposal of excess or unsuitable excavation.

3.04 GENERAL:

A. Provide all labor, equipment and associated materials to excavate areas specified.

PART 4 - MEASUREMENT AND PAYMENT

4.01 UNCLASSIFIED STREET EXCAVATION:

A. Unclassified street excavation, as authorized, shall be measured in its original position and the volume determined by the average end area method. All work performed shall be paid for at the contract bid price per cubic yard for unclassified street excavation.

B. When not listed as a separate contract pay item, unclassified street excavation shall be considered as incidental work, and the cost thereof shall be included in such contract pay item s as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required by the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***

SECTION 02238

REMOVAL OF CONCRETE

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of breaking up, removing and satisfactorily disposing of existing concrete, as classified, at locations indicated or as directed by the Engineer.

B. Existing concrete, when under this section, will be classified as follows:

1. Concrete Curb will include curb, curb and gutter combinations thereof.
2. Concrete Slabs will include, but not be limited to, patio slabs, porch slabs, concrete riprap and concrete pavement.
3. Sidewalks and Driveways will include concrete sidewalks and driveways.
4. Concrete Walls will include all walls regardless of height and wall footings.
5. Concrete Steps will include all steps and combinations of walls and steps.
6. Abandoned Foundations will include abandoned Electric Department foundations.
7. Miscellaneous Concrete shall include but not be limited to manholes, inlets, junction boxes and headwalls.

PART 2 PRODUCTS

2.01 MORTAR:

A. Mortar, for repair of existing concrete structures, shall conform to the requirements thereof in Section 03300 - Cast-In-Place Concrete.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Prior to commencing this work, all erosion control and tree protection measures required shall be in place and all utilities located and protected. The existing concrete shall be broken up, removed to conform to Section 02101 - "Preparing Right-of-Way" and disposed of by the Contractor and deposited at a permitted at a permitted disposal site.

B. Where only a portion of the existing concrete is to be removed and that remaining will continue to serve in its purpose, care shall be exercised to avoid damage to that portion to remain in place.

C. The existing concrete shall be cut to the neat lines when indicated or as established by the Engineer, by sawing with an appropriate type circular concrete

saw to a minimum depth of 1/2 inch.

D. Any reinforcing steel encountered shall be cut off 1 inch inside of concrete sawed line. Any existing concrete which is damaged or destroyed beyond the neat lines so established shall be replaced at the Contractor's expense.

E. Remaining concrete shall be mortared to protect the reinforcing steel and provide a neat clean appearance.

F. Where reinforcement is encountered in the removed portions of structures to be modified, a minimum of 1 foot of steel length shall be cleaned of all old concrete and left in place to tie into the new construction where applicable.

G. All unsuitable material shall be removed and replaced with approved material.

H. All foundation, walls or other objectionable material shall be removed to a minimum depth of 18 inches below all structures and 12 inches below areas to be vegetated.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Concrete curb and concrete wall removed as prescribed above will be measured by the linear foot in its original position regardless of the dimensions or size.

B. Concrete slabs and concrete sidewalks and driveways removed as prescribed above will be measured by the square foot in original position, regardless of the thickness and reinforcing.

C. Concrete steps removed will be measured per linear foot of each individual step tread including the bottom step.

D. Concrete foundation removed will be measured per each.

E. Miscellaneous concrete removed will be measured per each.

4.02 PAYMENT:

A. This item will be paid for at the contract unit price bid for "Removed Concrete Curb", "Removed Concrete Slab", "Remove Concrete Sidewalks and Driveways", "Removed Concrete Foundations" and "Remove Miscellaneous Concrete" which price shall be full compensation for all work herein specified, including the disposal of all material not required in the work, the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the work.

B. When not listed as a separate contract pay item, removal of concrete shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***

SECTION 02601

FLEXIBLE BASE

PART I - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.

B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, iron ore topsoil, shell, or crushed slag.

C. Flexible base shall be constructed as specified herein in one or more courses in conformance with details, lines and grades shown on the plans, and as established by the ENGINEER.

PART 2 -PRODUCTS

2.01 MATERIALS:

A. Materials for flexible base shall be crushed or un-crushed as necessary to comply with the requirements hereinafter specified.

B. Materials shall consist of durable course aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with the provisions of Section 02240.

2.03 TYPES:

A. Type A - Crushed or broken aggregate (excluding gravel aggregate).

B. Type B - Gravel Aggregate

C. Type C - Iron Ore Topsoil

D. Type D - Shell Aggregate with Sand Admixture

E. Type E - Shell Aggregate with Sand and Caliche Admixture

F. Type F - Caliche

G. Type G - Crushed Slag

H. Unless otherwise noted on the plans, the CONTRACTOR may use any one type of these types provided the material used meet the requirements set forth in the specification test limits herein.

2.04 GRADES:

A. Unless otherwise shown on the plans or directed by the ENGINEER, the final course of base material shall consist of Grades 1,2,3, or 4, as specified in Table 02601-1.

B. Base courses or sub-base materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.

C. All grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02601-1.

D. Testing of flexible base materials shall be in accordance with the following test procedures:

TEST	**TESTING PROCEDURE**
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Limit	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Tests	TEX-117-E (Part I or II)

E. Unless otherwise specified on the plans, samples for testing the material for Soil constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.

F. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.

TABLE 02601-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

	GRADES			
TYPES	**GRADE 1:**	**GRADE 2:**	**GRADE 3:**	**GRADE 4:**
	(Triaxial Class 1 Min compressive strength, psi: 45 at 0 psi lateral pressure and 175 at 15 psi lateral pressure.	(Traxial class 1 to 2.3) Min. compressive strength, psi: 35 at 0 psi lateral pressure and 175 at 15 psi lateral pressure.	(Unspecified Triaxial Class)	
TYPE A	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Crushed or Broken Aggregate (excluding gravel aggregate)	1-3/4 .....0 7/8" .....10-35 3/8" .....30-50 No. 4.....45-65 No. 40.....70-85 Max LL.....35 Max PI .....10 **Wet Ball Mill** Max Amt. .....40 Max Increase in Passing No. 40.....20	!-3/4" ..... 0-10 No. 4 ..... 45-75 No. 40 ..... 60-85 Max LL..... 40 Max PI ..... 12 **Wet Ball Mill** Max. Amt. ..... 50 Max Increase in Passing No. 40 20	1-3/4" .....0-10 No. 40.....60-85 Max LL..... 45 Max PI ..... 15 **Wet Ball Mill** Max. Amt. ..... 55 Max. Increase in Passing No. 40..... 20	As Shown On Plans
TYPE B	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Gravel Aggregate		1-3/4" ..... 0-10 No. 4 ..... 30-75 No. 40 ..... 70-85 Max LL..... 35 Max PI 12	1-3/4" 0-5 No. 4 30-75 No. 40.....65-85 Max. LL..... 35 Max. PI 12	As Shown On Plans
TYPE C	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Iron Ore Topsoil		2-1/2" ..... 0 No. 40 ..... 50-85 Max. LL..... 35 Max. PI 12	2-3/4" ..... 0 No. 40.....45-85 Max. LL..... 35 Max. PI 12	As Shown On Plans

TABLE 02601-1 CONT'D

TYPE D		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Sand-Shell		1-3/4" ..... 0-10 No. 4 ..... 45-65 No. 40 ..... 50-70 Max. LL..... 35 Max. PI 12	1-3/4" .....0-10 No. 40.....45-65 Max. LL.....35 Max PI 12	As Shown On Plans
TYPE E		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Shell with Sand and Caliche		1-3/4" ..... 0 No. 40 ..... 45-65 Max. LL..... 35 Max. PI 10	1-3/4" .....0 No. 40... ....45-65 Max. LL.....35 Max. PI 12	As Shown On Plans
TYPE F		**Retained on Sq. Sieve %**	**Retained on Sq. Sieve %**	
Caliche		1-3/4" ..... 0 No. 4 ..... 45-75 No. 40 ..... 50-85 Max. LL..... 40 Max. PI 12	1-3/4" .....0 No. 40.....50-85 Max. LL.....40 Max. PI 12	As Shown On Plans
TYPE G				
Crushed Blast Furnace Slag				As Shown On Plans

G. The limits establishing reasonable close conformity with the specified gradation and plasticity index are defined by the following:

1. The ENGINEER may accept the material, providing not more than 2 of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.
2. The ENGINEER may accept the material providing not more than 2 of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:

A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.

B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stock- pile for delivery to the road.

C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.

D. If the CONTRACTOR elects to produce the Type a material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the course aggregate stockpiles will be retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.

E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the CONTRACTOR will be required to secure other materials which will meet specifications requirements.

F. The central mixing plant shall be either the batch or continuous flow type, and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.

G. Mixing shall continue until a uniform mixture is obtained.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

A. Type roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.

B. All unstable or otherwise objectionable material shall be removed from the sub-grade and replaced with approved material.

C. All holes, ruts and depressions shall be filled with approved material and, if required, the sub-grade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the sub-grade in an acceptable condition to receive the base material.

D. The surface of the sub-grade shall be finished to line and grade as established and in conformity with the typical section shown on plans, and any deviation in

excess of 1/2 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

E. Sufficient sub-grade shall be prepared in advance to insure satisfactory prosecution of the work.

F. Material excavated in the preparation of the sub-grade shall be utilized in the construction of adjacent shoulders and slopes or other- wise disposed on as directed, and any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as directed by the Engineer.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE C, TYPE F, AND TYPE G MATERIAL:

A. Immediately before placing the base material, the sub-grade shall be checked as to conformity with grade and section.

B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered in each 100- foot station.

C. Material deposited upon the sub-grade shall be spread and shaped the same day.

D. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24-hour period, the materials shall be scarified and spread as directed by the Engineer.

E. The material shall be sprinkled, if directed, and shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

F. All areas and "nests" of segregated coarse or fine material shall be corrected to removed and replaced with well graded material, as directed by the ENGINEER.

G. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplies in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.

H. The course shall be compacted by method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and rolled ad directed until a uniform compaction is secured. Throughout this entire operation,

the shape of the course shall be maintained by blading and the surface upon completion shall be smooth and in conformity with the typical sections shown on plans and to the established lines and grades.

b) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

c) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.

2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".

b) In addition to the requirement specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.

c) After each section of flexible base is completed, tests as necessary will be made by the ENGINEER. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

d) Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to established lined and grades.

e) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

f) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.

I. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete, it shall be re-compacted and refinished at the sole expense of the CONTRACTOR.

J. Where Type C material is used, the material shall be scarified, thoroughly wetted, mixed, manipulated, and bladed so as to secure a uniformly wetted material, and pulled in over the sub-grade in courses and set under the action of blading and rolling. The work of mixing, blading, rolling, shaping, and subsequent maintenance shall be performed by the continuous use of sufficient number of satisfactory rollers and power maintainers with adequate scarifier attachments.

3.03 PLACEMENT OF FIRST COURSE - TYPE D MATERIAL:

A. Immediately before placing the base material, the sub-grade shall be checked as to conformity with grade and section, and corrections made if necessary.

B. All materials shall be delivered in approved vehicles of a uniform capacity.

C. The required amount of shell shall be uniformly spread across the section and allowed to dry sufficiently to insure proper slaking and mixing of the binder material. Immediately upon completion of the drying period, as determined by the ENGINEER, the specified amount of sand admixture as required to produce a combined material meeting the requirements hereinbefore specified, shall be spread uniformly across the shell.

D. The material shall then be sprinkled as required and thoroughly mixed by blading and harrowing, or other approved methods.

E. Failure to proceed with the placing of sand admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

F. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

G. The course shall be compacted by the method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the plans indicate that the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a) After mixing, all material shall be windrowed, and then spread over the section in layers.

b) The layer shall not exceed 2 inches in loose depth.

c) If necessary to prevent segregation, the material shall be wetted in the window prior to spreading.

d) After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction as directed by the ENGINEER. Succeeding layers shall then be placed similarly until the course is completed.

e) All areas and "nest of segregated coarse or fine material shall be corrected or removed and replaced with well graded material, as directed by the ENGINEER.

f) The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured.

g) Throughout this entire operation, the shape of the course shall be maintained by blading; and the surface, upon completion, shall be smooth and in conformity with the typical sections shown on plans, and to the established lines and grades.

h) In that area on which pavement is to be place, any deviation in excess of 1/4 inch in cross section in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

i) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.

2. When the plans indicate that the "Density Control" method of compaction is to be used, the compaction method shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

H. When indicated on the plans or permitted by the ENGINEER, Type D material may be mixed in a central mixing plant and delivered to the road as a combined mixture. When this method is used, the combined mixture shall meet the requirements for type D material as hereinbefore specified and the placing and compaction requirement shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

3.04 PLACEMENT OF FIRST COURSE - TYPE E MATERIAL:

A. The construction methods for placing the first course of Type E material shall be the same as prescribed for Type D material except that after the shell and sand have been placed, the prescribed amount of caliche shall then be spread across the sand and shell.

B. The composite mixture shall then be sprinkled as required and thoroughly mixed by blading and harrowing or other approved methods.

C. Compaction of the first course of Type E material shall be the same as prescribed above for Type D material.

D. Failure to proceed with placing the sand and caliche admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

E. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

3.05 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

A. Construction methods shall be the same as prescribed for the first course.

B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.06 DENSITY CONTROL:

A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.

B. The testing will be as outlined in Test Method Tex-114-E.

C. It is the intent of this specification to provide in that part of the base included in the top 8 inches immediately below the finished surface of the roadway not less than 100 percent of the density as determined by the compaction ratio method.

D. Field density determination shall be made in accordance with Test Method Tex-115-E.

3.07 TOLERANCES:

A. When tolerances are permitted by the plans, the limits establishing reasonable close conformity with percent density specified are defined by the following:

1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Flexible base will be measure by the square yard of surface area of completed and accepted work based on the width of flexible base as shown on the plans.

1. The flexible base shall be measured for depth by the units of 2000 square yards, with one measurement taken at a location selected by the ENGINEER.
2. In that unit where flexible base is deficient by more than 1/2 inch in thickness, the deficiency shall be corrected by scarifying, adding material as required, reshaping and re-compacting by sprinkling and rolling.

3. No additional payment over the contract unit price will be made for any flexible base of a thickness exceeding that required by plans.

B. The CONTRACTOR shall schedule his operations in such a manner as to facilitate the measurement of the pay item.

C. The ENGINEER may accept the work provided no more than 2 out of 10 depth tests performed are deficient by not more 1/2 inch and where no two consecutive tests on continuous work are outside the specified depth.

4.02 PAYMENT:

A. The accepted quantities of flexible base of the type, grade, and compaction method specified will be paid at the contract unit bid price per square yard, complete in place.

B. Where "Ordinary Compaction" is used, all sprinkling, rolling, and manipulation required will not be paid for directly, but will be incidental to other bid items.

C. The unit prices bid shall each be full compensation for shaping and fine grading the roadbed; for securing and furnishing all materials, including all royalty and freight involved; for furnishing scales and labor involved in weighing the material when required; for loosening, blasting, excavating, screening, crushing and temporary stockpiling when required; for loading all materials for all hauling and delivering. on the road; for spreading, mixing, blading, dragging, shaping and finishing and for all manipulation, labor, tools and incidentals necessary to complete the work.

*** * * END OF SECTION * * ***

SECTION 02610

PRIME COAT

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION:

A. Prime coat shall consist of application of asphaltic materials on completed base course and/or other approved area, which shall be applied in accordance with these specifications, as shown on the plans, and as directed by the ENGINEER.

1.02 QUALITY ASSURANCE:

A. Test and Certification of Bituminous Materials.

1. Bituminous material is to be tested in accordance with the requirements of AASHTO M-82 and sampled in conformance with AASHTO T-40.
2. Supply, at the time of delivery of each shipment of asphalt, two certified copies of test reports, from supplying vendor, to the ENGINEER.
3. Test reports shall indicate name of vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, purchase order number, and result of specified tests.

   The test report, signed by an authorized representative of the vendor, shall certify that the product delivered conforms to the specifications for type and grade indicated.

   Certified test reports and the testing required in the preparation of such report shall be at no cost to the COUNTY.

4. Final acceptance of bituminous materials shall be dependent on the determination by the ENGINEER that the material meets prescribed standards.

PART 2- PRODUCTS

2.01 MEDIUM CURING CUTBACK ASPHALT:

A. Medium-curing liquid asphalt, designated by the letters MC, shall consist of an uncracked petroleum base stock, produced by the processing of asphaltic or semi-asphaltic base crude petroleum, blended with a kerosene-type solvent. The base stock for all MC materials shall be straight run asphalt produced within the penetration range of 100 to 300, and the end point of the kerosene type solvent shall not exceed 525 degrees F. Medium curing liquid cutback asphalt shall be free from water and show no separation.

B. Medium curing cutback asphalt shall consist of materials specified above and

conforming to the requirements set forth in Table 2610-1.

C. Unless otherwise noted on the plans or directed by the ENGINEER, cutback asphalt Grade MC-30 shall be used.

2.02 BLOTTER MATERIAL:

A. Supply blotter material consisting of native sand and/or sweepings from base course.

B. Native sand shall be local material obtained from approved sources as approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Unless otherwise specified on the plans or, required by the ENGINEER, only asphaltic material shall be used. Where required, a combination of asphaltic and blotter material shall be used.

B. Application of Asphaltic Materials Only.

1. Apply prime coat to prepared surface when ambient air temperature is above 40 degrees F. and is rising and shall not be applied when the ambient air temperature is below 50 degrees F. and falling.
2. Apply prime coat to surfaces that have been cleaned by sweeping or other approved methods and where base is thoroughly dry and satisfactory for receiving prime coat.
3. Apply prime coat to cleaned base, at a rate of 0.2 to 0.5 gallons per square yard of surface area, using an approved type of self-propelled pressure distributor so constructed and operated to distribute the material evenly and smoothly.
4. Provide necessary facilities for the determination of temperature of asphaltic material in all heating equipment and distributors; and for determination of rate at which it is applied; and for securing uniformity at the junction of two distributor loads.
5. Keep in clean and good working condition all storage tanks, piping, reports, booster tanks and distributors used in the storage and handling of asphaltic materials.
6. Operate all associated equipment in a manner such that there is no contamination of asphaltic material with foreign material.
7. Calibrate distributor and furnish ENGINEER with an accurate and satisfactory record of such calibrations.

TABLE 2610-1

Specification Designation	Test	AASHTO Test Method	ASTM Test Method	MC	Grade MC 30	MC 70	MC 250	MC 800	MC 3000
Flash Point (Open Cleve) oF, Min.		T 48	D 92		100	100	150	150	150
Viscosity 140oF, Kinematic, CS		T 201	D 2170	60	30 to 140	70 to 500	250 to 1600	800 to 6000	3000 to
Furol Viscosity at 77 F. (Secs.)		T 72	D 88		75-150				
at 122 F. (Secs.)					60-120	300			
at 140 F. (Secs.)					125-250	to			
at 180 F. (Secs.)					100-200	600			
Distillation Distillate (% of Total Distillate to 680 F)		T 78	D 402						
to 437 F)					0-25	0-20	0-10	-0-	-0-
to 500 F					40-70	25-60	20-55	10-35	0-15
to 600 F					75-93	75-90	70-85	65-80	50-75
Residue from Distillation to 680 F Volume % by Difference Min.					50	55	67	75	80
Tests on Residue From Distillation Penetration at 77 F		T 49	D 5		120 to 250	120 to 250	120 to 250	120 to 250	120 to 250
*Ductility 77 F cm., Min.		T 51	D 113		100	100	100	100	100
Solubility in CC1 4, % Min.		T44	NONE	99.5	99.5	99.5	99.5	99.5	

Water, % Min.	T 55	D 95	0.2	0.2	0.2	0.2	0.2
Reaction to Spot Test	T 102**	-0-		-0-	-0-	-0-	-0-

* If penetration of residue is more than 200 and its ductility at 77 F is less than 100, the material will be acceptable if the ductility at 60 F is greater than 100.

** Using 85% Standard Naphtha and 15% Xylene.

NOTE: Viscosity tests may be made by either Kinematic or Furol test methods.

8. Recalibrates distributor, in a manner satisfactory to the ENGINEER, after the beginning of work, should the yield on the asphaltic material applied appear to be in error.
9. No traffic, hauling or placing of subsequent courses shall be permitted over freshly applied prime coat until authorized by the ENGINEER.
10. Apply asphaltic material at a temperature within 15 F of temperature of application selected by the ENGINEER based on temperature viscosity relationship noted in Table 2610-1.
11. Maintain surface until work is Blotter Material.

C. Application of Asphaltic and Blotter Material

1. Haul blotter material in vehicles of uniform capacity and placed on shoulders at spacings designated by the ENGINEER.
2. After application of asphaltic material as specified above, cover surface with blotter material as directed by the ENGINEER.
3. After application of blotter material, drag surface with approved drag broom, evenly and smoothly distributing the blotter material.
   Brooming or dragging operation shall continue, as directed by the ENGINEER, until the course has properly cured under traffic.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PRIME COAT:

A. Asphaltic material for prime coat will be measured for payment at point of delivery on the project in gallons at applied temperature. Payment will be paid at the unit bid price for "Prime Coat".

B. When not listed as a separate contract pay item, prime coat shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all material, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

4.02 BLOTTER MATERIALS:

A. Blotter mater will be considered incidental to asphaltic material for prime coat with no direct payment or payment therefor.

*** * * * END OF SECTION * * * ***

SECTION 02620

TACK COAT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Apply asphaltic materials on completed base course after curing of prime coat, on existing pavement, on bituminous surfaces, or on portland cement concrete surface.

1.02 QUALITY CONTROL:

A. Asphaltic materials supplied for tack coat shall be tested in accordance with applicable ASTM or AASHTO designation noted below.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Tack coat shall be composed of bituminous material of the type and grade specified in the plans or as specified by the ENGINEER.

B. Unless otherwise specified, tack coat shall be one of the following grades:

1. Penetrating Asphalt 85 - 100 or 120 - 150.
2. EA-CSS-1 or EA-1OS (SS-1) Emulsified Asphalt.
3. AC-5 or AC-10 Asphalt.

2.02 ASPHALT CEMENT (GRADES RC AND PENETRATING ASPHALT):

A. Asphalt cement binders shall be un-cracked petroleum asphalts and shall be carefully refined, by steam, vacuum, or solvent, from asphaltic or semi-asphaltic base crude petroleum at a temperature not to exceed 700 degrees F. Asphalt cements shall be free from thermal decomposition products and shall not be blended with any materials which have been subjected to cracking or produced from a crude petroleum sources other than that of the original material. The asphalt cement shall not contain residues from non-asphaltic sources. Asphalt cement shall be homogenous, free of water, and shall not foam when heated to 350 degrees F.

B. Paving asphalt shall be classified by penetration or viscosity and shall conform to the requirements set forth in one of the following tables as designated by the ENGINEER. The CONTRACTOR may supply asphalt meeting the requirements of one of the following tables provided that he obtains prior approval of the ENGINEER and with the provision that once approval has been obtained, the CONTRACTOR will remain with that grade throughout the project.

TABLE 02620-1

Specification Designation	AASHTO Test Method	ASTM Test Method	85 to 100	120 to 100
Flash Point (Open Cup) Min.	T43	D92	450	450
Penetration of Original Sample at 77 degrees F.	T49	D5	85 to 100	120 to 150
Thin-Film Oven Loss, Hours at 325 degrees F. % Max.	T179	D1754	0.75	0.75
Test of Residue from Thin-Film Oven Test % of Orig. Pen., Min.	T49	D5	50	50
Ductility at 77 degrees F., cm. after Loss at 325 degrees F., Min.	T51	D113	100	100
Solubility in $CC1^4$ Min	T44*	None	99.5	99.5
Reaction to Spot Test.	T102**	None	-0-	-0-

* Procedure No. 1 with $CC1^4$ substituted for CS^2.

* * Using 85% Standard Naphtha Solvent and 15% Xylene.

TABLE 02620-2
REEEEQUIREMENTS FOR SPECIFICATIONS FOR ASPHALT CEMENT
VISCOSITY GRADED AT 14 DEGREES F.

	VISCOSITY GRADE			
	AC-5		AC-10	
	Min.	Max.	Min.	Max
Viscosity, 60C (140F), poises	500	-100	1000	-200
Viscosity, 135C (275F), Cs	200	-	250	-
Penetration, 25C (77F), 100g, 5 sec.	140	-	80	-
Flash Point, COC, C (F)	177 (350)	-	219 (425)	-
Solubility in trichlorethylene,	99.0	-	99.0	-
Tests on residue from Thin film Oven Test:				
Loss on heating, percent	-	1.0	-	0.5
Viscosity, 60C (140F) poises	-	2000	-	2000
Ductility, 25C (77F), 5 cm per minute, cm	100	-	75	-
Spot test (when and as specified)[2] with:				
Standard naphtha solvent	Negative for all grades			
Naphtha-Xylene solvent, % Xylene	Negative for all grades			
Heptane-Xylene solvent, % Xylene	Negative for all grades			

[1] If ductility is less than 100, material will be accepted if ductility at 15.5C (60F) is 100.

[2] The use of the spot test is optional, when it is specified, the ENGINEER shall indicate whether the standard naphtha solvent, or the heptane-xylene solvent will be used in determining compliance with the requirement, and also, in the case of xylene solvents, the percentage of xylene to be used.

2.03 EMULSIFIED ASPHALTS:

A. Emulsified asphalts shall be composed of a paving asphalt base uniformly emulsified with water and an emulsifying or stabilizing agent. They shall be homogeneous throughout. Emulsified asphalt shall be classified as rapid-setting, medium-setting, or slow-setting type in either anionic or cationic emulsions.

B. The emulsified asphalt shall conform to the requirements asphalt shall conform to the requirements set forth in the following tables:

TABLE 02620-3
REQUIREMENTS FOR EMULSIFIED ASPHALT

ANIONIC EMULSION

TYPE: SETTING TIME	**RAPID**				**MEDIUM**				**SLOW**			
GRADE	(RS-2) EA-HVRS		(RS-2H) EA-HVRS 90		(RS-2) EA-HVMS		(RS-2) EA-HVMS-90		(RS-2) EA-11M		(RS-2) EA-10S	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
FUROL VISCOSITY AT 77 F (25 C), SEC., C.	---	---	---	---	---	---	---	---	30	100	30	100
FUROL VISCOSITY AT122 F (50 C)	100	300	100	300	100	300	100	300	---	---	---	---
RESIDUE BY DISTILLATION, %	63	---	63	---	63	---	63	---	60	---	60	---
OIL PORTION OF DISTILLATE, %	---	2.0	---	2.0	---	2.0	---	20	---	2.0	---	2.0
SIEVE TEST, %	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1
MISCIBILITY (STANDARD TEST)	---	---	---	---	---	---	---	---				
COATING	---	---	---	---	---	---	---	---			---	---
CEMENT MIXING, %	---	---	---	---	---	---	---	---	---	---	---	2.0
Demulsibility 50 cc OF N/10 CacL2, %	---	---	---	---	---	---	---	---	---	70	---	---
DEMULSIBILITY 33 CC OF N/50 CacL2	60	---	60	---	---	30	---	30	---	---	---	---
SETTLEMENT, 5 DAYS, %	---	5.0	---	5.0	---	5.0	---	5.0	---	5.0	---	5.0
FREEZING TEST 3 CYCLE	---	---	---	---								

TEST RESIDUE: PENETRATION AT 77 deg. F (25 C) 100 G, 5 SEC.	120	160	80	110	120	160	80	110	120	160	120	160
Solubility in Trichlordethylne, %	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---
Ductibility at 77 F (25 C) 5 cm/min., cms.	100	---	100	---	100	---	100	---	100	---	100	---

* Applies only when ENGINEER designates material for winter use.

* The test requirement for settlement may be waived when the emulsified asphalt is used in less than 5 days' time; or the Owner may require that the settlement test be run from the time the sample is received until it is used, if the elapse is less than 5 days.

** The 24-h (1-day) storage stability test may be used instead of the 5-day settlement test.

*** The demulsibility test shall be made within 30 days from date of shipment.

C. Unless otherwise specified, the various grades of emulsified asphalt shall be applied at temperatures within the limits specified below, the exact temperature to be determined by the ENGINEER. Emulsified asphalt shall be reheated, if necessary, but at no time after loading into a tank, car or truck for transportation from the refinery to the purchaser shall the temperature of the emulsion be raised above 185 degrees F. During all reheating operations the emulsified asphalt shall be agitated to prevent localized overheating. Emulsified asphalt shall not be permitted to cool to a temperature of less than 40 degrees F.

TABLE 02620-5
APPLICATION TEMPERATURE
OF EMULSIFIED ASPHALT

Grade	Mixing	Spraying
RS-1	Not used	70-140 deg. F.
A-HVRS, EA-CRS-2 CRS-1	Not used	125 - 185 deg. F.
EA-1OS, EA-CSS-1	50 - 160 deg. F.	70 - 140 deg. F.
EA-CSS-1	50 - 160 deg. F.	70 - 140 deg. F.

D. At the time of delivery of each shipment of asphalt, the vendor supplying the material shall deliver to the purchaser certified copies of the test report which shall indicated the name of the vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, and results of the above-specified tests. The test report shall be of the above-specified tests. The test report shall be certified and signed by an authorized representative of the vendor that the product delivered conforms to the specifications for the type and grade indicated.

E. Until the certified test reports and samples of the material have been checked by the ENGINEER to determine their conformity with the prescribed requirements, the material to which such report related and any work in which it may have been incorporated as an integral component will be only tentatively accepted by the ENGINEER. Final acceptance will be dependant upon the determination of the ENGINEER that the material involved fulfills the requirements prescribed therefore. The certified test reports and the testing required in connection with the reports will be at the expense to the Contracting Agency.

PART 3 - EXECUTION

3.01 PREPARATION OF SURFACE TO BE TREATED:

A. Surface to be tacked shall be patched, cleaned and free of dirt, surface moisture, vegetation and any other deleterious materials or irregularities to provide a smooth, uniform surface.

B. Unstable corrugated areas shall be removed and replaced with suitable patching materials. Patching shall be completed at no cost to the COUNTY.

C. The edges of existing pavements adjacent to new surface shall be cleaned to permit adhesion of tack coat.

3.02 WEATHER LIMITATIONS:

A. Tack coat shall not be applied on a wet surface; during wet weather; after sunset; or when the ambient temperature is below 40 degrees F.

3.03 APPLICATION

A. Apply tack coat uniformly with a self-propelled, pressure distributor at a rate of 0.02 to 0.15 gallons per square yard as directed by the ENGINEER.

B. Roll tack coat with a self-propelled pneumatic tired roller weighing not less than 4 tons without ballast, to evenly distribute asphaltic material. Each tire shall have a contact pressure of not less than 90 pounds per square inch.

C. Rolling will not be required for emulsified asphalt tack coat.

D. Rolling shall be completed at no cost to the COUNTY

E. Tack coat shall be applied in such a manner as to offer the least inconvenience to traffic and to permit one-way traffic without pickup or tracking.

F. In no case shall the surface be tacked extend beyond what can be covered in the same day by surfacing courses.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Asphaltic material for tack coat will be measured at point of delivery on project in gallons at the applied temperature.

4.02 PAYMENT:

A. Asphaltic material for tack coat will be measured at point of delivery on project in gallons at the applied temperature.

B. When not listed as a separate contract item, tack coat shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***

SECTION 02660

CONCRETE CURB AND GUTTER AND VALLEY GUTTER

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. This work shall consist of the construction of concrete curb, concrete curb and gutter, concrete gutter or valley gutter, or combination thereof in compliance with these specifications, lines, grades, and details shown on the plans, or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete and manufactured curb and gutter materials shall be subject to inspection and tests at plants and construction sites for compliance with quality requirements.

B. Concrete curb and gutter or concrete valley gutter shall be constructed with concrete conforming to the provisions of Section 02614 - Portland Cement Concrete Paving, or Class "B" concrete conforming to the requirements of Section 03300 - Cast-In-Place Concrete.

C. Preformed expansion Joint Filler shall conform to the requirements of AASHTO M-33 or M-153.

D. Linseed Oil shall conform to the requirements of AASHTO D-260.

E. Mineral Spirits shall conform to the requirements of AASHTO D-235.

2.02 FOUNDATION

A. Concrete curb and gutter or concrete valley gutter shall be placed on an approved foundation conforming to the requirements of the following City Of McAllen Specifications:

1. Section 02210 - Subgrade Preparation,

2. Section 02601 - Flexible Base,

3. Section 02230 - Roadway Excavation, Borrow, and Embankment.

PART 3 - EXECUTION

3.01 EXCAVATION

A. When required, excavation shall be made to the specified depth, and the base upon which the curb and gutter or valley gutter is to be placed shall be compacted to a firm, even surface conforming to the requirements of Subsection 2.02 above.

B. All soft and unacceptable material shall be removed an replaced with material approved by the ENGINEER in conformance with the requirements of Subsection 2.02 above.

3.02 FORMS

A. Forms shall be of wood or metal, straight, free from warp, and of such construction that there will be no interference to the inspection of grade or alignment.

B. All forms shall extend for the entire depth of the curb and gutter and shall be braced and secured sufficiently so that no deflection from alignment or grade will occur during the placing of the concrete. Flexible forms shall be used in curved sections so that the top surface of the forms will form a smooth, continuous arc.

3.03 MIXING AND PLACING

A. Concrete shall be proportioned, mixed, and placed in accordance with the requirements of Section 02614 and Section 03300.

B. Compaction of the concrete placed in forms shall be by vibration or other acceptable methods.

C. Unless otherwise provided, the exposed surfaces of curbs and gutters shall be finished by belting or with wooden floats. Forms shall be left in place until the concrete has set sufficiently so that they can be removed without injury to the curb and gutter.

3.04 SECTIONS

A. Curb and gutter shall be constructed in sections having a uniform length of 20 feet, unless otherwise directed by the ENGINEER. Sections shall be separate by open joints 1/8 inch wide except at expansion joints.

3.05 EXPANSION JOINTS

A. Expansion joints shall be formed at the intervals shown on the plans using a performed expansion joints filler having a thickness of 3/4 inch.

B. When the curb and gutter is constructed adjacent to or on concrete pavement, expansion joints, shall be located opposite or at expansion joints in the pavement.

3.06 CURING

A. Immediately upon completion of the finishing, the curb and gutter shall be moistened and kept moist for 3 days, or the curb and gutter shall be cured by the use of membrane-forming material. The method and details of curing shall be subject to the approval of the ENGINEER.

3.07 SURFACE TREATMENT

A. The surface of concrete curb and gutter or concrete valley gutter shall be treated with a solution of Linseed Oil and Mineral Spirits in accordance with the applicable requirements of Section 03300 - Cast-In-Place Concrete.

3.08 BACKFILLING

A. After the concrete has set sufficiently, the spaces in front and back of the curb shall be refilled to the required elevation with material approved by the ENGINEER, and shall be thoroughly tamped in layers of not more than 6 inches.

3.09 SLIP-FORM CONCRETE CURB, CONCRETE CURB AND GUTTER OR CONCRETE VALLEY GUTTER

A. Any concrete curb or concrete curb and gutter, except on structures, may be placed using a slip form machine provided that the finished concrete curb or concrete curb and gutter is true to line and grade and the concrete is dense and of the required surface texture.

B. The concrete shall be of a consistency that it will maintain the shape of the concrete curb or concrete curb and gutter section without support after slip forming.

C. The top and face of the finished concrete curb or concrete curb and gutter shall be true an straight and the top surface of the concrete curb or concrete curb and gutter shall be of uniform width and free from humps, sags, or other irregularities.

D. The forming portion of the slip form machine shall be readily adjustable vertically during the forward motion of the slip from machine to provide a variable height of concrete curb or concrete curb and gutter grade when necessary. A grade line gauge or pointer shall be attached to the slip form machine in such a manner that a continual comparison can be made between the concrete curb or concrete curb and gutter grade as indicated by the offset guidelines.

E. Concrete shall be fed to the slip form machine at a uniform rate. The slip form machine shall be operated under sufficient uniform restraint to forward motion to produce a well compacted mass of concrete free from surface pits larger than 3/16 inch in diameter and requiring no further finishing, other than light brushing with a wet brush. Finishing with a brush application of grout will not be permitted.

F. Transverse weakened plane and expansion joints shall be constructed at right angles to the line of the concrete curb, concrete curb and gutter, or concrete valley gutter.

G. Expansion joints may be constructed by sawing through the concrete curb or concrete curb and gutter section to its full depth. The width of the cut shall be such as to admit the joint filler with a snug fit.

H. The operations of sawing and inserting the joint filler shall be completed before curing the concrete. At the conclusion of the curing period the filler in each joint shall be checked for tightness of fit. The loose filler in any joint shall be mortared in place and cured.

I. Excavation shall be as per Subsection 2.02 above.

J. All remaining provisions of Subsection 2.02 above also apply, unless otherwise specified.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Curb and gutter, curb, and valley gutter shall be measured by the linear foot.

1. Curb shall be measured along the front face of the section at the finished grade elevation.

2. Combination curb and gutter will be measured along the face of the curb at the flowline of the gutter.

3. Valley gutter will be measured along the flowline of the gutter.

B. A deduction in length shall be made for drainage structures, such as catch basins or inlets, in the curb, gutter, or combination thereof.

C. There will be no direct measurement or payment of materials used to construct curb and gutter, curb or valley gutter.

D. Excavation or construction of embankment for foundation of curb, valley gutter, or combination curb and gutter will not be measured for payment.

4.02 PAYMENT

A. The accepted quantities of curb, valley gutter, and curb and gutter will be paid for at the contract unit bid price per linear foot for each kind and type specified complete in place.

B. Foundation preparation by excavating or constructing embankment to the required sub-grade elevation is considered incidental to the completion of the work and no direct payment will be made thereof.

C. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * * END OF SECTION * * * ***

SECTION 02670

PRECAST CONCRETE WHEEL STOP

DESCRIPTION

This work consists of furnishing and installing precast concrete wheel stops in locations shown on the plans or as designated by the Engineer.

MATERIALS

Requirement for material and fabrication of the precast wheel stop shall be the same as specified in Section 02660 Precast Concrete Curb. The details and dimensions shall be as shown on the plans.

Anchoring dowels shall be Grade 60 reinforcing bars, conforming to ASTM designation A615. Minimum bar size shall be #4 x 1.0 foot long. The dowel hole diameter shall not exceed the dowel diameter by more than ¼ inch.

CONSTRUCTION DETAILS

The precast wheel stop shall be set in place on top of the pavement with both ends bearing evenly. Steel dowels shall be driven into the underlying pavement through the holes at each end of the wheel stop. The dowels shall be driven so that they are flush with the top surface of the wheel stop. If necessary, holes shall be pre-drilled in the pavement.

METHOD OF MEASUREMENT

Precast concrete wheel stops shall be measured as the number of units actually installed.

BASIS OF PAYMENT

The unit price bid for each wheel stop shall include the cost of all labor, material, and equipment necessary to complete the work.

*** * * END OF SECTION * * ***

SECTION 02780

FLAT WHEEL ROLLING

PART 1- GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the compaction of subgrade, embankment, flexible base, surface treatments and asphalt surfaces by the operation of approved power roller as herein specified and as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. Embankments and Flexible Bases

1. Power rollers shall be of the 3-wheel, self-propelled type, weighing not less than 10 tons and shall provide a compression on the rear wheels of not less than 325 pounds per linear of wheel width. All wheels shall be flat.

2. The rear wheels shall have a diameter of not less than 48 inches and each shall have a wheel width of not less than 20 inches.

B. Surface Treatments and Pavements

1. Power rollers shall be the 3-wheel or tandem, self-propelled type, weighing not less than 3 tons nor more than 6 tons. All wheels shall be flat.

2. Rollers shall be equipped with an adequate scraping or cleaning device on each wheel.

3. Rollers used to compact asphalt mixture shall be equipped with a water system which will keep all tires uniformly wet.

4. In lieu of the rolling equipment specified, the CONTRACTOR may, upon written permission from the ENGINEER, operate other compacting in the same period of time as the specified equipment. If the substituted compaction within the same period of time as would be expected of the specified equipment, as determined by the ENGINEER, its use shall be discontinued.

5. Rollers shall be maintained in good repair and operating condition and shall be approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Subgrades, Embankments and Flexible Base

1. The subgrade or embankment layer or the base course shall be sprinkled if directed and rolling with a power roller shall start longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the rear wheel of the power roller.

2. On super-elevated curves, rolling shall begin at the low sides and progress toward the high sides. Alternate trips of the roller shall be slightly different in length.

3. The rollers, unless otherwise directed, shall be operated at a speed between 2 and 3 miles per hour.

B. Surface Treatments and Pavements

1. Rolling shall be done to produce a satisfactory surface as called for in surface treatment and pavement items.

2. The sequence of work shall be as indicated for embankment layer or base course.

3. The operating speed shall be determined by the CONTRACTOR.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional compensation will be made for materials, equipment or labor required by this item, but shall be considered incidental to the other items included in the contract.

*** * * END OF SECTION * * ***

SECTION 02782

PNEUMATIC TIRE ROLLING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the compaction of embankment, flexible base, surface treatments or pavements by the operation of approved pneumatic tire rollers.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

A. When used on seal coats, asphaltic surface treatments and bituminous mixture pavements, the roller shall be self propelled and equipped with smooth tread tires with 45 psi tire pressure.

B. The roller shall be so constructed as to be capable of being operated in both a forward and a reverse direction.

C. When used on bituminous mixture pavements, the roller shall have suitable provision for moistening the surface of the tires while operating.

D. When turning is impractical or detrimental to the work and when specifically directed by the ENGINEER, the roller shall be of the self-propelled type.

E. In lieu of the rolling equipment specified, the CONTRACTOR may operate other compacting equipment that will produce equivalent relative compaction in the same period of time as the specified equipment. If the substituted compaction equipment fails to produce the desired compaction within the same period of time, its use shall be discontinued.

F. Rollers shall be maintained in good repair and operating condition and shall be approved by the ENGINEER.

2.02 LIGHT PNEUMATIC TIRE ROLLER:

A. The light pneumatic tire roller shall consist of not less than 9 pneumatic tire wheels, running on axles in such manner that the rear group of tires will cover the entire gap between adjacent tires of the forward group and mounted in a rigid frame and provided with a loading platform or body suitable for ballast loading.

B. The front axle shall be attached to the frame in such manner that the roller may be turned within a minimum circle.

C. The pneumatic tire roller under working conditions shall have an effective rolling width of approximately 60 inches and shall be so designed that by ballast loading the total load be varied uniformly from 9,000 pounds or less to 18,000 pounds or more.

D. The roller shall be equipped with tires that will afford ground contact pressures to 45 pounds per square inch or more. The operating load and tire air pressure shall be within the range of the manufacturer's chart. The roller under working conditions shall provide a uniform compression under all wheels.

E. Individuals tire inflation pressures shall be within +5 psi of each other.

F. The pneumatic tire roller shall be drawn by either a suitable crawler type tractor, a pneumatic tired tractor, a truck of adequate tractive effort or may be of the self-propelled type and the roller, when drawn or propelled by either type of equipment, shall be considered a light pneumatic tire roller unit.

2.03 MEDIUM PNEUMATIC TIRE ROLLER (TYPE A):

A. The medium pneumatic tire roller (Type A) shall consist of not less than 7 pneumatic tired wheels, running on axles in such manner that the rear group of tires will cover the entire gap between adjacent tires of the forward group and mounted in a rigid frame and provided with a loading platform or body suitable for ballast loading.

B. The front axles shall be attached to the frame in such a manner that the roller may be turned within a minimum circle. The pneumatic tire roller, under working conditions, shall have an effective rolling width of approximately 84 inches and shall be so designed that, by ballast loading, the total load may be varied uniformly from 23,500 pounds or less to 50,000 pounds or more.

C. The roller shall be equipped with tires that will afford ground contact pressures to 80 pounds per square inch or more. Individual tire inflation pressures shall be within +5 psi of each other.

D. The operating load and tire air pressure shall be within the range of the manufacturer's chart.

E. The pneumatic tire roller shall be drawn by either a suitable crawler type tractor, a pneumatic tired tractor, a truck of adequate tractive effort or may be of the self-propelled type.

F. The roller, when drawn or propelled by any type of equipment, shall be considered a medium pneumatic tire roller unit.

G. The power unit shall have adequate tractive effort to properly move the operating roller at variable uniform speeds up to approximately 5 miles per hour.

2.04 MEDIUM PNEUMATIC TIRE ROLLER (Type B):

A. The medium pneumatic tire roller (Type B) shall conform to the requirements for Medium Pneumatic Tire Roller (Type A) as specified above, except that the roller shall be equipped with tires that will afford ground contact pressures to 90 psi or more.

PART 3 -EXECUTION

3.01 CONSTRUCTION METHODS:

A. The embankment layer or the base course be sprinkled if directed and rolling with a pneumatic tire roller shall start longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 of width of the pneumatic tire roller.

B. On super-elevated curves, rolling shall begin at the low sides and progress towards the high sides.

C. Alternative trips of the roller shall be slightly different in length.

D. The light pneumatic tire roller shall be operated at speeds between 2 and 6 miles per hour for asphalt surfacing work and all other work.

E. The medium pneumatic tire roller shall be operated at speeds which produce a satisfactory product.

F. Sufficient rollers shall be provided to compact the material in a satisfactory manner. When operations are so isolated from one another that 1 roller unit cannot perform the required compaction satisfactorily, additional roller units shall be provided.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional compensation will be made for materials, equipment or labor required by this item, but shall be considered subsidiary to the various items of the contract.

*** * * END OF SECTION * * ***

SECTION 02784

TAMPING ROLLING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of the compaction of embankment by the operation of approved tamping rollers as herein specified and as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. The tamping rollers shall consist of two metal rollers, drums or shells of 40 inches minimum diameter; each not less than 42 inches in length and unit mounted in a rigid frame in such a manner that each roller may oscillate independently of the other.

B. Each roller, drum or shell be surmounted by metal studs with tamping feet projecting not less than 7 inches from the surface and spaced not less than 6 inches nor more than 10 inches, measured diagonally center to center and the cross sectional area of each tamping foot, measured perpendicularly to the axis of the stud, shall not be less than 5 nor 8 square inches.

C. The roller shall be supplemented with cleaning teeth to provide self cleaning.

D. The roller shall be so designed that, by ballast loading, the load on each tamping foot may be varied uniformly from 125 to 175 psi of cross sectional area. The load per tamping foot will be determined by dividing the total weight of the roller by the number of tamping feet in 1 row parallel to or approximately parallel to the axis of the roller.

E. The compression to be provided at any time shall be as directed by the ENGINEER. The tamping roller shall be drawn by suitable power equipment of adequate tractive effort.

F. Two tamping roller, consisting of 4 cylinders, conforming to the above prescribed requirements, drawn by approved power equipment, shall be considered a roller unit.

G. Where turning is impractical or detrimental to the work and when specifically directed by the ENGINEER, 1 tamping roller consisting of 2 cylinders fastened to the front end of approved power equipment, shall be considered a roller unit.

H. In lieu of the rolling equipment specified, the CONTRACTOR may, upon written permission from the ENGINEER, operate other compacting equipment that will produce equivalent relative compaction in the same period of time a the specified equipment. If the substituted compaction equipment fails to produce the desired compaction within the same period of time as would be expected of the specified equipment, as determined by the ENGINEER, its use shall be discontinued.

I. Rollers shall be maintained in good repair and operating condition and shall be approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. This work shall be done only when ordered by the ENGINEER.

B. The embankment layer or the base courses shall be sprinkled if directed and rolling with a tamping roller unit shall start longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least 1/2 of the width of the tamping roller unit.

C. On super-elevated curves, rolling shall begin at the low sides and progress toward the high sides. Alternate trips of the unit shall be slightly different in length.

D. The tamping roller unit, unless otherwise directed, shall be operated at a speed between 2 and 3 miles per hour.

E. Sufficient roller shall be provided to compact the material in a satisfactory manner.

F. The minimum number of rolling units shall be governed by the progress in placing the material to be compacted. The quantity of material placed per hour shall be determined by averaging the total quantity of material placed within any 1 working day.

G. When operations are so isolated from one another that one roller cannot perform the required compaction satisfactorily, additional roller shall be provided and operated as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional payment will be made for the materials, equipment or labor required by this item, but shall be considered subsidiary to the various items included in the contract.

*** * * END OF SECTION * * ***

SECTION 02786

PROOF ROLLING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION WORK:

A. This work shall consist of furnishing and operating heavy pneumatic tired compaction equipment for testing the compaction of embankment, sub-grade or flexible base.

B. Proof roll is to be used to locate unstable areas.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. The proof rolling equipment shall consist of not less than 4 pneumatic tired wheels, running on axles carrying not more than 2 wheels and mounted in a rigid frame and provided with loading platform or body suitable for ballast loading.

B. All wheels shall be arranged so that they will carry approximately equal loads when operating on uneven surfaces.

C. The proof roller under working conditions shall have a rolling width of from 8 feet to 10 feet and shall be so designed that, by ballast loading, the gross load may be varied uniformly from 25 tons to 50 tons.

D. The tires shall be capable of operating under the various loads with variable air pressure up to 150 pounds per square inch. The operating load and tire pressure shall be within the range of the manufacturer's chart as directed by the ENGINEER.

E. The proof roller shall be drawn by a suitable crawler type tractor or rubber tire tractor of adequate tractive effort or may be of self-propelled type. There shall be a sufficient quantity of ballast available to load the equipment to a maximum gross weight of 50 tons.

F. Rubber tired tractive equipment shall be used on base courses.

G. Other type tractive equipment may be used on embankment sub-grade.

H. The heavy pneumatic tire roller unit shall be capable of turning 180 degrees in the crown width.

I. In lieu of the rolling equipment specified, the CONTRACTOR may, upon written permission from the ENGINEER, operate other equipment that will produce equivalent results as the specified equipment. If the substituted equipment fails to produces the desired results as would be expected of the specified equipment as determined by the ENGINEER, its use shall be discontinued.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. This work shall be done to proof all prepared sub-grades and flexible base courses or as directed by the ENGINEER.

B. On embankment compaction, each layer will be placed to specified thickness at optimum moisture and compacted with conventional equipment to comply with the requirements of the governing embankment item.

C. Prior to placing the overlaying course, the layer shall be proof rolled as directed by the ENGINEER.

D. When the operation of the proof rolling unit shows an area to be unstable or non-uniform, such area shall be brought to satisfactory stability and uniformity by additional compaction, by removal of unsuitable materials or replacement with suitable materials and re-compaction.

E. The surface tested shall then be checked for conformity with line and grade and any irregularities corrected.

F. Roller shall be operated at speeds between 2 and 6 miles per hour or as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No additional payment will be made for the materials, equipment or labor required by this item, but shall be considered subsidiary to the various items included in the contract.

*** * * END OF SECTION * * ***

SECTION 03300

CAST-IN-PLACE-CONCRETE

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED:

A. Mixing, placing, finishing and providing all related services necessary to construct all cast-in-place concrete work indicated on plans.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes:

1. ACI 315 - Manual of Standard Practice for Detailing.
2. ACI 318 - Building Code Requirements for Reinforced Concrete.
3. ACI 347 - Recommended Practice for Concrete Formwork.
4. ASTM A36 - Structural Steel.
5. ASTM C33 - Concrete Aggregates.
6. ASTM C39 - Concrete Strength of Molded Concrete Cylinders.
7. ASTM C94 - Ready-Mixed Concrete.
8. ASTM C143 - Slump of Portland Cement Concrete.
9. ASTM C150 - Portland Cement.
10. ASTM C309 - Liquid Membrance-Forming Compounds for Curing Concrete.
11. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
12. ACI 301 - Specification for Structural Concrete for Building.

B. Submit compliance submittals as specified in Division 1, including but not limited to the following: bar schedule, bar details, shop drawings including size and location of openings, water stops, joint systems and curing method.

C. Submit proposed concrete mix proportions to ENGINEER prior to placing concrete.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT:

A. Type I, Type II or Type III conforming to ASTM C150 as modified by Texas Department of Highways and Public Transportation, 1982 Standard Specifications.

B. Type I or Type II cement may be used unless Type II is specified.

C. Except when Type II specified, Type III may be used when the anticipated air temperature for the succeeding 12 hours will not exceed 60□F.

D. Type III may be used in all precast pre-stressed concrete except in piling when Type II cement is required for substructure concrete.

E. All cement used in a monolithic placement shall be of the same type.

F. May be either bagged or bulk. Partially set or caked cement will be rejected.

G. All types of cements shall be "low-alkali" cements.

2.02 WATER:

A. Clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter or other deleterious substances and shall not contain more than 1000 parts per million of chlorides as CL nor more than 1000 parts per million of sulfates as SO_4.

B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, un-coated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.

C. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate or mineral filler.

D. Gradation, percent of weight retained:

Sieve Size	**% Retained**
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	0 - 50
No. 30	0 - 75
No. 50	0 - 90
No. 100	0 - 100
No. 200	0 - 100

E. Fineness Modulus: for Grade 1 only - 2.3 minimum, 3.1maximum.

F. Miner Filler:

1. May be added upon written authorization of ENGINEER.
2. Shall be stone dust or clean crushed sand, or other approved inert material.
3. Shall not exceed 5% of the fine aggregate.
4. Shall meet the following requirements:

Passing No. 30 sieve	95 to 100%
Passing No. 100 sieve	70 to 100%

2.04 COARSE AGGREGATE:

A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.

B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.

C. Crushed stone shall consist of the clean, dust free product resulting from crushing of stone. There shall be no adherent coatings, clay, loam organic or deleterious substance, salt or alkali, and other foreign material.

D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.0%
Shale, slate or other similar material	1.0%
Clay lumps	0.25%
Soft fragments	3.0%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.0%

E. Course aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.

F. Gradation, percent of weight retained on:

Grade No. 1 - Maximum Nominal Size 2 1/2 in. (63 MM)

Sieve	Percentage Retained
2 1/2 in.	0%
2 in.	0 - 20%
1 1/2 in.	15 - 50%
3/4 in.	60 - 80%
No. 4	95 - 100%

Grade No. 2 - Maximum Nominal Size 1 1/2 in. (37.5 mm)

Sieve	Percentage Retained
2 in.	0%
1 1/2 in.	0 - 5%
3/4 in.	30 - 65%
3/8 in.	7 - 90%
No. 4	95 - 100%

Grade No. 4 - Maximum Nominal Size 3/8 in. (9.5mm)

Sieve	Percentage Retained
1/2 in.	0 - 5%
3/8	5 - 30%
No. 4	75 - 100%

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:

1. One-sixth of the least dimension between forms of that part of the structure in which concrete is to be placed;
2. Three-fourths of the clear space between reinforcement.
3. The maximum size aggregate is defined as the clear space between the sides of the smallest square opening through which 95 percent of the weight of the aggregate can be passed.
4. Unless otherwise noted or restricted by above Grade No. 2, gradation shall be used.

2.05 PIT-RUN AGGREGATE:

A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or curse aggregates, and shall consist of hard, durable, un-coated pebbles or stone particles mixed with sand.

B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.

C. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and above.

E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

A. Concrete admixtures shall comply with Section 03320.

2.07 REINFORCING STEEL:

A. Reinforcing steel shall comply with Section 03320.

2.08 CURING MATERIALS:

A. Liquid Membrane: white pigmented chlorinated rubber, ASTM C309.

B. Liquid Membrane: resin base, clear compound, permitting application of paint, Servicised Products Corp. - Code 2802 or equal.

C. Plastic Film: white pigmented, 0.00085" (minimum) thick.

D. Burlap: jute fabric, lean, free of impurities.

E. Surface Hardener: gray crystal, acidic fluosilicate base, slightly hygroscopic chemical surface hardener, SIKA Chemical Corp. or equal.

2.09 JOINT MATERIALS:

A. Joint Sealer: hot poured, non-extruding, elastic, ASTM D1190.

B. Preformed Expansion Joint Filler: non-extruding, bituminous fiber, ASTM D1751.

2.10 WATERSTOP:

A, Polyvinyl chloride or rubber, center bulb.

B. Size to suit joints, minimum 6".

2.11 FORM MATERIALS:

A. Use plywood, metal, metal framed plywood faced or other acceptable panel-type material.

B. Coat forms with non-bonding, non-staining commercial compounds.

2.12 MOISTURE BARRIER:

A. Polyethylene sheet, minimum 8 mil., ASTM E154.

2.13 CONCRETE MIX DESIGN AND CONTROL:

A. Submit not less than 10 days prior to the start of concreting operations, to the ENGINEER.

1. Mix design, using a course aggregate factor acceptable to the Engineer.
2. Sufficient samples of all materials to be incorporated into the mix for testing.
3. Full description of the source of supply of each material component.

B. Course aggregate factor:

1. Not more than 0.82 when voids less than 48%.
2. Not more than 0.85 when voids exceed 48%.

3. Not less than 0.68.

C. No changes or deviations from proportions or sources of supply without approval of ENGINEER.

D. No concrete may be placed on the job site until the mix design has been approved by ENGINEER in writing to the CONTRACTOR.

2.14 CONCRETE QUALITY:

A. Consistency:

1. Mortar shall cling to the course aggregate.
2. The aggregate shall not segregate during transport.
3. The concrete and mortar shall show no free water when removed from the mixer.

B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.

C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.

D. Excessive bleeding shall be avoided.

E. Slump requirements shall be as follows:

Structural Concrete	Avg. Slump	Max. Slump
(a) Cased Drilled Shafts and thin-walled Sections (9 inches or less)	4	5
(b) Slabs, Caps, Columns, Piers, Wall Sections Over 9 inches, etc.	3	4
(c) Slip Form Paving Underwater or seal concrete		2 1/2
(d) Rip-Rap, curb, Gutter and other Miscellaneous Concrete	As Specified	By Owner

Note: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE

CLASS OF CONCRETE	MIN.-MAX. SX. CEMENT	MIN. BEAM STRENGTH 28-DAY PSI	MIN. BEAM STRENGTH 7-DAY PSI	MAX. WATER CEMENT RATIO ITEM 2.1.1.	COARSE NO.
A.	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3-***
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5-8.0	AS SPECIFIED ON PLANS	N/A	5.5	3

* Entrained Air:

** No. 1 course aggregate may be used in foundations only (except cased drilled shafts).

*** Pre-stressed Concrete.

**** ASTM C 293 (Center Point).

2.15 GROUT:

A. Non-Shrink:

1. Use pre-mix non-shrink, Embeco Premixed Grout or Embeco Pre Mixed Mortar by Master Builders Company or equal.
2. Keep water to a minimum for placing by the dry packing method.

B. Grout for Bonding:

1. 1 part cement to 1 1/2 parts sand by weight.
2. Keep water to a minimum.

PART 3 - EXECUTION

3.01 SUBGRADE:

A. Insure sub-grade is true to line and grade and compacted as specified.

B. Fill and re-compact any ruts or depressions.

C. Check cross section with a template.

D. Place moisture barrier or moisten sub-grade prior to placing of concrete. Method to be approved by the ENGINEER.

3.02 FORMS:

A. Provide forms for all concrete work including footings and base slabs.

B. Construct forms so that completed concrete will conform to shapes, lines, grades and dimensions indicated and required.

C. Forms shall be true, plumb and level with reasonable tight joints. Adequately support and brace forms.

D. Place anchors, inserts, bolts, sleeves and other device indicated or required for the various portions of all the work.

E. Oil temporary forms with non-staining form oil before reinforcing steel is placed.

F. Rough form finish as defined by ACI 301 permitted for concealed concrete.

G. Smooth form finish as defined by ACI 301 permitted for concealed concrete.

H. Provide 3/4 inch chamfer on exposed corners and edges, and 1-foot below ground level.

3.03 REMOVAL OF FORMS:

A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.

B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.

C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.

D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

E. The entire contents of the drum shall be discharged before any materials are placed.

F. Improperly mixed concrete will not be placed.

G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transix Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.
2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.
3. Concrete shall not be placed on the job after a period of 1 hours after the cement has been placed in the mixer, with mixer turning; 30 minutes without mixer turning.

I. Continuous Volummetric Mix Concrete:

1. A mobile, continuous, Volummetric mixer of the rotating puddle type may be used for when approved by ENGINEER.
2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mix them to the required consistency before discharging.
3. The mixers shall adequate water supply and metering devices.
4. Calibration of these mixers will be required.

3.04 PLACING CONCRETE:

A. The minimum temperature of all concrete at the time of placement shall not be less than 50□ F.

B. Clean transporting equipment, reinforcing and embedded items before placing concrete.

C. Batch trucks or paving equipment not permitted on prepared sub-grade unless authorized by the ENGINEER based on actual job conditions.

D. Place no concrete until after inspection of forms by ENGINEER.

E. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

AIR OR CONCRETE TEMPERATURE	**NON-AGITATED CONCRETE**	**MAXIMUM TIME**
80 deg. F or Above	(26.6 deg. C)	15 minutes
35 deg. F or 79 deg. F	(1.6 to 26.1 deg. C)	30 minutes

AGITATED CONCRETE

90 deg. F or Above	(32.2 deg. C)	45 minutes
75 deg F to 89 deg. F	(23.9 to 31.6 deg. C)	60 minutes
35 deg. F to 74 deg. F	(1.6 to 23.3 deg. C)	90 minutes

F. Prevent segregation during placing.

G. Consolidate flat work with one pass of mechanical vibrator moving parallel to centerline. Unusual sections and widths may be hand puddled and finished.

H. Place concrete continuously so that each pour unit will be monolithic in construction and will terminate at expansion, contraction or construction joint. Permit not more than 30 minutes between depositing adjacent batches.

I. Place slab concrete over membrane waterproofing before waterproofing has become damaged or dirty.

J. Concrete placement will not be permitted when impending weather conditions will impair the quality of work.

K. Slope horizontal surfaces of exterior concrete for drainage.

L. Deposit concrete in forms in horizontal layers not deeper than 24 inches. Avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.

M. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spanding, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

N. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate placed layer of concrete and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without casing segregation of mix.

3.05 PLACING CONCRETE IN WATER:

A. Concrete shall be deposited in water only when specified on the plans or with written permission of the ENGINEER.

B. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is deposited.

C. Pump will not be permitted during the concrete placing, nor until it has set for at least 36 hours.

D. The concrete shall be placed with a tremie, closed bottom-dump bucket or other approved method.

E. The concrete shall not be allowed to fall freely through the water nor shall it be disturbed after it has been placed. Its surface shall be kept approximately level during placement.

F. The tremie shall consist of a water tight tube 14 inches or less in diameter. It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete. It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow. The lower end of the tremie shall be submerged in the concrete at all times.

G. Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard. It shall be lowered gradually and carefully until it rests upon the concrete already gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.

H. The placing operations shall be continuous until the work is complete.

I. Unless otherwise specified all concrete placed under water, except seal concrete, shall contain an additional sack of cement per cubic yard.

3.06 JOINTS:

A. CONTRACTOR:

1. Extend entirely across flat slabs at locations shown.
2. Location where not shown; maximum spacing is:
   a. Driveways: 10'
   b. Sidewalks: 4'
   c. Other flat slabs: 20 times slab thickness.
3. Saw depth not less than 1/4 slab thickness.

B. Expansion:

1. Install where shown on the plans.
2. Locations where not shown: all structures and features which project through, into or against slab.
3. Install according to manufacturer's recommendations, set material securely before placing concrete.
4. Install 1 inch width unless shown otherwise.

C. Filling Joints:

1. Fill not later than 14 days after sawing.
2. Fill immediately following cleaning.
3. Fill to 1/8" of surface.
4. Remove excess while material is still pliable.
5. Refill low areas where necessary.
6. Omit filling sidewalk joints.

3.07 FINISHING EXTERIOR FLAT WORK:

A. Strike off and float as required.

B. Check surface with ten foot straight edge, maximum variance allowed - 1/8".

C. Drag concrete surface longitudinally with double thickness burlap drag after completion of straight edging unless noted otherwise.

D. Use edger on edges of slab.

3.08 CURING:

A. CONTRACTOR shall inform the ENGINEER fully of the methods and procedures proposed for curing; shall provide proper equipment and material in adequate amounts; shall have approval of the proposed method, equipment and material prior to placing concrete.

B. All concrete shall be cured for a period of 4 curing days except as noted herein.

EXCEPTIONS TO 4-DAY CURING

Description	**Required Curing**
Upper Surfaces of Bridge Roadway, Median and Sidewalk Slabs and Top Slabs of Direct Traffic Culverts	8 Curing Days

A curing day is defined as a calendar day when the ambient temperature, taken in the shade

*** * * END OF SECTION * * ***

SECTION 03320

CONCRETE ADMIXTURES

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing materials for use as admixtures in concrete.

PART 2 - PRODUCTS

2.01 AIR ENTRAINING ADMIXTURE

A. An "Air Entraining Admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will entrain uniformly dispersed microscopic air.

B. This admixture shall conform to ASTM C 260, modified as follows:

1. The cement used in any series of tests shall be either the cement proposed for specific work or a reference" Type I cement from one mill.

2. Unless otherwise indicated, the minimum relative durability factor shall be 80.

C. The air entraining admixture used in the reference concrete shall be high quality neutralized Vinsol Resin.

2.02 WATER - REDUCING, RETARDING ADMIXTURE

A. A "Water-reducing, Retarding Admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and retard the initial set of the concrete.

B. This mixture shall conform to ASTM C 494, Type A or D, modified as follows:

1. The water-reducing retarder shall retard the initial set of the plastic concrete a minimum of 2 hour and a maximum of 4 hours when the materials are at a temperature of 90 F, the dosage rate specified by the manufacturer.

2. The cement used in any series of tests shall be either the cement proposed for specific work or a "reference" Type I cement for one mill.

3. All concrete tested shall contain entrained air.

2.03 WATER-REDUCING ADMIXTURE

A. "Water-reducing Admixture" is defined as a material which when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and required strength.

B. This admixture shall conform to ASTM C 494, Type A.

2.04 ACCELERATING ADMIXTURE

A. In "Accelerating Admixture" is defined as an admixture that accelerates the setting time and the early strength development of concrete.

B. This admixture shall conform to ASTM C 494, Type C, modified as follows:

1. This accelerating admixture will contain no chlorides and shall be used in the liquid for only.

2.05 HIGH RANGE WATER REDUCING ADMIXTURES

A. A "High-range Water Reducing Admixture," referred to as a super plaster size, is defined as a synthetic polymer material which, when added to a low slump concrete mixture increases the slump without segregation, impermeability and durability of the mix.

B. This admixture shall conform to ASTM C 494, Type F or G, modified as follows:

1. It shall reduce the required water by a minimum of 15 percent.

2. It shall increase the 7 day compressive strength of the concrete by a minimum of 25 percent.

C. The admixture when added to the mix shall produce the following:

1. Modify a low slump concrete, without the addition of water, to produce a slump which conforms to the range indicated.

2. It shall prevent a temperature rise of the mix above 100 F during high ambient conditions.

3. It shall not increase the chloride content of mix.

2.06 CERTIFICATION

A. The CONTRACTOR shall submit the name of the admixture proposed and manufacturer's certification that products selected meet the requirements of this item and of ADTM C 260 and C 494 as required.

B. If more than one admixture is proposed in the concrete mix, a statement of compatibility of components shall accompany certification.

C. The ENGINEER may request additional information to be submitted such as infrared spectrophotometry scan, solids content, ph value, etc., for further identification.

D. A change in formulation discovered by any of the tests prescribed herein or other means and not reported and re-tested, may be cause to permanently bar the manufacturer from furnishing admixtures for COUNTY work.

E. The ENGINEER reserves the right to perform any or all of the tests required by ASTM C 260 and C 494 as a check on the tests reported by the manufacturer.

F. In case of any variance, the ENGINEER tests will govern.

2.07 APPROVAL

A. The ENGINEER shall approve all admixtures and dosage. Approval of admixtures shall be based on previous performance of the admixture.

B. The dosage will be determined from the manufacturer's recommendations, trial mixes or current job approved mix designs, if it is shown that no substantial change in any of the proposed ingredients has been made.

C. Should the CONTRACTOR desire to change the admixture or dosage approved during the progress of the work, the CONTRACTOR shall perform trial mixes at his own expense and submit the new mix design for approval.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. No concrete shall be delivered to the project until the mix design is approved. All concrete delivered shall conform to the approved job mix formula. Unless otherwise indicated, all concrete shall be air entrained. All admixtures will be added at the Batch Plant. All admixtures shall be in the liquid state. No admixtures shall be dispensed on dry aggregates. Each admixture shall be dispensed separately, but at the same time as the mixing water.

B. An approved job mix formula for normal hot weather concreting may not perform satisfactorily for extended retardation, in which case its use will not be permitted.

C. The rotation of the mixer shall be sufficient to thoroughly mix the admixture into the concrete.

D. Admixtures shall be agitated as required to prevent separation or sedimentation of solids. Air agitation of Neutralized Vinsol Resin will not be permitted.

E. Normally air entraining agents shall be charged into the mixer at the beginning of the batch and retarding or water reducing admixtures shall be charged into the mixer during the last part (approximately 1/3) of the batch when an air-entraining agent is used.

F. Accelerating admixtures will not be used only on the written approval of ENGINEER. Accelerating admixtures will not be permitted in bridge decks, direct traffic culvert slabs at any time nor when Type II cement is specified.

G. All admixtures shall be of the same brand from only one manufacturer for the entire project, unless otherwise approved by the ENGINEER.

H. Accelerators will be used only to meet special project requirements and will require the approval of the ENGINEER.

I. For individual placements of concrete of 25 cubic yards or more and for all ready-mix concrete, the admixture shall be measured and dispensed by a readily adjustable dispenser. When set to a predetermined volume, the dispenser shall fill to the preset amount and hold it positively without leakage until the operator releases the content into the mixing water by some positive means. Unless otherwise indicated, completely automatic dispensing will not be required, except for use with a full automatic plant.

J. The calibrated container shall be a measuring reservoir of the type where the level of the admixture is visible at all times. A strip gauge with one ounce increments for air entraining admixtures, ten ounce increments for dispersing admixtures, shall be attached securely to the measuring apparatus. This strip shall be a material possessing weather resistant qualities. The accuracy equipment shall visibly show the total amount to be dispensed for ready check by the ENGINEER.

K. When individual placements of less than 25 cubic yards and with the concrete batched on the job site, the ENGINEER may waive the requirements for mechanical dispensing equipment.

L. When high range water reducing admixtures are indicated the following will be observed:

1. Ready-mixed concrete shall be delivered in transit mixers and the capacity of the transit mixture shall be reduced for each bath by 25 percent of the rated capacity to assure proper mixing.

2. If during the placement of concrete, a change in slump resulting in a slump loss in excess of 3 inches is noted, the remaining concrete shall be rejected.

3. The addition of water will not be permitted at the job site.

4. Only one liquid admixture shall be used to achieve the desired results, except where air entrainment is indicated, the air entrainment agent will be

permitted.

5. The concrete design shall meet the following requirements:

ITEM	TEST	VALUE
Air entrainment	ASTM C 260	3 to 6 percent
High range water reducing Admixture	ASTM C 494 Type F or G	
Water cement ratio Gal/.Sack Max.		6.25
Minimum cement content in Sacks (94 lb. sack)		6.0
Coarse aggregate factor		6.5
Slump Maximum, inches		10
Flexural strength @ 7 days, psi		650
Maximum concrete temperature F		100

PART 4 - MEASUREMENT AND PAYMENT

4.01 No additional compensation will be made for the materials, equipment test or methods required by this item, but shall be considered subsidiary to various items included in the contract.

*** * * END OF SECTION * * ***

SECTION 03330

REINFORCING STEEL

PART 1 - GENERAL

1.01 This work shall consist of the furnishing and placing of reinforcing steel, deformed and smooth, of the size and quantity indicated and in accordance with these specifications.

PART 2 - PRODUCTS

2.01 BARS:

A. Bar reinforcement shall be deformed and shall conform to ASTM A 615, A 616, Grades 40, 60, or 75 and shall be open-hearth, basic oxygen or electric furnace new billet steel, unless otherwise indicated. Large diameter new billet steel (Nos. 14 and 18), Grade 75, will be permitted for straight bars only.

B. Where bending of bar sizes No. 14 or No. 18 of Grades 40 or 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM specification. the required bend shall be 90 degrees at a minimum temperature of 60 F around a pin having a diameter of 10 times the nominal diameter of the bar and shall be free of cracking.

C. Spiral reinforcement shall be either smooth or deformed bars or wire of the minimum diameter indicated. Bars for spiral reinforcement shall comply with ASTM A 675, A 615, or A 617. Wire shall comply with ASTM A 82. The minimum yield strength for spiral reinforcement shall be 40,000 psi.

D. In cases where the provisions of this item are in conflict with the provisions of the ASTM Designation to which reference is made, the provisions of this item shall govern.

E. Report of chemical analysis showing the percentages of carbon, manganese, phosphorus and sulfur will be required for all reinforcing steel when it is to be welded, except for drill shafts. No tack welding will be allowed. All welding shall conform to the requirements of AWS D-1-72.

F. The nominal size and area and the theoretical weight (lbs.) of reinforcing steel bars covered by these specifications are as follows:

BAR SIZE NUMBER	NOMINAL DIAMETER INCHES	NOMINAL AREA SQUARE INCHES	WEIGHT PER LINEAR FOOT
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.65
18	2.257	4.00	13.60

G. Smooth bars, larger than No. 4, may be steel conforming to the above or may be furnished in any steel that meets the physical requirements of ASTM A36.

H. Smooth, around bars shall be designated by size number through No. 4. Smooth bars above No. 4 shall be designated by diameter in inches.

2.03 WELDED WIRE FABRIC:

A. Wire for fabric reinforcement shall be cold-drawn from rods hot-rolled from open-hearth, basic oxygen or electric furnace billet. Wire shall conform to the requirements of the standard Specifications for Cold-Drawn Steel Wire for concrete Reinforcement, ASTM A82 or A496. Wire fabric, when used as reinforcement, shall conform to ASTM A 185 or A 497.

B. When wire is ordered by size numbers, the following relations between size number, diameter in inches and area shall apply unless otherwise indicated.

SIZE W NUMBER	NOMINAL DIAMETER (INCH)	NOMINAL AREA SQUARE INCHES
31	0.628	0.310
30	0.618	0.300
28	0.597	0.280
26	0.75	0.260
24	0.553	0.240
22	0.529	0.220
20	0.505	0.200
18	0.479	0.180
16	0.451	1.160
14	0.391	0.140
12	0.391	0.120
10	0.357	0.100
8	0.319	0.080
7	0.299	0.070
6	0.276	0.060
5.5	0.265	0.055
5	0.252	0.050
4.5	0.239	0.045
4	0.226	0.040
3.5	0.211	0.035
3	0.195	0.030
2.5	0.178	0.025
2	0.160	0.020
1.5	0.138	0.015
1.2	0.124	0.012
1	0.113	0.010
0.5	0.080	0.005

C. When deformed wire is required, the size number shall be preceded by D and for smooth wire the prefix shall be shown.

2.04 CHAIRS AND SUPPORTS:

A. Chairs and Supports shall be steel, precast mortar or concrete blocks cast in molds meeting the approval of the ENGINEER of sufficient strength to position the reinforcement as indicated when supporting the dead load of the reinforcement, the weight of the workers placing concrete and the weight of the concrete bearing on the steel.

B. Chairs shall be plastic coated when indicated.

C. Chair types and uses shall be as follows:

Chair Types and Applicable Uses

Structural or Architectural Elements (columns, beams, walls, slabs)exposed to weather, and subject to sand blasting, water blasting or grinding.	Galvanized steel or steel chairs with plastic coated feet.
Structural or Architectural Elements exposed to weather and subject to sand blasting, water blasting or grinding.	Stainless steel chairs.
Structural or Architectural Elements not exposed to weather or corrosive condition.	Uncoated steel chairs.

Slabs and grade beams cast on grade. Steel chairs with a base with 9 inch^2 minimum area or sufficient area to prevent the chair from sinking into fill or sub-grade. Precast mortar or concrete blocks meeting the requirements of this item may be used.

2.05 BENDING:

A. The reinforcement shall be bent cold, true to the shapes indicated. Bending shall preferable be done in the shop.

B. Irregularities in bending shall be cause for rejection.

C. Unless otherwise indicated, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as follows:

1. Bends of 90 degrees and greater in stirrups, ties and other secondary bars that enclose another bar in the bend.

Bar Number	Grade 40	Grade 60
3, 4, 5	3d	4d
6, 7, 8	4d	5d

2. All bends in main bars and in secondary bars not covered above:

Bar Number	Grade 40	Grade 60	Grade 75	
3 thru 8	6d	6d	--	
9, 10	8d	8d	--	
11	8d	8d	8d	
14, 18	10d	10d	--	

2.06 STORAGE:

A. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust.

B. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations.

C. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross sectional area and tensile properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel indicated.

2.07 SPLICES:

A. No splicing of bars, except when indicated or specified herein, will be permitted without written approval of the ENGINEER.

B. No substitution of bars will be allowed without the approval of the ENGINEER. Any splicing of substituted bars shall conform to Table 03330-1.

C. Splices not indicated will be permitted in slabs no more than 15 inches in thickness, columns, walls and parapets, but not included for measurement, subject to the following:

1. Splices will not be permitted in bars 30 feet or less in plan length.
2. For bars exceeding 30 feet in plan length, the distance center to center of splices shall not be less than 30 feet minus 1 splice length, with no more than 1 individual bar length less than 10 feet.

3. Splices not indicated, but permitted hereby, shall conform to Table 03330-1. The specified concrete cover shall be maintained at such splices and the bars placed in contact and securely tied together.

TABLE 03330-1

Minimum Lap Requirements

Bar Number	Grade 40	Grade 60
3	1 foot 0 inches	1 foot 0 inches
4	1 foot 2 inches	1 foot 9 inches
5	1 foot 5 inches	2 feet 2 inches
6	1 foot 9 inches	2 feet 7 inches
7	2 feet 4 inches	3 feet 5 inches
No. 8	3 feet 0 inches	4 feet 6 inches
No. 9	3 feet 10 inches	5 feet 8 inches
No. 10	4 feet 10 inches	7 feet 3 inches
No. 11	5 feet 11 inches	8 feet 11 inches

D. Spiral steel shall be lapped a minimum of 1 turn. Bar No. 14 and No. 18 may not be lapped.

E. Welding of reinforcing bars may be used only where indicated or as permitted herein. All welding operations, processes, equipment, materials, workmanship and inspection shall conform to the requirements indicated. All splices shall be of such dimension and character as to develop the full strength of the bar being spliced.

F. End preparation for butt welding reinforcing bars shall be done in the field, except Bar No. 6 and larger shall be done in the shop. Delivered bars shall be of sufficient length to permit this practice.

G. For box culvert extensions with less than 1 foot of fill, the existing longitudinal bars shall have a lap with the new bars as shown in Table 03330-1.

H. For box extensions with more than 1 foot of fill, a minimum lap of 6 inches will be required.

I. Unless otherwise indicated, dowel bars transferring tensile stress shall have a minimum embedment equal to the minimum lap requirements shown in Table 03330-1.

J. Shear transfer dowels shall have a minimum embedment of 12 inches.

PART 3 - EXECUTION

3.01 PLACING:

A. Reinforcement shall be placed as near as possible in the position indicated. Unless otherwise indicated, dimensions shown for reinforcement are to the centers of the bars.

B. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch.

C. Cover of concrete to the nearest surface of steel shall be as follows:

ITEM	MINIMUM COVER INCHES
1. Concrete cast against and permanently exposed to earth.	3
2. Concrete exposed to earth or weather:	
Bar No. 6 through 18 bars	2
Bar No. 5, W31 or D31 wire and smaller	1 1/2
3. Concrete not exposed to weather or in contact with ground:	
Slabs, walls, joists:	
Bar No. 14 and 18	1 1/2
Bar No. 11 and smaller	1
Beams, columns:	
Primary reinforcement, ties, stirrups, spirals	1 1/2
Shells, folded plate members:	
Bar No. 6 and larger	1
Bar No. 5, W31 or D31 wire, and smaller	1

D. Vertical stirrups shall always pass around the main tension members and be attached securely thereto. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers or approved precast mortar or concrete blocks. For approval of plastic spacers on a project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.

E. All reinforcing steel shall be tied at all intersections, except that where spacing is less than 1 foot in each direction, alternate intersections only need be tied. For reinforcing steel cages for other structural members, the steel shall be tied at enough intersections to provide a rigid cage of steel. Mats of wire fabric shall overlap each other 1 full space as a minimum to maintain a uniform strength and shall be tied at the ends and edges.

F. Where prefabricated deformed wire mats are specified or if the CONTRACTOR requests, welded wire fabric may be substituted for a comparable area of steel reinforcing bar plan, subject to the approval of the ENGINEER.

G. A suitable tie wire shall be provided in each block, to be used for anchoring to the steel. Except in unusual cases and when specifically authorized by the ENGINEER, the size of the surface to be placed adjacent to the forms shall not exceed $2^{1/2}$ inches square or the equivalent thereof in cases where circular or rectangular areas are provided. Blocks shall be cast accurately the thickness required and the surface to be placed adjacent to the forms shall be a true plane, free of surface imperfections.

H. Reinforcement shall be supported and tied in such a manner that sufficiently rigid cage of steel is provided. If the cage is not adequately supported to resist settlement or floating upward of the steel overturning of truss bars or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken. Sufficient measurements shall be made during concrete placement to insure compliance with the above.

I. No concrete shall be deposited until the ENGINEER has reviewed the placement of the reinforcing steel and all mortar, mud, dirt, etc, shall be cleaned from the reinforcement, forms, workers' boots and tools.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. The measurement of quantities of reinforcement furnished and placed will be based on the calculated weight of the steel actually placed as indicated, with no allowance made for added bar lengths for splices requested by the CONTRACTOR nor for extra steel used when bars larger than those indicated or with a higher grade of steel are substituted with the permission of the ENGINEER.

B. Tie wires and supporting devices will not be included in the calculated weights.

C. The calculated weight of bar reinforcement will be determined using the theoretical bar weight set forth in this item.

D. Measurement required by a change in design will be computed as described above for the actual steel required to complete the work.

4.02 PAYMENT:

A. The accepted quantities of reinforcing steel will be paid for at the contract unit bid price per pound complete in place.

B. When not listed as a separate contract pay item, reinforcing steel shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work, will be for furnishing, bending, fabricating, welding and placing reinforcement, for all clips, blocks, metal spacers, ties, chairs, wire or other materials used for fastening reinforcement in place and for all tools, labor, equipment and incidentals necessary to complete the work.

*** * * END OF SECTION * * ***

BID FORM

HIDALGO COUNTY PRECINCT No. 4

CONSTRUCTION OF A NEW MULTI-PURPOSE FACILITY AND MECHANICAL SHOP

PROJECT NO. 2012-056-02-29-MSS

SAMPLE

Item No.	Estimated Quantity	Unit	Item Description	Unit Bid Price In Words	Unit Price In Figures	Total Extension In Figures
1	*34.33*	*STA*	*PREPARING ROW*	*THREE HUNDRED* Dollars *FIFTY* Cents	*$300.50*	*$6,271.44*

BASE BID						
1	9,707	SY	PRIME COAT (MC-30) ENTIRE BASE OF PARKING AREA AND ACCESS ROAD AND LEAVE IT READY FOR HMAC INSTALLATION (MATERIAL & LABOR)	Dollars Cents		
2	10,409	SY	8" COMPACTED CALICHE (LABOR ONLY)	Dollars Cents		
3	1,450	LF	TYPE "A" BARRIER CONCRETE CURB AND GUTTER (MATERIAL & LABOR)	Dollars Cents		
4	4,672	SF	(4") CONCRETE SIDE WALK (MATERIAL & LABOR)(519.0 SY)	Dollars Cents		
5	354	LF	6 FT CONCRETE VALLEY GUTTER (MATERIAL & LABOR)	Dollars Cents		
6	1	LS	PARKING LOT STRIPPING AS PER PLANS (MATERIAL & LABOR)	Dollars Cents		
7	13	EA	CONCRETE SPILLWAYS (MATERIAL & LABOR)	Dollars Cents		
8	72	LF	REMOVE CONCRETE CURB AND GUTTER	Dollars Cents		
9	346	SY	6" CONCRETE APRON ENTRANCE	Dollars Cents		
10	1,980	SY	EXCAVATE, TREAT & REWORK EXISTING ACCESS ROAD SECTION TO ACHIEVE PROPOSED FINISH GRADE	Dollars Cents		
11	94	EA	PRECAST CONCRETE WHEEL STOPS	Dollars Cents		
			Base Bid Price In Words		**Bid In Figures**	
				Dollars	$	
				Cents		

Total Bid Price In Words (Base Bid)	**Bid In Figures**
Dollars	$
Cents	

ADD ALTERNATE NO. 1						
1	10,409	SY	TENSAR TX 5 TRIAX GEOGRID (MATERIAL & LABOR)	*Dollars*		
				Cents		

Add Alternate No. 1 Bid Price In Words	Bid In Figures
Dollars	$
Cents	

Total Bid Price In Words (Add Alternate No. 1)	Bid In Figures
Dollars	$
Cents	

ADD ALTERNATE NO. 2						
1	9	EA	SAFETY END TREATMENT	*Dollars*		
				Cents		

Add Alternate No. 2 Bid Price In Words	Bid In Figures
Dollars	$
Cents	

Total Bid Price In Words (Add Alternate No. 2)	Bid In Figures
Dollars	$
Cents	

STA - STATION
LS - LUMP SUMP
LF - LINEAR FEET
EA - EACH
SY - SQUARE YARD(S)

BIDDER/COMPANY NAME: _____
ADDRESS: _____
PHONE NUMBER: _____
AUTHORIZED SIGNATURE: _____
PRINTED NAME: _____
TITLE: _____

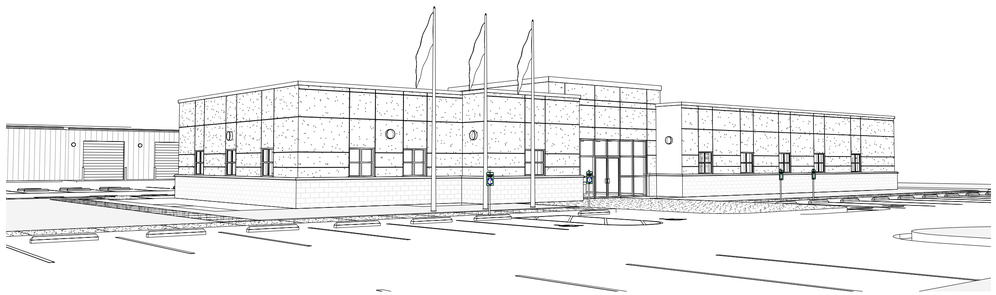
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MAINTENANCE AND ADMINISTRATION BUILDINGS

HIDALGO COUNTY PRECINCT No.04

EDINBURG, TX

RAMON GARCIA
JOEL QUINTANILLA
HECTOR (TITO) PALACIOS
JOE M. FLORES
JOSEPH PALACIOS



COUNTY JUDGE
COMMISSIONER PCT. 1
COMMISSIONER PCT. 2
COMMISSIONER PCT. 3
COMMISSIONER PCT. 4

CONSTRUCTION DOCUMENTS
ERO PROJECT # 12014

PROJECT TEAM

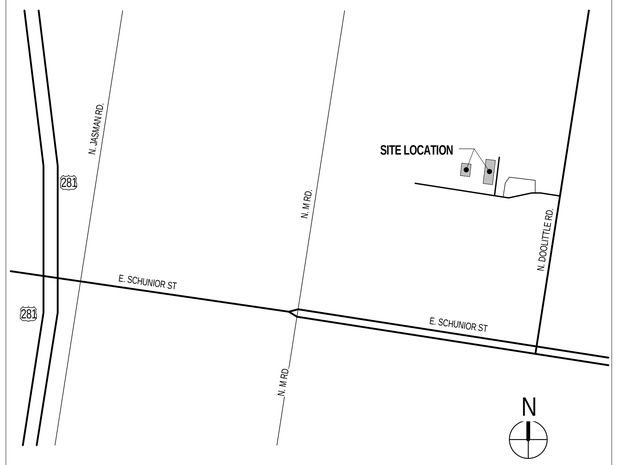
OWNER:
HIDALGO COUNTY
PRECINCT No.04
1051 N. DOOLITTLE RD.
EDINBURG, TEXAS 78542
TEL:956.383.3112
FAX:956.381.5905
JOSEPH PALACIOS, COMMISSIONER PCT. 4

ARCHITECT:
ERO ARCHITECTS
300 S. 8TH STREET
MCALLEN, TEXAS 78501
TEL:956.664.0400
FAX:956.661.0401
ELI R. OCHOA, AIA

STRUCTURAL ENGINEER:
HINOJOSA ENGINEERING INC.
108 W. 18TH ST.
MISSION, TEXAS 78572
TEL:956.581.0143
FAX:956.581.2074
RICK HINOJOSA, P.E.

MECHANICAL-ELECTRICAL-PLUMBING ENGINEER:
HALFF ASSOCIATES, INC.
5000 WEST MILITARY, SUITE 100
MCALLEN, TEXAS 78503
TEL:956.664.0286
FAX:956.664.0282
TREY MURRAY, P.E. (PLUMBING)
GABE HINOJOSA, P.E. (MECHANICAL PLUMBING)
TONY NICANOR, P.E. (ELECTRICAL)

LOCATION



1051 N. DOOLITTLE RD, EDINBURG, TX 78542

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AE405	ENLARGED F.P. & INT. ELEV. - RESTROOMS - ADMINISTRATION
AE406	ENLARGED F.P. & INT. ELEV. - LOBBY & PRIVATE RR - ADMINISTRATION
AE407	ENLARGED F.P & INT. ELEV. - ADMINISTRATION
AE408	ADMINISTRATION MILLWORK SECTIONS
AE409	MAINTENANCE MILLWORK SECTIONS
AE501	PLAN DETAILS - MAINTENANCE

Sheet List

AE502	PLAN DETAILS - MAINTENANCE
AE503	PLAN DETAILS - ADMINISTRATION
AE504	PLAN DETAILS - ADMINISTRATION
AE505	SECTION DETAILS - MAINTENANCE
AE506	SECTION DETAILS - ADMINISTRATION
AE507	SECTION DETAILS - ADMINISTRATION
AE508	ROOF DETAILS
AE509	ROOF DETAILS
AE510	RCP DETAILS
AE511	DOOR AND WINDOW DETAILS
AE512	DOOR AND WINDOW DETAILS
AE513	DOOR AND WINDOW DETAILS
AE601	DOOR & FRAME SCHEDULE - A & M
AE602	WINDOW TYPES
AF601	ROOM FINISH SCHEDULE
AS100	COMPOSITE SITE PLAN
AS101	PARTIAL SITE PLAN - MAINTENANCE
AS102	PARTIAL SITE PLAN - ADMINISTRATION
AS501	ENLARGED RAMP PLAN AND SECTIONS
AS502	SITE DETAILS
CIVIL	
AE303	BUILDING SECTIONS - MAINTENANCE
PLUMBING	
PS100	PLUMBING SITE PLAN
PL101	PLUMBING SANITARY SEWER PLAN - M
PL102	PLUMBING SANITARY SEWER PLAN - A
PQ103	PLUMBING LUBE AND COMPRESSED AIR PLAN - M
PL501	PLUMBING DETAILS
PL502	PLUMBING DETAILS
PL601	PLUMBING SCHEDULES
PL602	PLUMBING RISER SCHEMATIC DIAGRAMS
PL603	PLUMBING RISER SCHEMATIC DIAGRAMS
PJ701	AUTOMATIC SPRINKLER SYS. PERFORMANCE SPECIFICATIONS NOTES
PJ702	CONCEPTUAL FIRE PROTECTION PLAN
MECHANICAL	
MH001	MECHANICAL GENERAL NOTES
MH101	MECHANICAL PLAN - MAINTENANCE BUILDING
MH102	MECHANICAL PLAN - ADMINISTRATION BUILDING
MH501	MECHANICAL DETAILS
MH502	MECHANICAL DETAILS
MH601	MECHANICAL SCHEDULES
MH602	MECHANICAL SCHEDULES
ELECTRICAL	
EL001	ELECTRICAL GENERAL LEGEND
ES100	ELECTRICAL SITE PLAN
EL101	ELECTRICAL LIGHTING PLAN - M
EL102	ELECTRICAL LIGHTING PLAN - A
EL103	ELECTRICAL LIGHTING CONTROL PLAN - M
EL104	ELECTRICAL LIGHTING CONTROL PLAN - A
EP105	ELECTRICAL POWER PLAN - M
EP106	ELECTRICAL POWER PLAN - A
EP107	ELECTRICAL SPECIAL SYSTEMS PLAN - M
EP108	ELECTRICAL SPECIAL SYSTEMS PLAN - A
EP109	MECHANICAL EQUIPMENT POWER PLAN - M
EP110	MECHANICAL EQUIPMENT POWER PLAN - A
EP501	ELECTRICAL DETAILS
EP502	ELECTRICAL DETAILS
EP503	ELECTRICAL DETAILS
EP505	ELECTRICAL DETAILS
EP504	ELECTRICAL DETAILS
EP506	ELECTRICAL DETAILS
EP507	ELECTRICAL DETAILS
EP601	ELECTRICAL ONE LINE DIAGRAM
EP602	ELECTRICAL SCHEDULES
EP603	ELECTRICAL PANEL SCHEDULES
EP604	ELECTRICAL PANEL SCHEDULES

SET #

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.:	12014
DRAWN BY:	YIPG
CHECKED BY:	YIPG

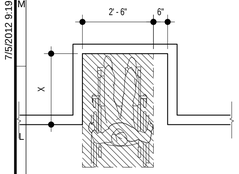
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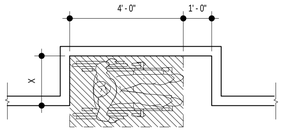
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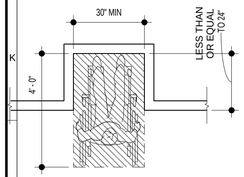
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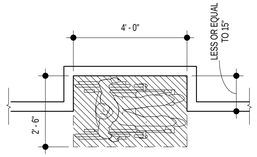




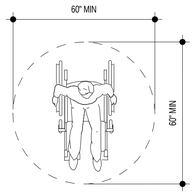
NOTE: IF X > 24" THEN AN ADDITIONAL MANEUVERUNG CLEARANCE OF 6" SHALL BE PROVIDED.

NOTE: IF X > 15" THEN AN ADDITIONAL MANEUVERUNG CLEARANCE OF 12" SHALL BE PROVIDED.

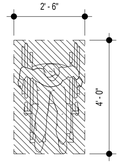




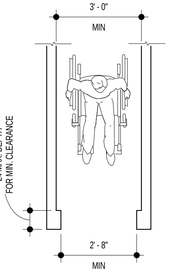
CLEAR FLOOR SPACE IN ALCOVES



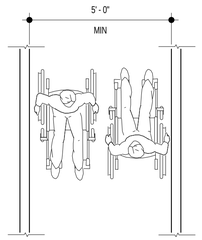
TURNING RADIUS CLEAR FLOOR SPACE



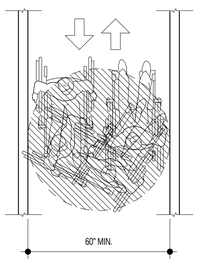
CLEAR FLOOR SPACE



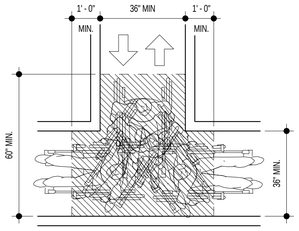
WHEELCHAIR PASSAGE WIDTH



DOUBLE WHEELCHAIR PASSAGE WIDTH

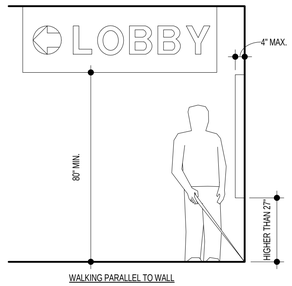


MINIMUM CLEAR WIDTH FOR TWO WHEELCHAIR

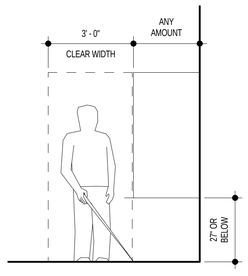


T-SHAPED SPACE FOR 180 DEGREE TURNS.

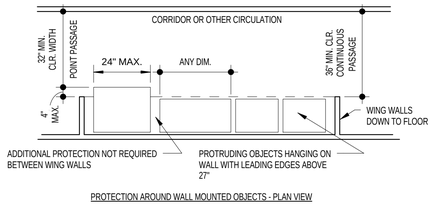
A1 SPACE ALLOWANCES
3/8" = 1'-0"



WALKING PARALLEL TO WALL

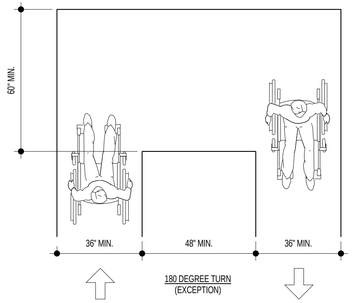


WALKING PARALLEL TO WALL

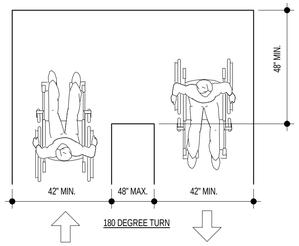


PROTECTION AROUND WALL MOUNTED OBJECTS - PLAN VIEW

K6 PROTRUDING OBJECTS
3/8" = 1'-0"

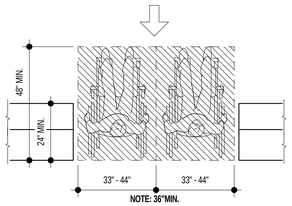


180 DEGREE TURN (EXCEPTION)

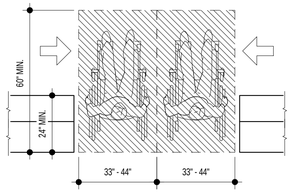


180 DEGREE TURN

G4 ACCESSIBLE ROUTE
3/8" = 1'-0"

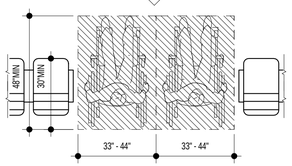


BLEACHER SEATING

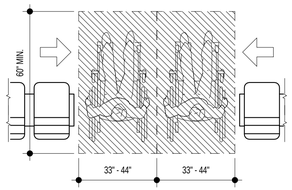


SIDE ACCESS

FORWARD OR REAR ACCESS

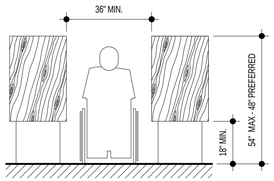


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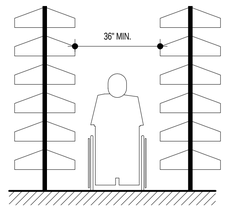


THEATER SEATING

SIDE ACCESS

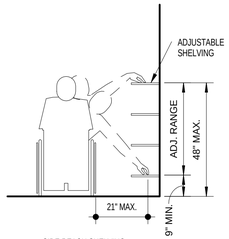


CARD CATALOG



STACKS

A4 SPACE ALLOWANCES
3/8" = 1'-0"



SIDE REACH SHELVING

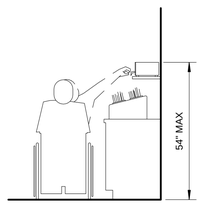
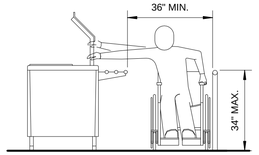
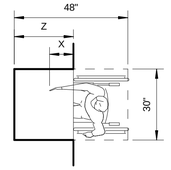


TABLE AREAS

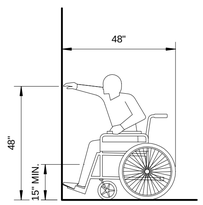


SERVING LINES

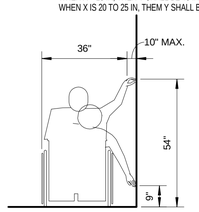


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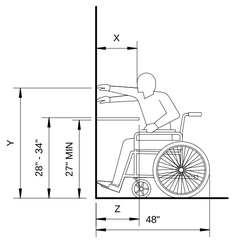
NOTE: X SHALL BE SMALLER OR EQUAL TO 25";
Z SHALL BE GREATER OR EQUAL TO X.
WHEN X < 20 IN, THEN Y SHALL BE 48 IN MAX.
WHEN X IS 20 TO 25 IN, THEM Y SHALL BE 44 IN MAX.



HIGH FORWARD REACH LIMIT

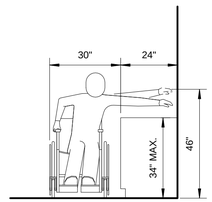


HIGH & LOW SIDE REACH LIMITS



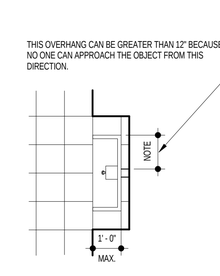
MAXIMUM FRONT REACH OVER OBSTRUCTIONS

NOTE: X SHALL BE SMALLER OR EQUAL TO 25";
Z SHALL BE GREATER OR EQUAL TO X.
WHEN X < 20 IN, THEN Y SHALL BE 48 IN MAX.
WHEN X IS 20 TO 25 IN, THEM Y SHALL BE 44 IN MAX.



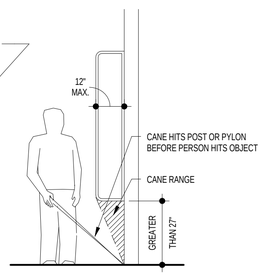
MAXIMUM SIDE REACH OVER AN OBSTRUCTION

A8 REACH RANGES1
3/8" = 1'-0"

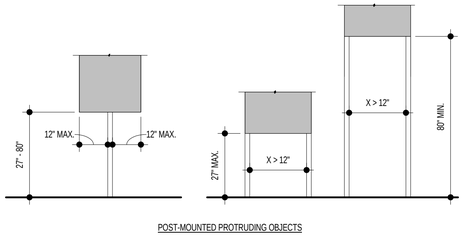


WALKING PERPENDICULAR TO A WALL

OBJECTS MOUNTED ON POSTS OR PYLONS - PLAN VIEW

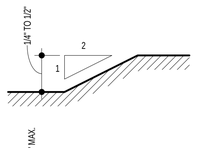


OBJECTS MOUNTED ON POSTS OR PYLONS - ELEVATION



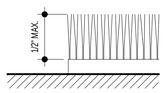
POST-MOUNTED PROTRUDING OBJECTS

G12 POST-MOUNTED PROTRUDING OBJECTS
3/8" = 1'-0"

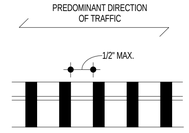




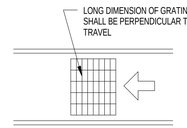
CHANGES IN LEVEL



CARPET PILE THICKNESS



GRATING DETAILS



GRATING ORIENTATION

A12 GROUND AND FLOOR SURFACE
3/8" = 1'-0"

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

No.	Description	Date

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

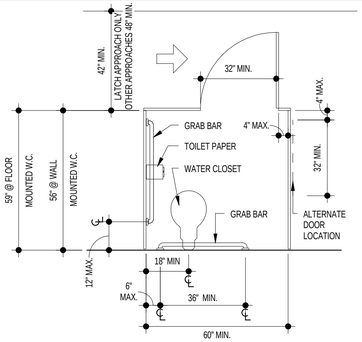
PROJECT NO.: 12014
DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE:
ACCESSIBILITY REQUIREMENTS

GI002

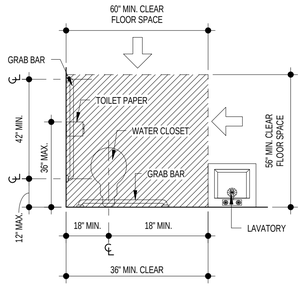
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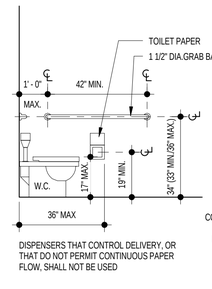
STANDARD STALL - PLAN VIEW

WATER CLOSETS IN TOILET STALLS



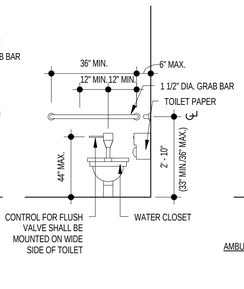
PLAN VIEW

WATER CLOSETS THAT ARE NOT IN TOILET STALLS



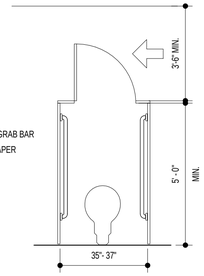
SIDE VIEW

DISPENSERS THAT CONTROL DELIVERY, OR THAT DO NOT PERMIT CONTINUOUS PAPER FLOW, SHALL NOT BE USED

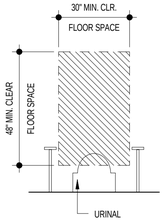


FRONT VIEW

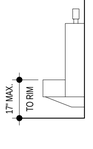
WATER CLOSET ELEVATIONS ADULT MOUNTING HEIGHTS



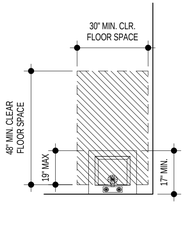
AMBULATORY ACCESSIBLE TOILET COMPARTMENT



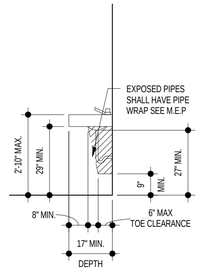
PLAN VIEW



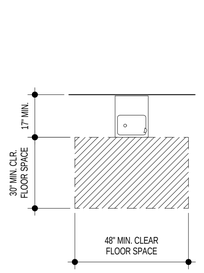
SIDE VIEW



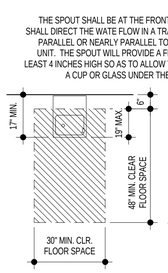
LAVATORY - PLAN



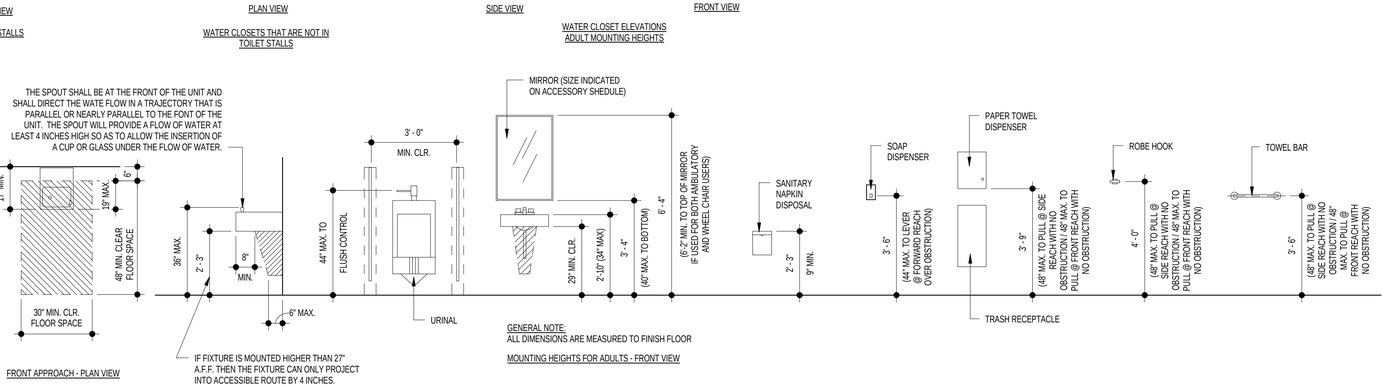
LAVATORY - ELEVATION ADULT MOUNTING HEIGHTS



SIDE APPROACH - PLAN VIEW



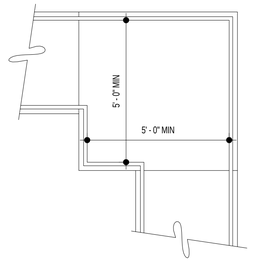
FRONT APPROACH - PLAN VIEW



MOUNTING HEIGHTS FOR ADULTS - FRONT VIEW

G1 TOILET, LAV. & DRINKING FOUNTAIN.

3/8" = 1'-0"



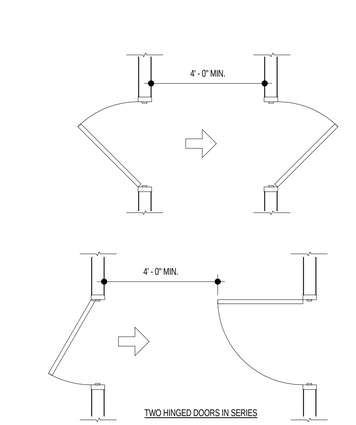
RAMP LANDING - CHANGE IN DIRECTION

GENERAL NOTES:

1. INFORMATION SHOWN ON THIS SHEET IS THE MINIMUM REQUIRED FOR ADA COMPLIANCE

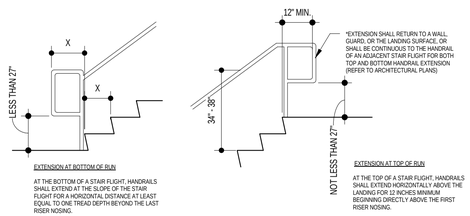
2. SOME CONDITIONS SHOWN ON THIS SHEET MAY NOT BE REQUIRED BY THIS PROJECT. COMPARE THE REQUIREMENTS OF THE ARCHITECTURAL DRAWINGS WITH THIS SHEET FOR RELEVANT INFORMATION.

3. IF ANY DISCREPANCIES ARE FOUND BETWEEN THE DRAWINGS, SPECIFICATIONS AND THE INFORMATION ON THIS SHEET, NOTIFY THE ARCHITECT IMMEDIATELY FOR CLARIFICATION.



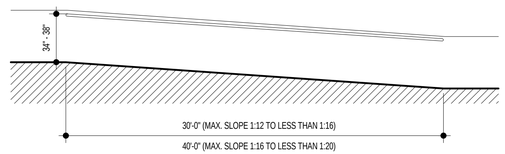
D1 DOOR CLEARANCES.

3/8" = 1'-0"

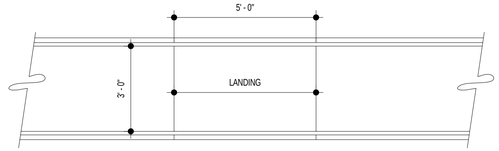


A1 SHOWER CLEARANCE

3/8" = 1'-0"



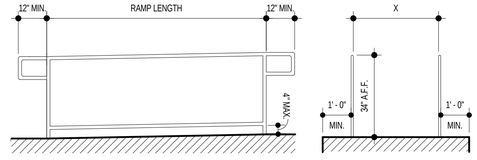
RAMP LONGITUDINAL SECTION



RAMP LANDING - STRAIGHT RUN

X = 36" MIN. IF RAMP IS < 30" IN LENGTH

X = 44" MIN. IF RAMP IS > 30" IN LENGTH



ELEVATION

SECTION

RAILING WITH EXTENDED PLATFORM

A11 RAMPS

3/8" = 1'-0"

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956.661.0400
www.eroarchitects.com

"NOT FOR CONSTRUCTION"

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE:

ACCESSIBILITY REQUIREMENTS

GI003

C:\Users\eslainas\Documents\12014-HC- PRECINCT 4 - JUNE 14 2012_eslainas.rvt

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ABBREVIATIONS

A	A/C.	AIR CONDITIONING
	A.W.P.	ACOUSTICAL WALL PANEL
	AB.	ANCHOR BOLT
	ABV.	ABOVE
	ACT.	ACOUSTICAL TILE
	A.D.	AREA DRAIN
	A.D.A.	AMERICANS WITH DISABILITIES ACT (1990)
	ADJ.	ADJUSTABLE
	A.F.F.	ABOVE FINISH FLOOR
	AGG.	AGGREGATE
	AHU.	AIR HANDLING UNIT
	AL.ST.	ALUMINUM STOREFRONT
	A.F.G.	ABOVE FINISH GRADE
	ALUM.	ALUMINUM
	ALT.	ALTERNATE
		ANGLE
	ANOD.	ANODIZED
	AP.	ACCESS PANEL
	APPROX.	APPROXIMATELY
	ARCH, ARCHL.	ARCHITECTURAL
	ASPH.	ASHALT
B	BD.	BOARD
	BLDG.	BUILDING
	BLK.	BLOCKING
	BM.	BEAM
	BOS.	BOTTUM OF STEEL
	B, BOTT.	BOTTOM
	BRZ.	BRONZE
	B.U.R.	BUILT-UP ROOF
C	C	CHANNEL
	CAB,CABT.	CABINET
	CFMF.	COLD FORMED METAL FRAMING
	CH.	COAT HOOK
	CHBO.	CHALK BOARD
	C.J.	CONTROL JOINT
	℄	CENTER LINE
	CLG.	CEILING
	CLR.	CLEAR
	C.M.U.	CONCRETE MASONARY UNIT
	COL.	COLUMN
	COMP.	COMPRESSIBLE
	CONC.	CONCRETE
	CONNX	CONNECTION
	CONST.	CONSTRUCTION
	CONT.	CONTINUOUS
	COND.	CONDITION
	CONT.	CONTINUOUS
	CORR.	CORRIDOR
	CPT.	CARPET
	CT.	CERAMIC TILE
	CTSK.	COUNTERSINK
	C.W.	COLD WATER
D	DBL.	DOUBLE
	DEF.	DEFORMED
	DIA.	DIAMETER
	DIM.	DIMENSION**S**
	DIV.	DIVISION
	DN.	DOWN
	D.P.	DAMPPROOFING
	DR.	DOOR
	DTL.	DETAIL
	D.S.	DOWNSPOUT
	DWG.	DRAWING
	DWLS.	DOWELS
	DWR.	DRAWER
E	EA.	EACH
	EGSB.	EXTERIOR GYPSUM SOFFIT BOARD
	EIFS.	EXTERIOR INSULATED FINISH SYSTEM
	EL.	ELEVATION (HEIGHT)
	ELEC., ELECT.	ELECTRICAL
	ELEV.	ELEVATION (DRAWING)
	E.J.	EXPANSION JOINT
	EQ.	EQUAL
	EQUIP.	EQUIPMENT
	ETC.	ET CETERA
	EW.	EACH WAY
	EXGR.	EXISTING GRADE
	EXH.	EXHAUST
	EXIST.	EXISTING
	EXP.	EXPANSION
	EXPD.	EXPOSED
	EXT.	EXTERIOR
	E.W.C.	ELECTRIC WATER COOLER
F	FA.	FIRE ALARM
	FB.	FACE BRICK
	FC.	FIRE CODE
	FD.	FLOOR DRAIN
	F.E.	FIRE EXTINGUISHER
	F.E.C.	FIRE EXTINGUISHER CAB.
	FF.	FINISH FLOOR
	FFE.	FINISH FLOOR ELEVATION
	FGD.	FINISH GRADE
	F.H.C.	FORE HOSE CAB
	FIN.	FINISH
	FIXT.	FIXTURE
	FLR.	FLOOR
	FLSHG.	FLASHING
	FLUOR.	FLUORESCENT
	FOC.	FACE OF CONCRETE
	FOM.	FACE OF MASONRY
	FOLD PART.	FOLDING PARTITION
	FR-WD	FIRE-RETARDANT TREATED WOOD
	FT.	FEET
	FUR.	FURRING
G	G.	GAS
	GA.	GAUGE
	GALV.	GALVANIZED
	G.B.	GRAB BAR
	G.C.	GENERAL CONTRACTOR
	GD.	GRADE
	GCMU.	GLAZED CONCRETE MASONARY UNIT(S)
	GEN.	GENERAL
	G.I.	GALVANIZED IRON
	GND.	GROUND
	GL.	GLASS
	GR.	GRADE
	GSFT.	GLAZED STRUCTURAL FACING TILE
	GTP.	GLASED TILE PAVER(S)
	GYP.	GYPSUM BOARD

H	HB.	HOSE BIB
	HC.	HANDICAPPED ACCESSIBLE
	HD.	HEAD, HEADED, HEAVY DUTY
	HDG.	HOT-DIPPED GALVANIZED
	HDWR	HARDWARE
	HEWC.	HANDICAP ELECTRIC WATER COLLER
	HGT.	HEIGHT
	HLB.	HORIZONTAL LOUVER BLINDS
	HORIZ.	HORIZONTAL
	HM.	HOLLOW METAL FRAME
	HR, HRS.	HOUR, HOURS
	H.W.	HOT WATER
I	I.D.	INSIDE DIAMETER
	IG.	INSULATING GLASS
	IN.	INCH, INCHES
	INC.	INCANDESCENT
	INCL.	INCLUDING
	INSUL.	INSULATION
	INT.	INTERIOR
J	JAN.	JANITOR
	JST.	JOIST
	JT.	JOINT
L	LAM.	LAMINATE
	LAV.	LAVATORY
	LB.	POUND
	LF.	LINEAR FOOT
	L.P.	LIGHTPOLE
	LT.	LIGHT
	LT. WT.	LIGHT WEIGHT
	LLH.	LONG LEG HORIZONTAL
	LLV.	LONG LEG VERTICAL
M	MAX.	MAXIMUM
	MB	MOP BASIN
	MANUF., MFR.	MANUFACTURER
	MAS.	MASONRY
	MATL	MATERIAL
	MAX.	MAXIMUM
	MB.	MARKER BOARD
	MECH.	MECHANICAL
	MEM. WP.	MEMBRANE WATERPROOFING
	MEP.	MECHANICAL, ELECTRICAL & PLUMBING
	MEZZ.	MEZZANINE
	MID.	MIDDLE
	MIR.	MIRROR
	M.H.	MANHOLE
	MIN.	MINIMUM
	MISC.	MISCELLENEOUS
	M.O.	MASONRY OPENING
	MOD.	MODULE
	MTL.	METAL
	MTP.	METAL TOILET PARTITIONS
	MULL	MULLION
N	N.A.	NOT APPLICABLE
	N.I.C.	NOT IN CONTRACT
	NO.	NUMBER
	N.T.S.	NOT TO SCALE
O	O.C.	ON CENTER
	O.C.D.	OVERHEAD COILING DOOR
	O.C.G.	OVERHEAD COILING GRILL
	O.D.	OUTSIDE DIAMETER/DIMENSION
	OFF.	OFFICE
	O.F.C.I.	OWNER FURNISHER, CONTRACTOR INSTALLED
	OH.	OVERHEAD
	OPNG.	OPENING
	OPP.	OPPOSITE
	ORD.	OVERFLOW ROOF DRAIN
	O.T.S.	OPEN TO STRUCTURE
P	PAR.	PARALLEL
	P.C.	PRECAST
	P.C.P.	PORTLAND CEMENT PLASTER
	PEN.	PENETRATION
	PG.	PLATE GLASS
	P.H.	PAPER HOLDER
	PL.	PLATE
	P.L.	PROPERTY LINE
	PLUMB.	PLUMBING
	PLWD	PLYWOOD
	PNTGR	PAINT GRADE
	POL.	POLISHED
	P.P.	POWER POLE
	PR.	PAIR
	PT.	PRESSURE TREATED
	PTD.	PAPER TOWEL DISPENSER
	PTN.	PARTITION
	PVMT	PAVEMENT
	P.W.B.	PREFINISHED WALL BOARD
Q	QA.	QUALITY ASSURANCE
	QT.	QUARRY TILE
R	R	RADIUS
	RAF.	RESILIENT ATHLETIC FLOORING\
	RBR	RUBBER
	RCP.	REINFORCED CONCRETE PIPE
	RD.	ROOF DRAIN
	RE.	REFERENCE
	RECP.	RECEPTACLE
	REINF.	REINFORCE
	REQ.,REQD	REQUIRED
	RES.	RESILIENT
	REV.	REVISED
	RO.	ROUGH OPENING
	RM.	ROOM
	RV.	ROOF VENT
S	SB	SPLASH BLOCK
	SC.	SEALED CONCRETE
	SCH.,SCHED.	SCHEDULE(D)
	SCFV.	SOLID CORE FLUSH VENEER
	SCPL.	SOLID CORE PLASTIC LAMINATE
	S.D.	SOAP DISPENSER
	SEC.	SECTION
	SF.	SQUARE FEET
	SG.	SLIDING GLASS DOOR
	SGFT.	STRUCTURAL GLAZED FACING TILE
	SGL.	SINGLE
	SHT.	SHEET
	SIM.	SIMILAR
	SJ.	SAWN CONTROL JOINT
	SPC	SPECIAL COATING SYSTEM
	SPEC., SPECS.	SPECIFICATIONS
	SQ.	SQUARE
	SS.	SOUND STRIP
	SS, ST. STL.	STAINLESS STEEL
	SR.	SHOWER ROD
	SS.	STAINLESS STEEL
	STD.	STANDARD
	STL.	STEEL
	STR., STRUCT.	STRUCTURAL
	SUSP.	SUSPENDED
	S.A.C.	SUSPENDED ACOUSTICAL CEILING
T	T.B.	TACKBOARD
	T.D.R.	TOWEL DISPENSER AND RECEPTACLE
	TECH.	TECHNICAL
	TEMP.	TEMPERATURE
	TEL.	TELEPHONE
	TERR.	TERRAZZO
	THK.	THICK
	TKS.	TACKSTRIP
	TLT.	TOILET
	T.O.	TOP OF
	T.O.B.	TOP OF WOOD BLOCKING
	T.O.C.	TOP OF CURB
	T.O.D.	TOP OF DRAIN
	T.O.M.	TOP OF MASONRY
	T.O.S.	TOP OF STEEL
	T.T.D.	TOILET TISSUE DISPENSER
	TYP.	TYPICAL
U	UBC.	UNIFORM BUILDING CODE
	UON.	UNLESS OTHERWISE NOTED
	U.N.O.	UNLESS NOTED OTHERWISE
	UR.	URINAL
	URS.	URINAL SCREEN
	UTIL.	UTILITY
V	V.	VENT
	V.C.T.	VINYL COMPOSITION TILE
	VEND.	VENDING
	VENT.	VENTILATING
	VER.	VERIFY
	VERT.	VERTICAL
	VEST.	VESTIBULE
	V.I.F.	VERIFY IN FIELD
	VTR.	VENT THROUGH ROOF
	VGE.	PREFINISHED VYNIL CLAD GYP. BD.
	VWC.	VINYL WALL COVERING
W	W	WATTS
	W/	WITH
	WB.	WIND BRACE
	W.C.	WATER CLOSET
	WD.	WOOD
	WDW.	WINDOW
	WH.	WATER HEATER
	WNDW.	WINDOW
	WO	WITHOUT
	W.P.	WATERPROOFING
	W.R.	WASTE RECEPTICLE
	W.S.	WEATHERSTRIP
	WT.	WEIGHT
	WWF	WELDED-WIRE FABRIC

DRAWING CONVENTIONS

PLAN NORTH

COLUMN REFERENCE. GRID (LETTER, NUMBER)

CENTER LINE

LEVEL MARKER

MATCH LINE

ELEVATION SYMBOL

SECTION SYMBOL

ROOM NAME AND NUMBER

DOOR DESIGNATION

WINDOW DESIGNATION

ONE HOUR FIRE RATING

PLAN OR DETAIL ENLARGED

DIMENSIONS

MATERIAL LEGEND

EARTH (UNDISTURBED)

EARTH (COMPACTED)

POROUS FILL (STONE OR GRAVEL, ETC.)

CAST - IN - PLACE CONCRETE

BRICK (COMMON OR FACE)

CONCRETE MASONRY UNIT (CMU)

CUT STONE

STEEL (LARGE SCALE)

RESILIENT FLOORING

ACOUSTICAL CEILING TILE

TERRAZZO

PLASTER, SAND, CEMENT, GROUT

GYPSUM BOARD

CLAY STRUCTURAL TILE

GLASS

RIGID INSULATION

GYPSUM SHEATING

BATT INSULATION

ROUGH WOOD (CONTINUOUS)

ROUGH WOOD (NON-CONTINUOUS)

PLYWOOD

FINISHED WOOD

BUILDING CODE SUMMARY
"ADMINISTRATION BUILDING"

BUILDING CODE

INTERNATIONAL BUILDING CODE, 2006 EDITION
INTERNATIONAL FIRE CODE, 2006 EDITION
INTERNATIONAL PLUMBING CODE, 2006 EDITION
INTERNATIONAL MECHANICAL CODE, 2006 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE, 2006 EDITION
NATIONAL ELECTRICAL CODE, 2008 EDITION

USE AND OCCUPANCY CLASSIFICATION

BUSINESS GROUP **B** (SECTION 304.1) "CIVIC ADMINISTRATION"

MIXED OCCUPANCY:	**NO**
OCCUPANCY SEPARATION:	**NO**
AREA SEPARATION:	**NO**
SPRINKLER SYSTEM PROVIDED:	**YES**

(PER SECTION 903.3.1.1 NFPA 13)

GENERAL BUILDING HEIGHTS AND AREAS

ALLOWABLE HEIGHT AND BUILDING AREAS
(TABLE 503, SECTION 504.2, SECTION 506.3 - 2006 IBC)

	ALLOWED:	ACTUAL:
BUILDING HEIGHT: (WITH INCREASE PER SECTION 504.2)	55'-0" 75'-0"	**26'-0"**
NUMBER OF STORIES: (WITH INCREASE PER SECTION 504.2)	4 **5**	**1**
BUILDING AREA PER STORY: (WITH INCREASE PER SECTION 506.3)	23,000 **35,100**	**11,700**

TYPES OF CONSTRUCTION

INFORMATION FROM CHAPTER 6 - TYPES OF CONSTRUCTION
CONSTRUCTION CLASSIFICATION: **TYPE II B**
(SECTION 602.2 AND TABLE 601)

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	RATING REQUIRED	RATING PROVIDED
STRUCTURAL FRAME	0	**0**
BEARING WALLS EXTERIOR INTERIOR	0 0	**0** **0**
NONBEARING WALLS EXTERIOR INTERIOR	0 0	**0** **0**
FLOOR CONSTRUCTION	0	**0**
ROOF CONSTRUCTION	0	**0**

MEANS OF EGRESS

INFORMATION FROM CHAPTER 10 - MEANS OF EGRESS
OCCUPANT LOAD:
(PER TABLE 1004.1.1)

TOTAL OCCUPANT LOAD: **274**

EGRESS WIDTH PER OCCUPANT LOAD SERVED:
(PER TABLE 1005.1)

	REQUIRED	PROVIDED
EXIT DOORS 274 X 0.15	41.1"	**165"**

NUMBER OF EXITS AND CONTINUITY
(PER TABLE 1019.1)

OCCUPANT LOAD	MINIMUM NUMBER OF EXITS REQUIRED	PROVIDED
FLOOR AREA LOAD 274	2	**3**

EXIT ACCESS TRAVEL DISTANCE
ALLOWED: (TABLE 1016.1) 300'

ACTUAL : **120'**

LIFE SAFETY SYSTEM REQUIREMENTS

EMERGENCY LIGHTING:	**YES**
EXIT SIGNS:	**YES**
FIRE ALARM:	**YES**
SPRINKLER SYSTEMS:	**YES**
PANIC HARDWARE:	**YES**
FIRE EXTINGUSHERS:	**YES**

NOTES:

1. PER TABLE 1017.1 OF THE 2006 INTERNATIONAL BUILDING CODE THE CORRIDORS ARE NOT REQUIRED TO BE RATED IF THE BUILDING IS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM.
2. PER TABLE 1015.1 OF THE 2006 INTERNATIONAL BUILDING CODE THE MAXIMUM OCCUPANT LOAD FOR SPACES WITH ONE MEANS OF EGRESS FOR THIS PROJECTS OCCUPANCY IS 49.
3. ALL INTERIOR FINISHES FOR THIS PROJECT MUST COMPLY WITH 2006 IBC-CHAPTER 8 INTERIOR FINISHES.
4. PORTABLE FIRE EXTINGUSHERS SHALL BE PROVIDED AS REQUIRDED BY THE INTERNATIONAL FIRE CODE
5. REFER TO SHEET AE101 FOR THE LOCATION OF THE ANNUNCIATOR PANEL
6. FIRE DEPARTMENT COMMUNICATION SYSTEM SHALL COMPLY WITH 2006 IBC - SECTION 907.2.12.3.

BUILDING CODE SUMMARY
"MAINTENANCE BUILDING"

BUILDING CODE

INTERNATIONAL BUILDING CODE, 2006 EDITION
INTERNATIONAL FIRE CODE, 2006 EDITION
INTERNATIONAL PLUMBING CODE, 2006 EDITION
INTERNATIONAL MECHANICAL CODE, 2006 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE, 2006 EDITION
NATIONAL ELECTRICAL CODE, 2008 EDITION

USE AND OCCUPANCY CLASSIFICATION

BUSINESS GROUP **F-1** (SECTION 306.2) "MODERATE - HAZARD"

MIXED OCCUPANCY:	**NO**
OCCUPANCY SEPARATION:	**NO**
AREA SEPARATION:	**NO**
SPRINKLER SYSTEM PROVIDED:	**NO**

GENERAL BUILDING HEIGHTS AND AREAS

ALLOWABLE HEIGHT AND BUILDING AREAS
(TABLE 503, SECTION 504.2, SECTION 506.3 - 2006 IBC)

	ALLOWED:	ACTUAL:
BUILDING HEIGHT:	55'-0"	**21'-2"**
NUMBER OF STORIES:	2	**1**
BUILDING AREA PER STORY:	15,500	**5,164**

TYPES OF CONSTRUCTION

INFORMATION FROM CHAPTER 6 - TYPES OF CONSTRUCTION
CONSTRUCTION CLASSIFICATION: **TYPE II B**
(SECTION 602.2 AND TABLE 601)

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	RATING REQUIRED	RATING PROVIDED
STRUCTURAL FRAME	0	**0**
BEARING WALLS EXTERIOR INTERIOR	0 0	**0** **0**
NONBEARING WALLS EXTERIOR INTERIOR	0 0	**0** **0**
FLOOR CONSTRUCTION	0	**0**
ROOF CONSTRUCTION	0	**0**

MEANS OF EGRESS

INFORMATION FROM CHAPTER 10 - MEANS OF EGRESS
OCCUPANT LOAD:
(PER TABLE 1004.1.1)

TOTAL OCCUPANT LOAD: **38**

EGRESS WIDTH PER OCCUPANT LOAD SERVED:
(PER TABLE 1005.1)

	REQUIRED	PROVIDED
EXIT DOORS 38 X 0.2	7.6"	**66"**

NUMBER OF EXITS AND CONTINUITY
(PER TABLE 1019.1)

OCCUPANT LOAD	MINIMUM NUMBER OF EXITS REQUIRED	PROVIDED
FLOOR AREA LOAD 38	2	**2**

EXIT ACCESS TRAVEL DISTANCE
ALLOWED: (TABLE 1016.1) 200'

ACTUAL : **87'**

LIFE SAFETY SYSTEM REQUIREMENTS

EMERGENCY LIGHTING:	**YES**
EXIT SIGNS:	**YES**
FIRE ALARM:	**YES**
SPRINKLER SYSTEMS:	**NO**
PANIC HARDWARE:	**YES**
FIRE EXTINGUSHERS:	**YES**

NOTES:

1. PER TABLE 1015.1 OF THE 2006 INTERNATIONAL BUILDING CODE THE MAXIMUM OCCUPANT LOAD FOR SPACES WITH ONE MEANS OF EGRESS FOR THIS PROJECTS OCCUPANCY IS 49.
2. ALL INTERIOR FINISHES FOR THIS PROJECT MUST COMPLY WITH 2006 IBC-CHAPTER 8 INTERIOR FINISHES.
3. PORTABLE FIRE EXTINGUSHERS SHALL BE PROVIDED AS REQUIRDED BY THE INTERNATIONAL FIRE CODE
4. REFER TO SHEET AE101 FOR THE LOCATION OF THE ANNUNCIATOR PANEL
5. FIRE DEPARTMENT COMMUNICATION SYSTEM SHALL COMPLY WITH 2006 IBC - SECTION 907.2.12.3.

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: Author
CHECKED BY: Checker

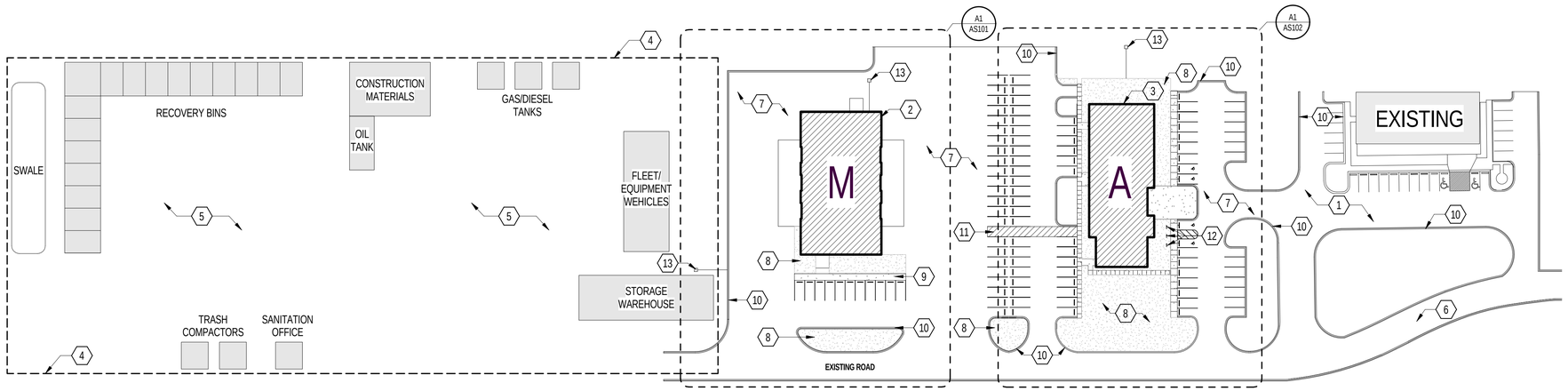
SHEET TITLE:

CODE ANALYSIS AND PROJECT INFORMATION

GI004

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A1 OVERALL SITE PLAN
1" = 60'-0"

CONSTRUCTION GENERAL NOTES

1. THE GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL BECOME FAMILIAR WITH THE SCOPE OF WORK, PROJECT ON-SITE/OFF-SITE CONDITIONS AND FIELD VERIFY PRIOR TO BIDDING. ANY UNCLEAR ITEMS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING PRIOR TO SUBMITTAL PROPOSAL.

2. THE GENERAL CONTRACTOR SHALL NOT DISTURB AREAS OUTSIDE THE PROJECT LIMITS.

3. THE GENERAL CONTRACTOR IS TO COMPLY WITH FEDERAL, STATE AND LOCAL CODE REQUIREMENTS. ADDITIONALLY, THE CONTRACTOR IS TO COMPLETE TEXAS HEALTH DEPARTMENT NOTIFICATIONS AND SUBMIT FORMS AND REQUIRED INFORMATION TO MEET "TEXAS COMMISSION OF ENVIRONMENTAL QUALITY" (TECQ) REQUIREMENTS PRIOR TO START OF PROJECT.

4. SHOULD THE CONTRACTOR SUSPECT THAT HAZARDOUS MATERIALS ARE PRESENT, IMMEDIATELY NOTIFY OWNER TO ARRANGE FOR PROPER REMOVAL OF ANY AND ALL HAZARDOUS MATERIALS.

5. THE GENERAL CONTRACTOR SHALL REMOVE DELETERIOUS MATERIALS AND DEBRIS FROM PROJECT SITE ON A DAILY BASIS, AND DISPOSE OF ITEMS ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL CODE REQUIREMENTS.

6. THE GENERAL CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OVERHEAD AND UNDERGROUND UTILITIES BEFORE BEGINNING WORK.

7. MARK FOR STAKE LOCATIONS OF FENCING, SITE WALLS, SITE FURNITURE, ETC. FOR APPROVAL BY ARCHITECT, PER SPECIFICATIONS, PRIOR TO INSTALLATION.

8. REFER TO CIVIL DRAWINGS FOR GRADING, UTILITY AND ADDITIONAL LAYOUT INFORMATION.

9. REFER TO M.E.P. DRAWINGS FOR ADDITIONAL NOTES AND INSTRUCTIONS.

10. COORDINATE ROOF PENETRATIONS WITH M.E.P. PENETRATIONS SHALL BE FLASHED TO MEET "SMACNA" DETAIL REQUIREMENTS.

11. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS AND INFORMATION.

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13. DO NOT SCALE DRAWINGS. IF DIMENSIONS ARE IN QUESTION, OBTAIN CLARIFICATION FROM THE ARCHITECT BEFORE CONTINUNING THE WORK.

14. SITE PLAN(S) DIMENSIONS ARE SHOWN FROM FACE OF BUILDING FAÇADE, BACK OF CURB, OR COORDINATE POINT UNLESS OTHERWISE NOTED.

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19. EXAMINE SPECIFIED PRODUCTS AND SUBMIT WRITTEN EXCEPTIONS, OBJECTIONS, OR SUBSTITUTIONS WITH ANALYSIS AND RECOMMENDATIONS PRIOR TO SUBMITTING BID COST AND/OR COMMENCING WORK.

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22. THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY TO USE.

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SHEET KEYNOTES

1. REFER TO CONSTRUCTION GENERAL NOTES FOR ADDITIONAL INFORMATION

2. OUTLINE OF MAINTENANCE BUILDING

3. OUTLINE OF ADMINISTRATION BUILDING

4. OUTLINE OF PROPOSED STAGING AREA

5. EQUIPMENT LAYOUT PROVIDED BY OWNER. CONTRACTOR TO COORDINATE FINAL LOCATION.

6. EXISTING ROAD. REFER TO CIVIL.

7. APSHALT PAVING N.I.C. REFER TO CIVIL.

8. LANDSCAPE N.I.C. OWNER PROVIDED, CONSTRACTOR INSTALLED.

9. CONCRETE SIDEWALK N.I.C. REFER TO CIVIL.

10. CONCRETE CURB N.I.C. REFER TO CIVIL.

11. SIDEWALK RAMP N.I.C. REFER TO CIVIL.

12. FLAG POLES

13. (2) 4" CONDUITS AND PULL BOX, REFER TO MEP. OWNER PROVIDED AND INSTALLED. COORDINATE FINAL LOCATION WITH OWNER.

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Architect: 18160

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CHECKED BY: YIPG

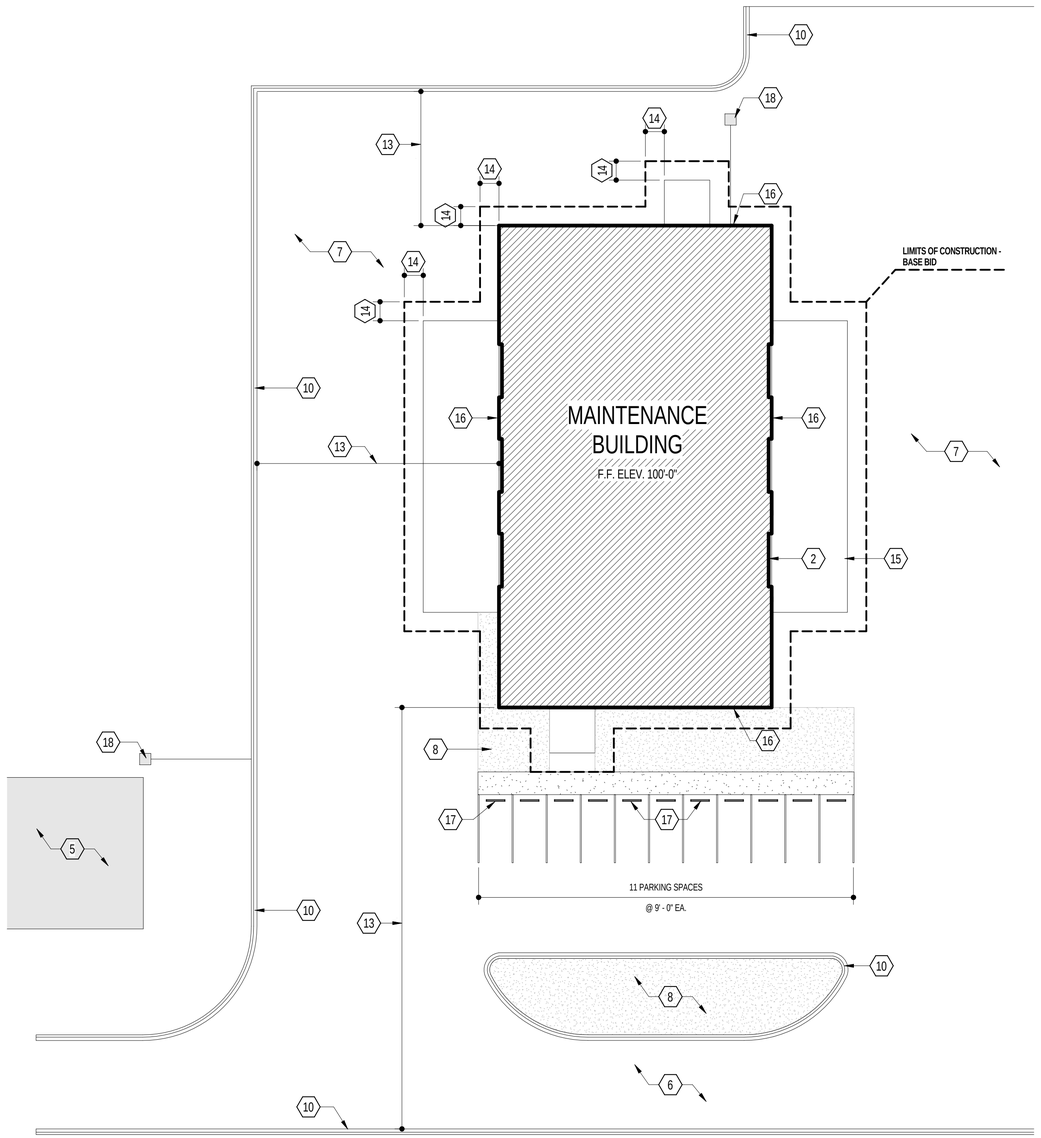
SHEET TITLE:

COMPOSITE SITE PLAN

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A1 PARTIAL SITE PLAN - MAINTENANCE BLDG.

1" = 20'-0"

N

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11. SIDEWALK RAMP N.I.C. REFER TO CIVIL.
12. FLAG POLES
13. FOR ACTUAL BUILDING'S LOCATION REFER TO CIVIL.
14. LIMITS OF CONSTRUCTION 5' - 0" OFF BUILDING'S FOUNDATION.
15. BUILDING'S FOUNDATION PAD, REFER TO STRUCTURAL.
16. EXTERIOR LIGTHING, REFER TO MEP.
17. CONCRETE WHEEL STOP, REFER TO CIVIL.
18. (2) 4" CONDUITS AND PULL BOX, REFER TO MEP. OWNER PROVIDED AND INSTALLED. COORDINATE FINAL LOCATION WITH OWNER.

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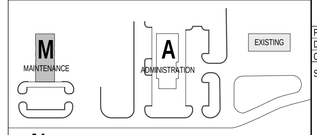
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N
PLAN NORTH

KEY PLAN

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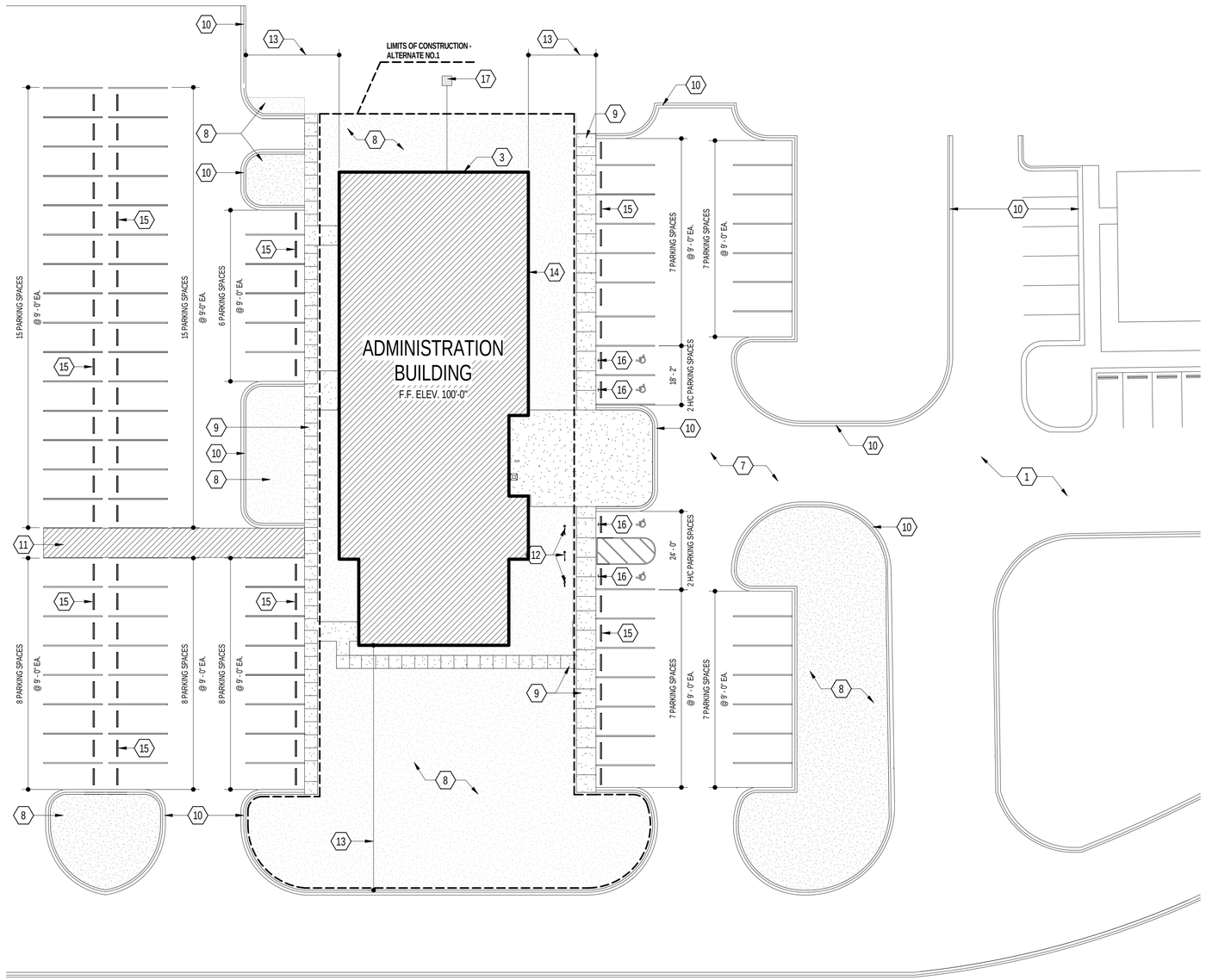
No.	Description	Date

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: PARTIAL SITE PLAN - MAINTENANCE

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A1 PARTIAL SITE PLAN - ADMINISTRATION BLDG.
1" = 20'-0"

N

SHEET KEYNOTES

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16. H.C. SIGN, REFER TO CIVIL.
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M MAINTENANCE
A ADMINISTRATION
EXISTING

N PLAN NORTH

KEY PLAN

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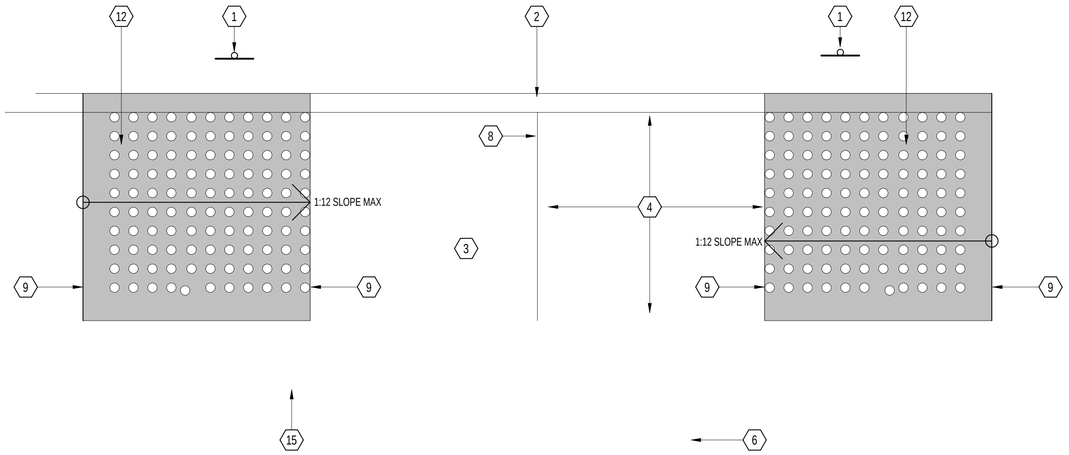
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SHEET TITLE: PARTIAL SITE PLAN - ADMINISTRATION

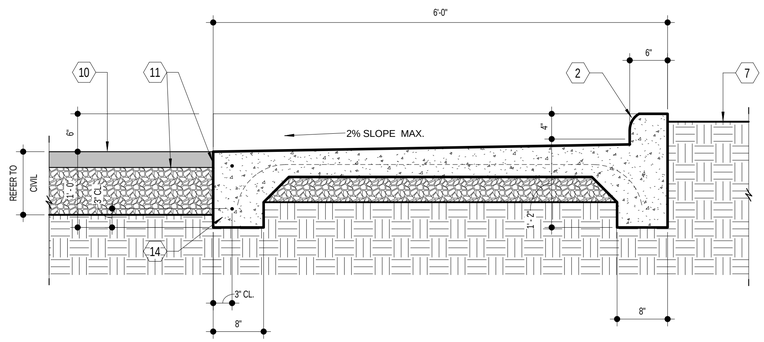
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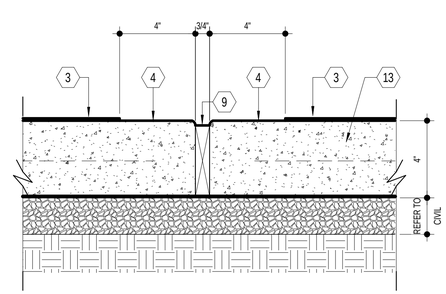
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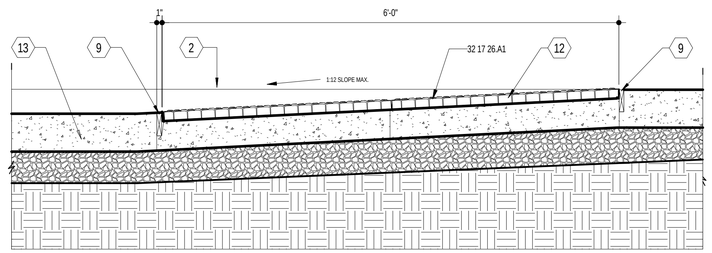
H1 ENLARGED H.C. RAMP PLAN
1/2" = 1'-0"



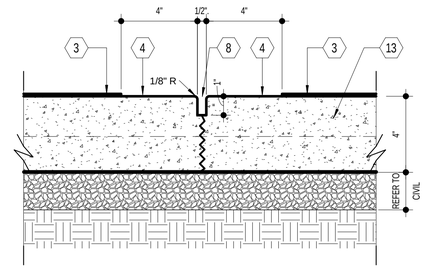
D1 TYPICAL SIDEWALK SECTION
1" = 1'-0"



D7 TYPICAL SECTION AT SIDEWALK EXPANSION JOINT
3" = 1'-0"



A1 TYPICAL SIDEWALK RAMP SECTION
1" = 1'-0"



A7 TYPICAL SECTION AT SIDEWALK CONTROL JOINTS
3" = 1'-0"

SHEET KEYNOTES

1. CENTER H.C. SIGNAGE ON PARKING SPACE BELOW. REFER TO CIVIL DWG'S
2. FORMED CONCRETE CURB (6"). REFER TO CIVIL DWG'S
3. BROOM FINISH
4. TOOLED EDGE
5. CONCRETE WHEELSTOP. REFER TO CIVIL DWG'S
6. STRIPING FOR PARKING. REFER TO CIVIL DWG'S
7. REFER TO CIVIL DWG'S FOR GRADING CONTOURS
8. TOOLED CONTROL JOINT (TYP.)
9. 1" x 4" REDWOOD EXPANSION JOINT (TYP. AT ALL 4" THICK CONCRETE SLABS AND WALKS)
10. REFER TO CIVIL DWG'S FOR PAVING SECTION
11. APPLY TACK COAT AS REQUIRED. REFER TO CIVIL SPECS.
12. DETACTABLE WARNING SURFACES
13. 4" THICK CONCRETE SLAB REINF. WITH 6 x 6 - W2.9 x W2.9W.W.F ON 2" MIN. SAND BASE TO 95% STANDARD PROCTOR
14. 3'-0" WIDE x 1'-0" DEEP CONCRETE SPREAD FOOTING REINFORCED WITH 4 - #5 CONT. & #4 AT 12" O.C. TRANS.
15. CONCRETE WHEELSTOP. REFER TO CIVIL DWG'S

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

No.	Date	Description

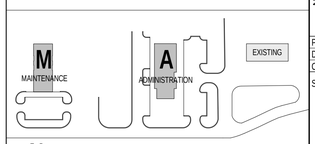
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

PROJECT NO.:	12014
DRAWN BY:	Author
CHECKED BY:	YIPG

SHEET TITLE: ENLARGED RAMP PLAN AND SECTIONS

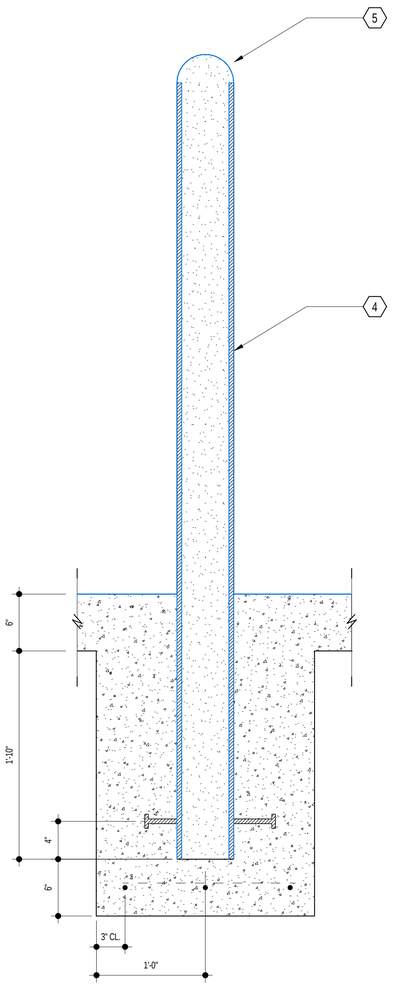


KEY PLAN

AS501

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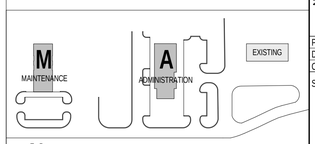
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A1 BOLLARD SECTION
1 1/2" = 1'-0"

SHEET KEYNOTES

1. OUTLINE OF CONCRETE WALK.
2. IN GROUND LIGHT FIXTYRE. REFER TO ELECTRICAL DRAWINGS FOR TYPE AND LOCATION.
3. OUTLINR OF BUINHILG
4. 6" O.D SCHEDULE 80 STEEL PIPE BOLLARDS FILLED WITH 3000# PEA GRAVEL CONCRETE. WELD 1/2" ROUND X 6" LONG STUD BOLT TO PIPE EACH SIDE.
5. FORMED CONCRETE DOME ATOP BOLLARD



N
PLAN NORTH

KEY PLAN

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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

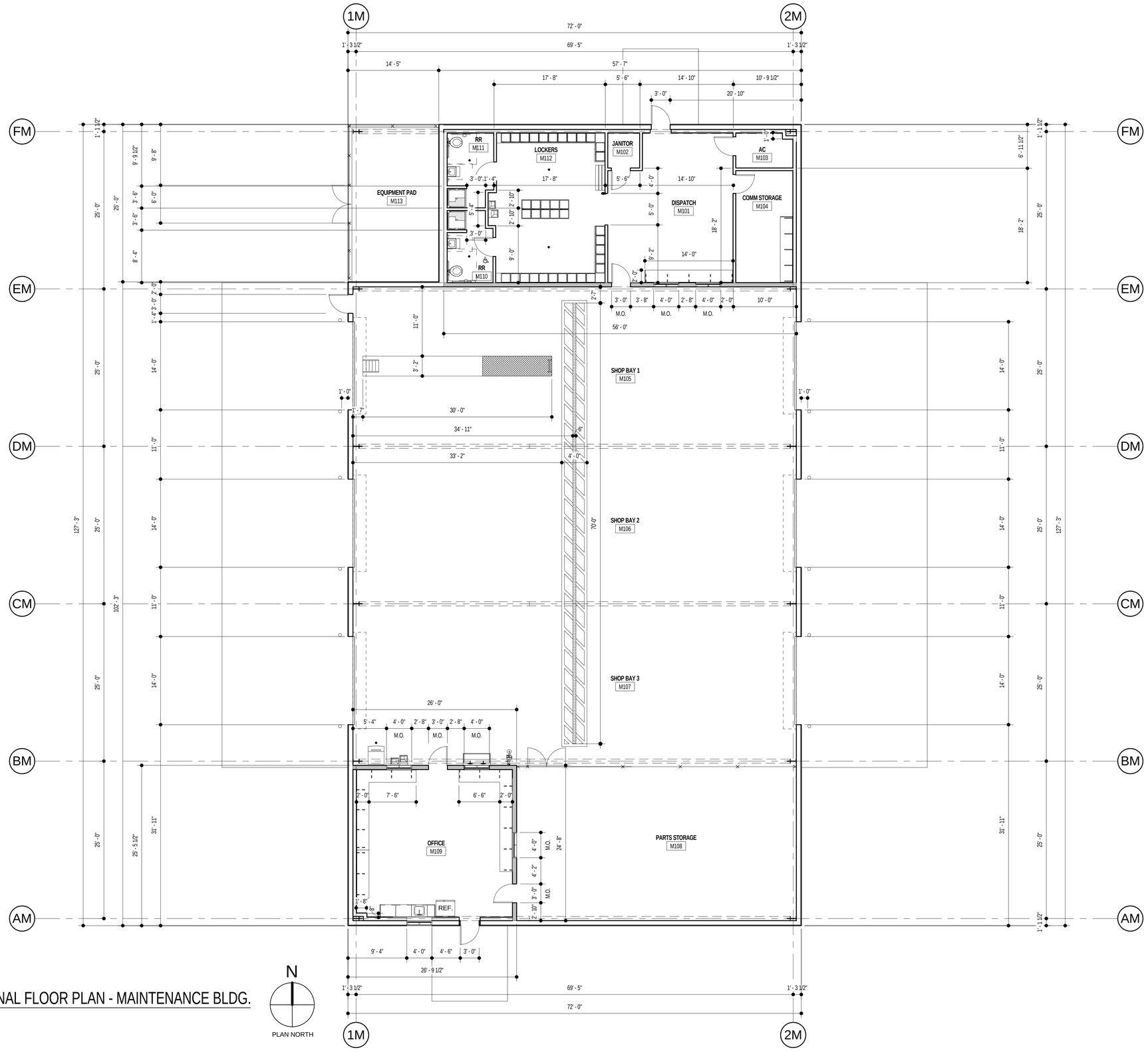
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DRAWN BY: Author
CHECKED BY: YIPG

SHEET TITLE: SITE DETAILS

AS502

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A1 DIMENSIONAL FLOOR PLAN - MAINTENANCE BLDG.
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES

1. REFER TO "CONSTRUCTION GENERAL NOTES" FOR ADDITIONAL REQUIREMENTS.

2. FLOOR PLAN(S) DIMENSIONS ARE TO THE CENTER LINE OF COLUMNS, FACE OF CONCRETE OR MASONARY WALLS AND FACE OF METAL STUDS, UNLESS NOTED OTHERWISE.

3. REFER TO SHEETS GI002, GI003 AND GI004 FOR ACCESSIBILITY REQUIREMENTS AND PROJECT INFORMATION.

4. REFER TO AE312 AND AE313 FOR WALL TYPES.

5. REFER TO AF601 FOR GENERAL ROOM FINISHES.

6. PROVIDE BLOCKING AS REQUIRED FOR PROPER SUPPORT OF WALL AND CEILING MOUNTED EQUIPMENT.

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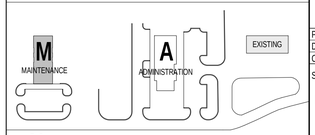
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: DIMENSIONAL FLOOR PLAN - MAINTENANCE

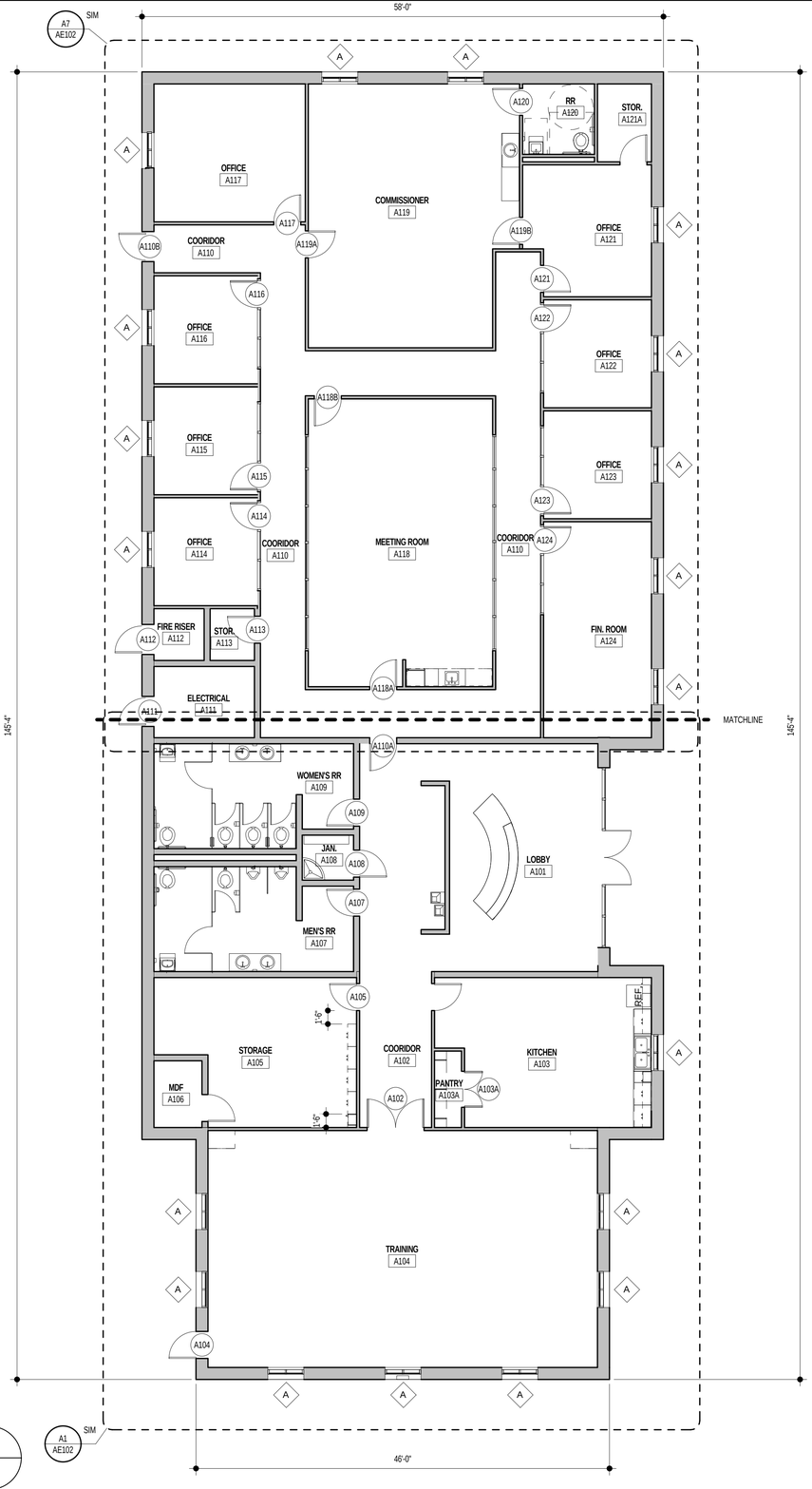


KEY PLAN

AE100

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A1 COMPOSITE FLOOR PLAN - ADMINISTRATION BLDG.
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES

1. REFER TO "CONSTRUCTION GENERAL NOTES" FOR ADDITIONAL REQUIREMENTS.

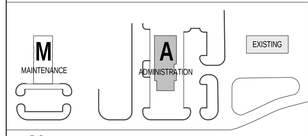
2. FLOOR PLAN(S) DIMENSIONS ARE TO THE CENTER LINE OF COLUMNS, FACE OF CONCRETE OR MASONARY WALLS AND FACE OF METAL STUDS, UNLESS NOTED OTHERWISE.

3. REFER TO SHEETS GI002, GI003 AND GI004 FOR ACCESSIBILITY REQUIREMENTS AND PROJECT INFORMATION.

4. REFER TO AE312 AND AE313 FOR WALL TYPES.

5. REFER TO AF601 FOR GENERAL ROOM FINISHES.

6. PROVIDE BLOCKING AS REQUIRED FOR PROPER SUPPORT OF WALL AND CEILING MOUNTED EQUIPMENT.



KEY PLAN

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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

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No.	Date	Description

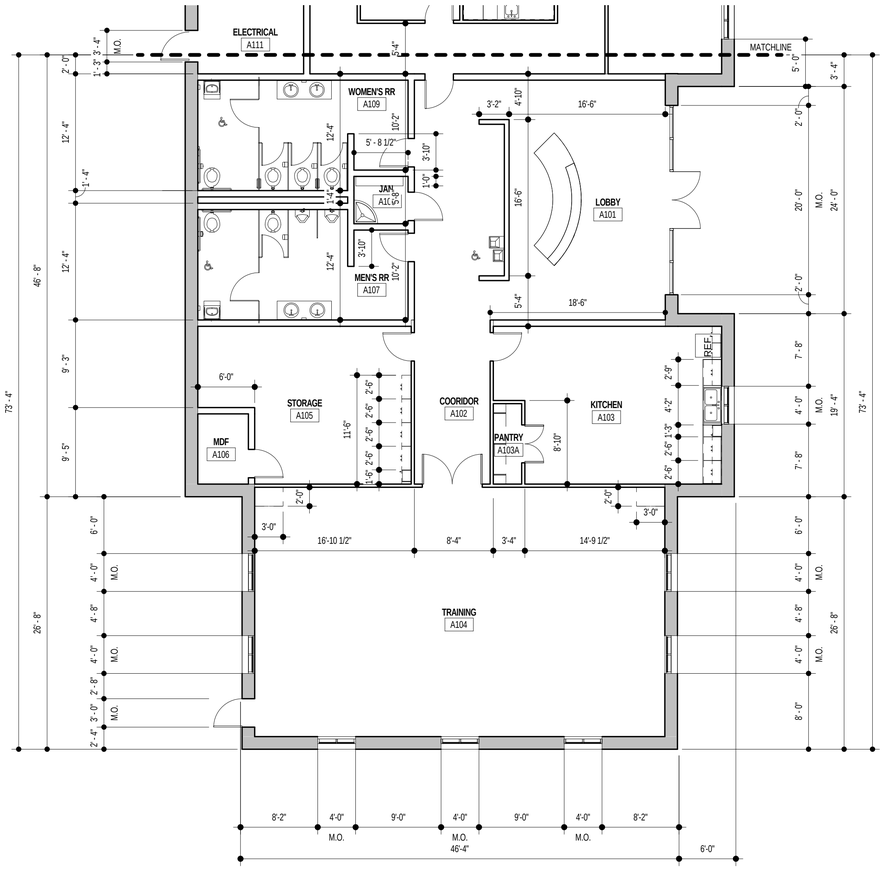
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DRAWN BY: E.S.
CHECKED BY: YIPG

SHEET TITLE: DIMENSIONAL COMPOSITE FLOOR PLAN - ADMINISTRATION

AE101

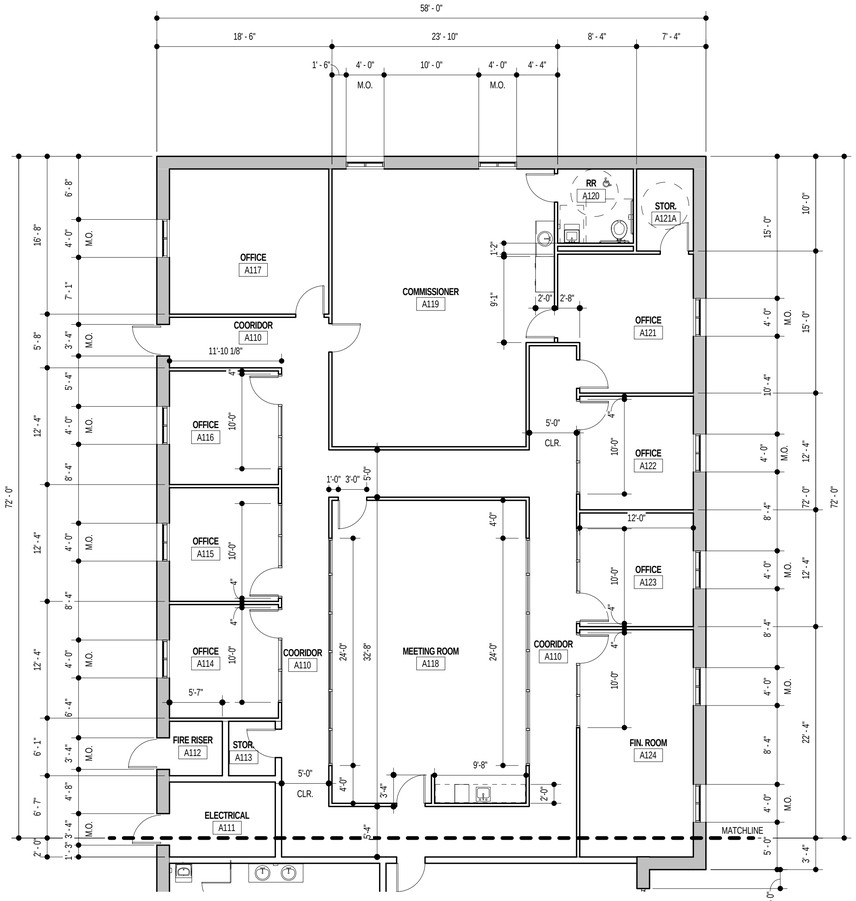
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A1 PARTIAL DIMENSIONAL FLOOR PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

N
PLAN NORTH



A7 PARTIAL DIMENSIONAL FLOOR PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES

1. REFER TO "CONSTRUCTION GENERAL NOTES" FOR ADDITIONAL REQUIREMENTS.

2. FLOOR PLAN(S) DIMENSIONS ARE TO THE CENTER LINE OF COLUMNS, FACE OF CONCRETE OR MASONARY WALLS AND FACE OF METAL STUDS, UNLESS NOTED OTHERWISE.

3. REFER TO SHEETS GI002, GI003 AND GI004 FOR ACCESSIBILITY REQUIREMENTS AND PROJECT INFORMATION.

4. REFER TO AE312 AND AE313 FOR WALL TYPES.

5. REFER TO AF601 FOR GENERAL ROOM FINISHES.

6. PROVIDE BLOCKING AS REQUIRED FOR PROPER SUPPORT OF WALL AND CEILING MOUNTED EQUIPMENT.

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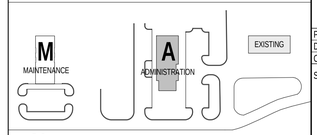
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: CS
CHECKED BY: YIPG

SHEET TITLE: DIMENSIONAL FLOOR PLAN - ADMINISTRATION

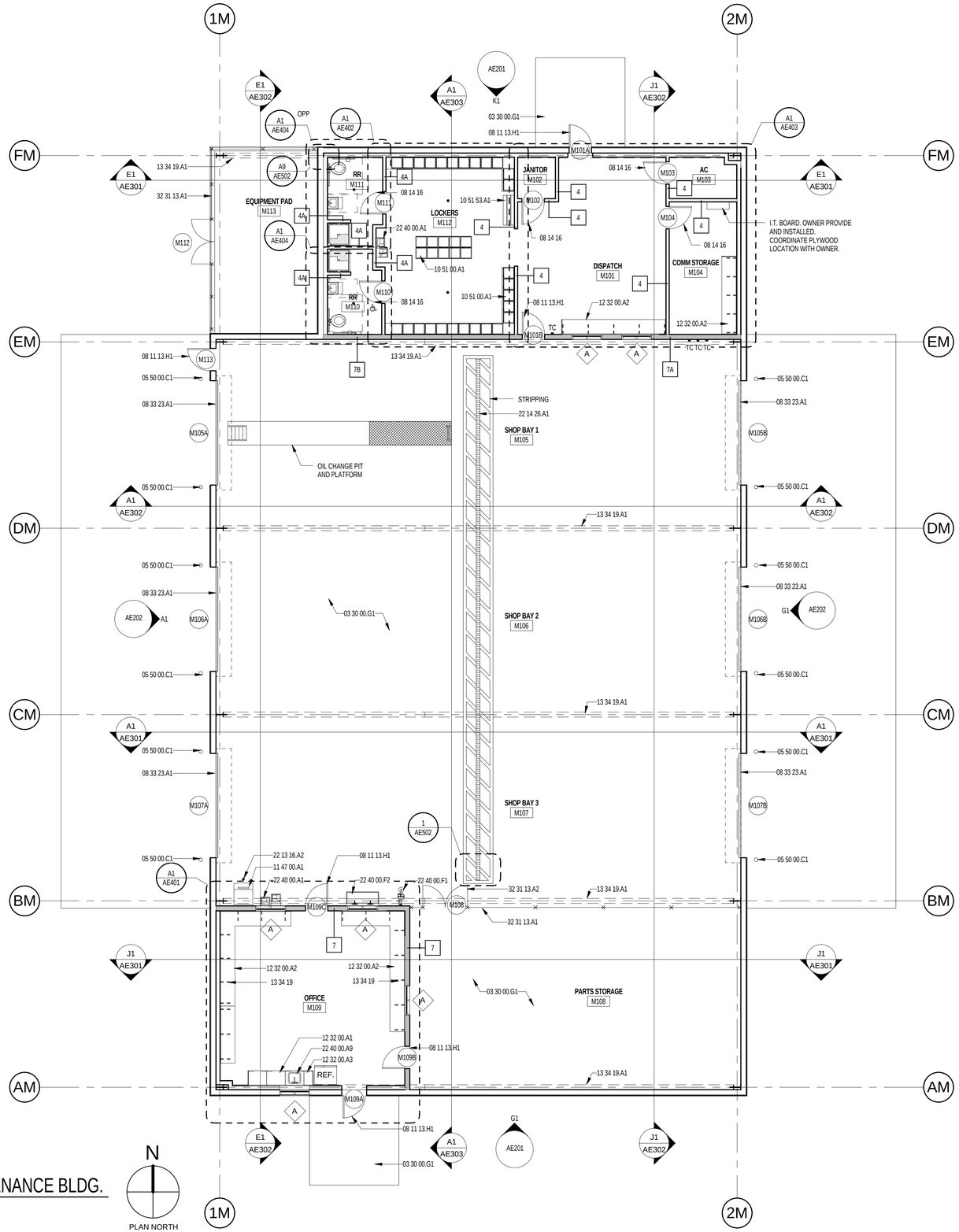


KEY PLAN

AE102

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FLOOR PLAN GENERAL NOTES

1. REFER TO "CONSTRUCTION GENERAL NOTES" FOR ADDITIONAL REQUIREMENTS.

2. FLOOR PLAN(S) DIMENSIONS ARE TO THE CENTER LINE OF COLUMNS, FACE OF CONCRETE OR MASONARY WALLS AND FACE OF METAL STUDS, UNLESS NOTED OTHERWISE.

3. REFER TO SHEETS GI002, GI003 AND GI004 FOR ACCESSIBILITY REQUIREMENTS AND PROJECT INFORMATION.

4. REFER TO AE312 AND AE313 FOR WALL TYPES.

5. REFER TO AF601 FOR GENERAL ROOM FINISHES.

6. PROVIDE BLOCKING AS REQUIRED FOR PROPER SUPPORT OF WALL AND CEILING MOUNTED EQUIPMENT.

KEYNOTE LEGEND

03 30 00.G1	CAST-IN-PLACE FOUNDATION. REFER TO STRUCTURAL
05 50 00.C1	GUARD POST BOLLARDS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 14 16	FLUSH WOOD DOORS
08 33 23.A1	14' X 14' OVERHEAD COILING DOOR
10 51 00.A1	METAL LOCKERS
10 51 53.A1	LOCKER ROOM BENCH
11 47 00.A1	ICE MACHINE
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
12 32 00.A3	COUNTERTOP
13 34 19	METAL BUILDING SYSTEMS
13 34 19.A1	PRE-ENGINEERED METAL STRUCTURE. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
22 13 16.A2	FLOOR DRAIN
22 14 26.A1	TRENCH DRAIN
22 40 00.A1	DRINKING FOUNTAIN
22 40 00.A9	UTILITY SINK
22 40 00.F1	EMERGENCY WASH STATION
22 40 00.F2	SCRUB SINK
32 31 13.A1	CHAIN LINK FENCE
32 31 13.A2	CHAIN LINK GATE

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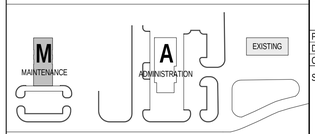
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: ARCHITECTURAL FLOOR PLAN - MAINTENANCE



KEY PLAN

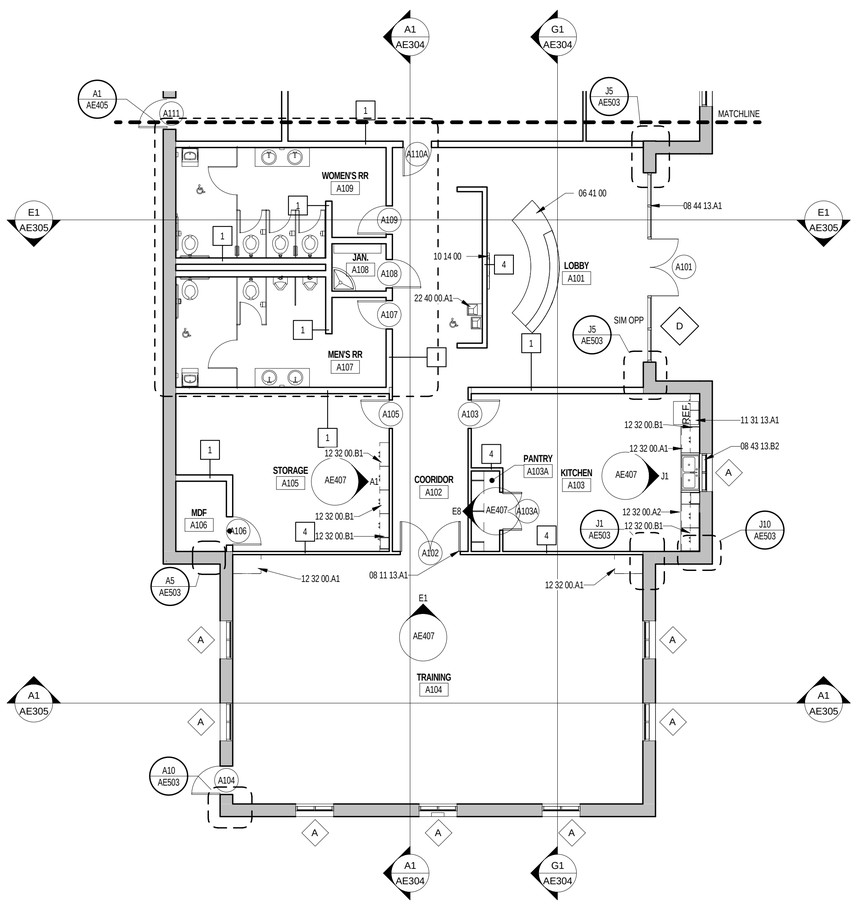
A1 ARCHITECTURAL FLOOR PLAN - MAINTENANCE BLDG.
1/8" = 1'-0"

N
PLAN NORTH

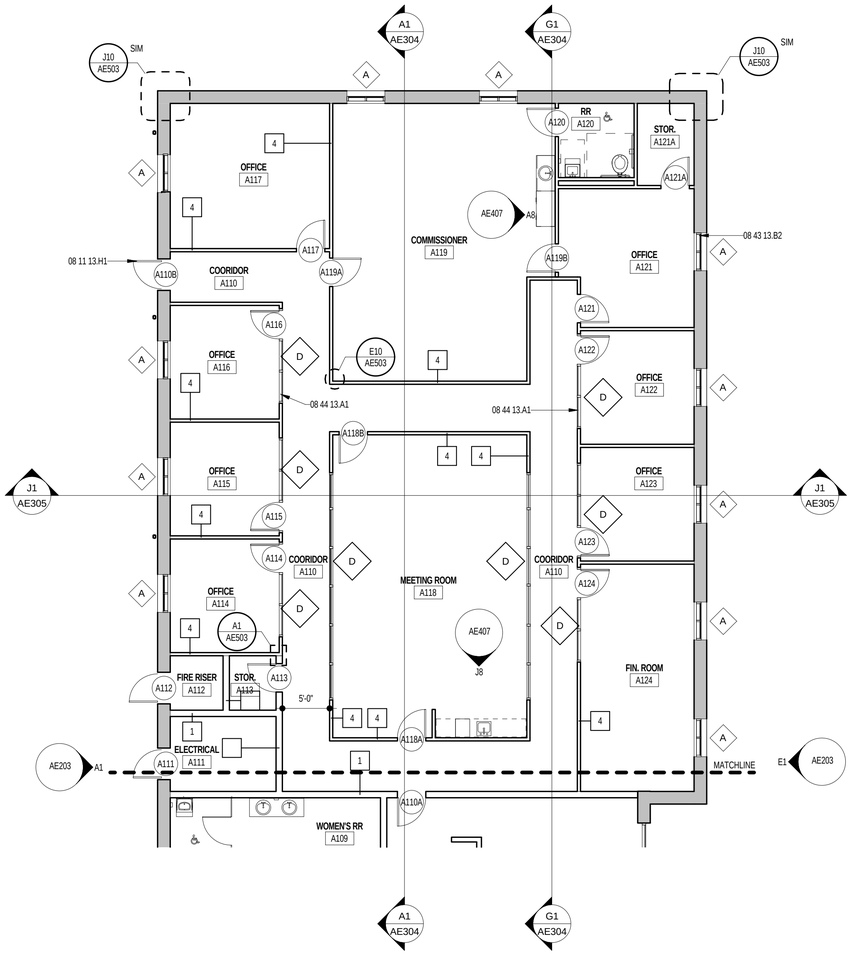
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A1 ARCHITECTURAL FLOOR PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"



A7 ARCHITECTURAL FLOOR PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

N
PLAN NORTH

FLOOR PLAN GENERAL NOTES

1. REFER TO "CONSTRUCTION GENERAL NOTES" FOR ADDITIONAL REQUIREMENTS.

2. FLOOR PLAN(S) DIMENSIONS ARE TO THE CENTER LINE OF COLUMNS, FACE OF CONCRETE OR MASONARY WALLS AND FACE OF METAL STUDS, UNLESS NOTED OTHERWISE.

3. REFER TO SHEETS GI002, GI003 AND GI004 FOR ACCESSIBILITY REQUIREMENTS AND PROJECT INFORMATION.

4. REFER TO AE312 AND AE313 FOR WALL TYPES.

5. REFER TO AF601 FOR GENERAL ROOM FINISHES.

6. PROVIDE BLOCKING AS REQUIRED FOR PROPER SUPPORT OF WALL AND CEILING MOUNTED EQUIPMENT.

KEYNOTE LEGEND

06 41 00	ARCHITECTURAL MILLWORK
08 11 13.A1	HOLLOW METAL DOOR FRAME
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
08 44 13.A1	CURTAIN WALL
10 14 00	SIGNAGE
11 31 13.A1	REFRIGERATOR. NOT IN CONTRACT
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
12 32 00.B1	WALL CABINET
22 40 00.A1	DRINKING FOUNTAIN

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Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

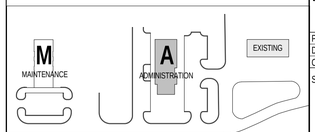
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: E.S.
CHECKED BY: Checker

SHEET TITLE: ARCHITECTURAL FLOOR PLAN - ADMINISTRATION BLDG

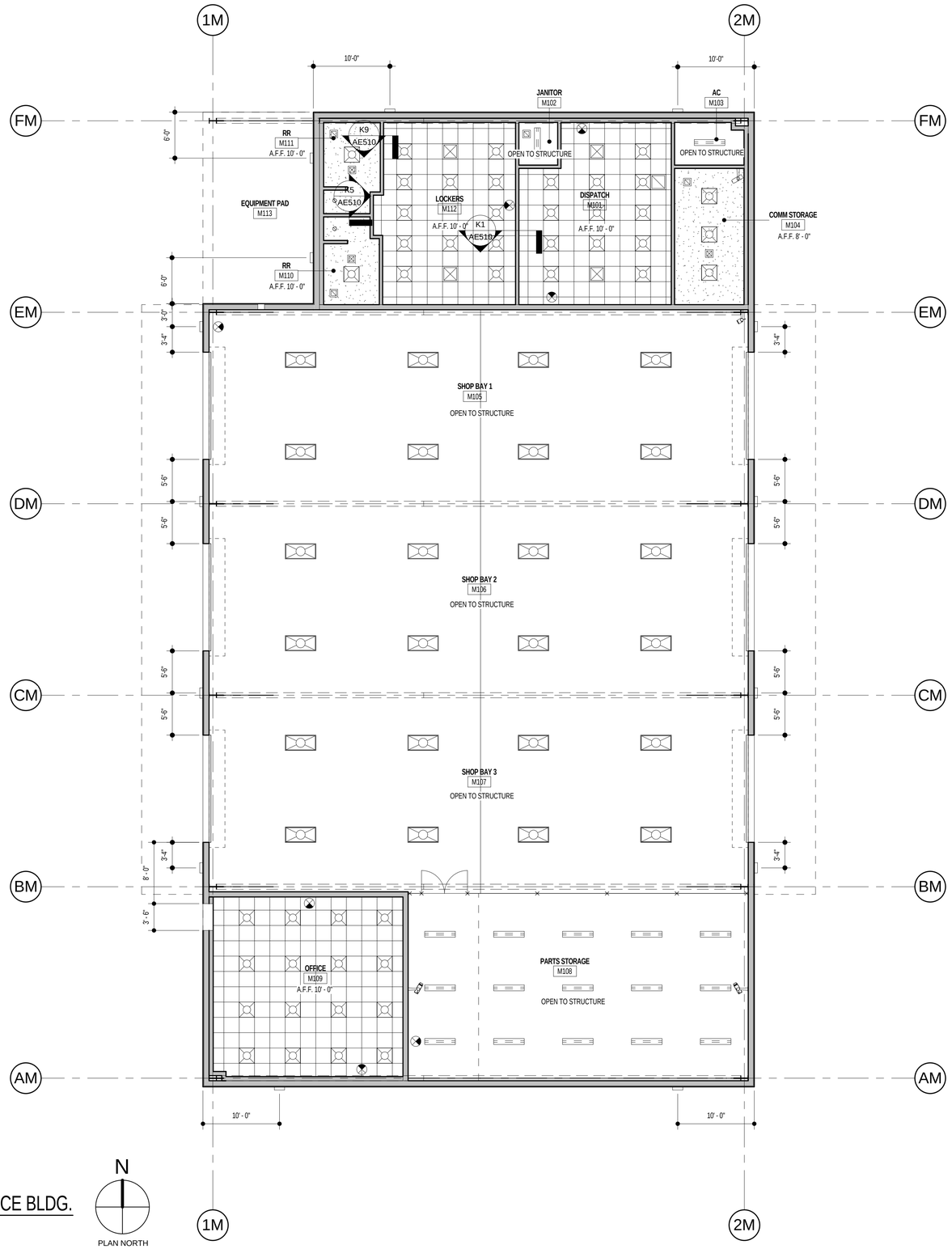


N
PLAN NORTH
KEY PLAN

AE104

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A1 REFLECTED CEILING PLAN - MAINTENANCE BLDG.
1/8" = 1'-0"

N
PLAN NORTH

RCP GENERAL NOTES

1. ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER ENGINEERING DRAWINGS FOR LOCATION OF LIGHT FIXTURES, DIFFUSERS, ETC. SEE M.E.P. DRAWINGS FOR ADDITIONAL INFORMATION AND INSTRUCTIONS.

2. SEE ELECTRICAL DRAWINGS FOR SPECIFIC LIGHT FIXTURE TYPES, EXIT SIGNS, VISUAL ALARMS, ETC.

3. SEE MECHANICAL DRAWINGS FOR SPECIFIC MECHANICAL DIFFUSERS.

4. LIGHTING FIXTURES THAT ARE NOT THE FULL SIZE OF A CEILING PANEL SHALL BE LOCATED IN THE CENTER OF THE CEILING PANEL.

5. REFER TO SHEET AE511 FOR RCP DETAILS. PAINT ALL EXPOSED TO VIEW AREA, INCLUDING STRUCTURAL MEMBERS AND M.E.P. EQUIPMENT.

6. REFER TO INTERIOR AND EXTERIOR ELEVATIONS FOR LIGHT FIXUTRES MOUTING HEIGHT. COORDINATE WITH ELECTRICAL DRAWINGS.

7. COORDINATE ALL CEILING MOUNTED PROJECTOR LOCATIONS WITH LIGHT FIXTURES.

8. TAPE AND FLOAT ALL FIRE RATED GYPSUM BOARD. SEAL ALL PENETRATIONS WITH FIRE CAULK.

9. CEILING GRID TO BE CENTERED IN ROOMS UNLESS OTHERWISE NOTED.

10. DOWNLIGHTS TO BE CENTERED IN CEILING PANELS UNLESS OTHERWISE NOTED.

11. ALL GP. BD. CEILINGS AND SOFFITS ARE 5/8" GP.BD. UNLESS SHOWN OTHERWISE. ALL VERTICAL FACES OF SOFFITS ARE GP.BD. UNLESS SHOWN OTHERWISE.

12. ALL EXPOSED GP.BD. TO BE PAINTED UNLESS SHOWN OTHERWISE.

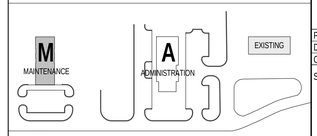
13. COORDINATE ALL MECH. DUCT WORK, PIPING, SPRINKLER LINES, AND CABLE TRAY TO AVOID CONFLICTS WITH LIGHTS AND STRUCTURE.

14. PAINT ALL EXPOSED CONDUITS, JUNCTION BOXES, ELECTRICAL ITEMS (NOT FACTORY FINISHED), SPRINKLER LINES, MECH., DUCTWORK, PIPING UNLESS ROOM FINISH SCHEDULE CALLS FOR EXPOSED CONSTRUCTION.

15.REFER TO SHEETS AE105/AE106 TO RCP FOR CEILING TYPE AND HEIGHTS.

RCP LEGEND

- PAINTED GYPSUM BOARD CEILING
- 09 51 00 2'-0" X 2'-0" ACOUSTICAL CEILING TILE - TYPE A
- NO CEILING OPEN TO STRUCTURE ABOVE
- AIR DIFFUSER AS SCHEDULED, RE: MECHANICAL DRAWINGS AND SPECS
- RETURN AIR DIFFUSER AS SCHEDULED, RE: MECHANICAL DRAWINGS AND SPECS
- LIGHT FIXTURES AS SCHEDULED RE: ELECTRICAL DRAWINGS AND SPECS
- H S MD S — SPECIALTY EQUIPMENT AS SCHEDULED RE: ELECTRICAL DRAWINGS AND SPECS





KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

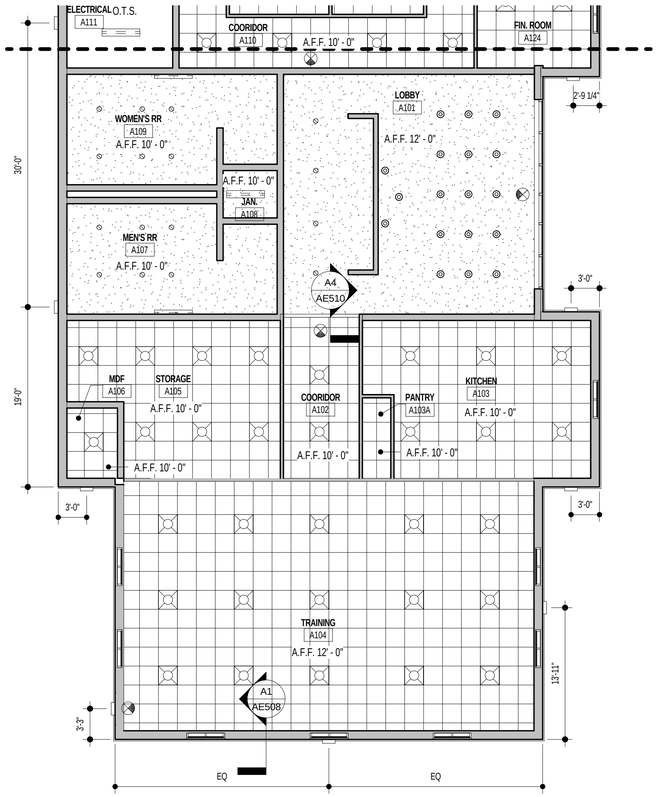
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DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: REFLECTED CEILING PLAN - MAINTENANCE

AE105

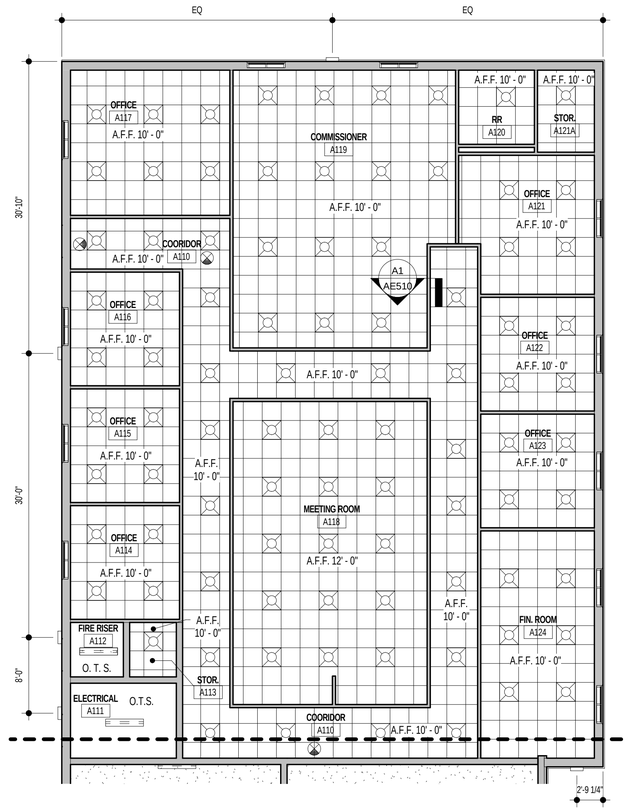
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A1 REFLECTED CEILING PLAN - ADMINISTRATION BLDG.
1/8" = 1'-0"

N
PLAN NORTH



A5 REFLECTED CEILING PLAN - ADMINISTRATION BLDG.
1/8" = 1'-0"

N
PLAN NORTH

RCP GENERAL NOTES

1. ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER ENGINEERING DRAWINGS FOR LOCATION OF LIGHT FIXTURES, DIFFUSERS, ETC. SEE M.E.P. DRAWINGS FOR ADDITIONAL INFORMATION AND INSTRUCTIONS.

2. SEE ELECTRICAL DRAWINGS FOR SPECIFIC LIGHT FIXTURE TYPES, EXIT SIGNS, VISUAL ALARMS, ETC.

3. SEE MECHANICAL DRAWINGS FOR SPECIFIC MECHANICAL DIFFUSERS.

4. LIGHTING FIXTURES THAT ARE NOT THE FULL SIZE OF A CEILING PANEL SHALL BE LOCATED IN THE CENTER OF THE CEILING PANEL.

5. REFER TO SHEET AE511 FOR RCP DETAILS. PAINT ALL EXPOSED TO VIEW AREA, INCLUDING STRUCTURAL MEMBERS AND M.E.P. EQUIPMENT.

6. REFER TO INTERIOR AND EXTERIOR ELEVATIONS FOR LIGHT FIXUTRES MOUTING HEIGHT. COORDINATE WITH ELECTRICAL DRAWINGS.

7. COORDINATE ALL CEILING MOUNTED PROJECTOR LOCATIONS WITH LIGHT FIXTURES.

8. TAPE AND FLOAT ALL FIRE RATED GYPSUM BOARD. SEAL ALL PENETRATIONS WITH FIRE CAULK.

9. CEILING GRID TO BE CENTERED IN ROOMS UNLESS OTHERWISE NOTED.

10. DOWNLIGHTS TO BE CENTERED IN CEILING PANELS UNLESS OTHERWISE NOTED.

11. ALL GP. BD. CEILINGS AND SOFFITS ARE 5/8" GP.BD. UNLESS SHOWN OTHERWISE. ALL VERTICAL FACES OF SOFFITS ARE GP.BD. UNLESS SHOWN OTHERWISE.

12. ALL EXPOSED GP.BD. TO BE PAINTED UNLESS SHOWN OTHERWISE.

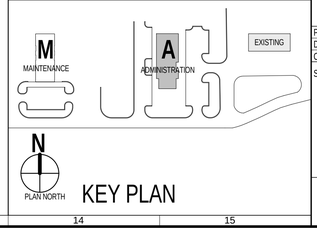
13. COORDINATE ALL MECH. DUCT WORK, PIPING, SPRINKLER LINES, AND CABLE TRAY TO AVOID CONFLICTS WITH LIGHTS AND STRUCTURE.

14. PAINT ALL EXPOSED CONDUITS, JUNCTION BOXES, ELECTRICAL ITEMS (NOT FACTORY FINISHED), SPRINKLER LINES, MECH., DUCTWORK, PIPING UNLESS ROOM FINISH SCHEDULE CALLS FOR EXPOSED CONSTRUCTION.

15.REFER TO SHEETS AE105/AE106 TO RCP FOR CEILING TYPE AND HEIGHTS.

RCP LEGEND

- PAINTED GYPSUM BOARD CEILING
- 09 51 00 2'-0" X 2'-0" ACOUSTICAL CEILING TILE - TYPE A
- NO CEILING OPEN TO STRUCTURE ABOVE
- AIR DIFFUSER AS SCHEDULED, RE: MECHANICAL DRAWINGS AND SPECS
- RETURN AIR DIFFUSER AS SCHEDULED, RE: MECHANICAL DRAWINGS AND SPECS
- LIGHT FIXTURES AS SCHEDULED RE: ELECTRICAL DRAWINGS AND SPECS
- SPECIALTY EQUIPMENT AS SCHEDULED, RE: ELECTRICAL DRAWINGS AND SPECS (H, S, MD, S)



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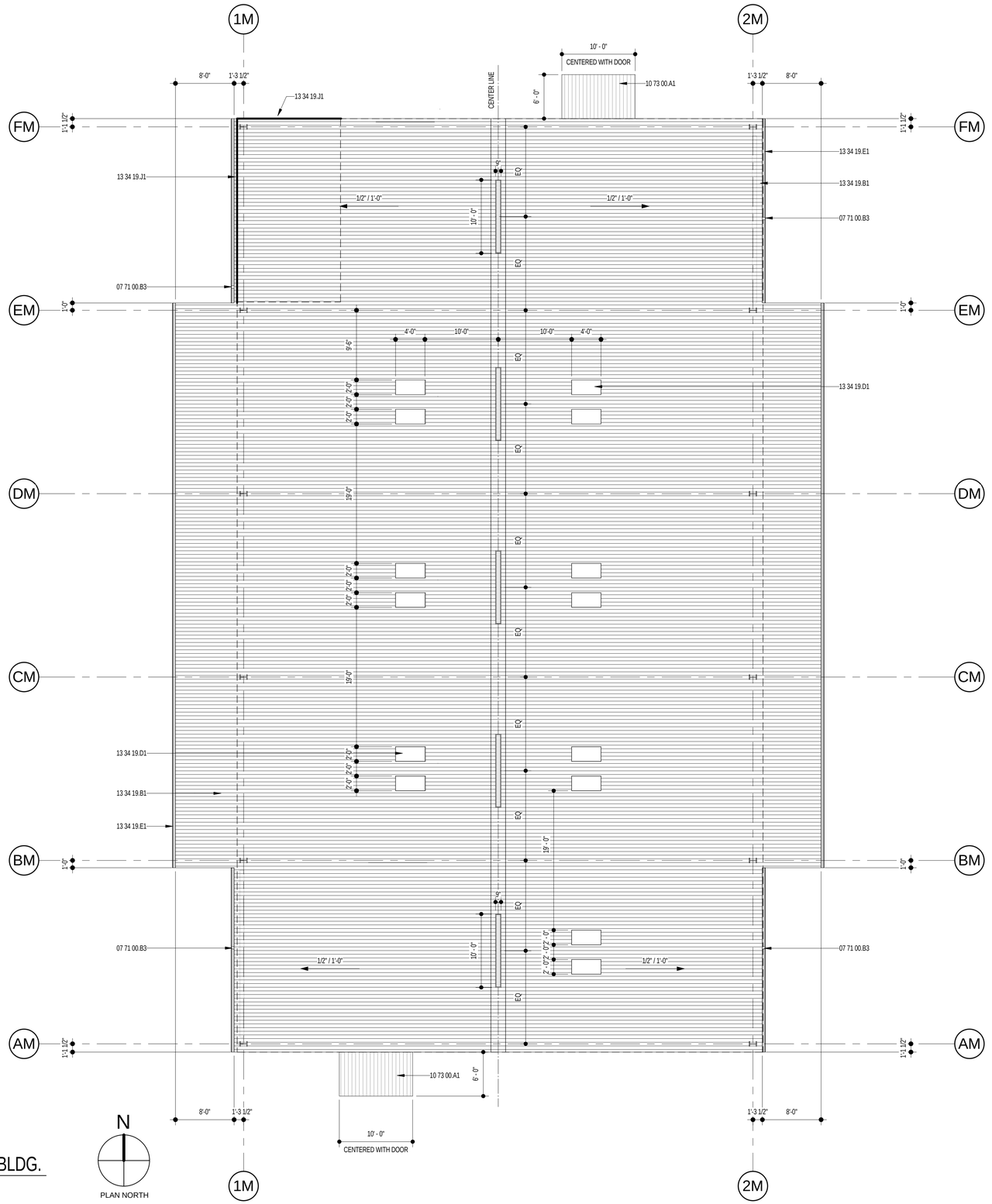
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DRAWN BY: CS
CHECKED BY: YIPG

SHEET TITLE: REFLECTED CEILING PLAN DETAILS - ADMINISTRATION

AE106

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A1 ROOF PLAN - MAINTENANCE BLDG.
1/8" = 1'-0"

ROOF PLAN GENERAL NOTES

1. PROVIDE TAPERED INSULATION CRICKETS (1/2" MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS. SMOKE VENTS, ROOF HATCHES & OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND & TO ENSURE POSITIVE ROOF DRAINAGE.

2. PROVIDE ADDITIONAL FULLY ADHERED MEMBRANES AS PROTECTION AT "SERVICE SIDE" OF ALL MECH. EQUIPEMENT. FIELD VERIFY LOCATIONS AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS. FIELD VERIFY LOCATIONS AT DOWNSPOUT LOCATIONS.

3. ALL WOOD BLOCKING AT ROOF EDGES ARE TO BE FABRICATED FROM CONT. 2X FR-WD BOARDS. PROVIDE LARGER 2X FR-WD AS REQUIRED PER DIMENSIONED DETAILED OR AS FIELD CONDITIONS DICTATE ALL COPING TO BE SLOPED TOWARD THE INTERIOR.

4. ALL EXPOSED FLASHING, COPING (IF APPLICABLE) AND THEIR ACCESSORIES SHALL BE SPECIFIED. PAINT ALL METAL FLASHING THAT IS NOT PREFINISHED (TYP) AND VISIBLE FROM THE GROUND.

5. ALL THROUGH FLASHING SYSTEM TO ACCOMADATE 8" MININUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.

6. ANY CRACKS OR VOIDS IN RISE WALLS ABOVE COUNTER FLASHING SHALL BE REPAIRED WITH COMPATIBLE SEALANT.

7. ALL METAL FLASHING SHALL EXTEND BEYOND ROOF EDGE MIN. 8" WHERE FLASHING ABUTS VERTICAL WALL SURFACE AS DETAILED. ALL FLASHING SHALL BE INSTALLED IN SHINGLE FLASHING.

8. PROVIDE CONCRETE SPLASH BLOCKS BENEATH ALL DOWNSPOUTS.

9. TAPER WATER AWAY FROM ALL HVAC UNITS AND PARAPET WALLS.

10. PROVIDE PRE-FINISHED METAL END CLOSURE 8" BEYOND CANOPY BELOW W/ END DRAINS IN THROUGH WALL FLASHING AT THESE LOCATIONS.

11. REFER MEP DRAWINGS FOR ADDITIONAL INFORMATION.

12. ALL PRE-ENGINEERED METAL BUILDING ROOF ACCESSORIES MAY VARY DEPENDING ON THE CHOSEN PEMB MANUFACTURER. COORDINATE SIZES WITH ARCHITECT.

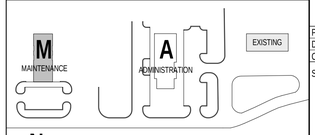
KEYNOTE LEGEND

07 71 00.B3	DOWNSPOUT
10 73 00.A1	CANOPY SYSTEM
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.D1	PRE-ENGINEERED METAL BUILDING TRANSLUCENT ROOF PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.E1	PRE-ENGINEERED METAL BUILDING ROOF ACCESORIES. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.J1	PRE-ENGINEERED METAL BUILDING ROOF SKIRT. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS

ROOF PLAN LEGEND:

METAL ROOF PANELS

FLEECE BACKED ELVALOY ROOFING MEMBRANE ON TAPERED ROOF INSULATION



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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

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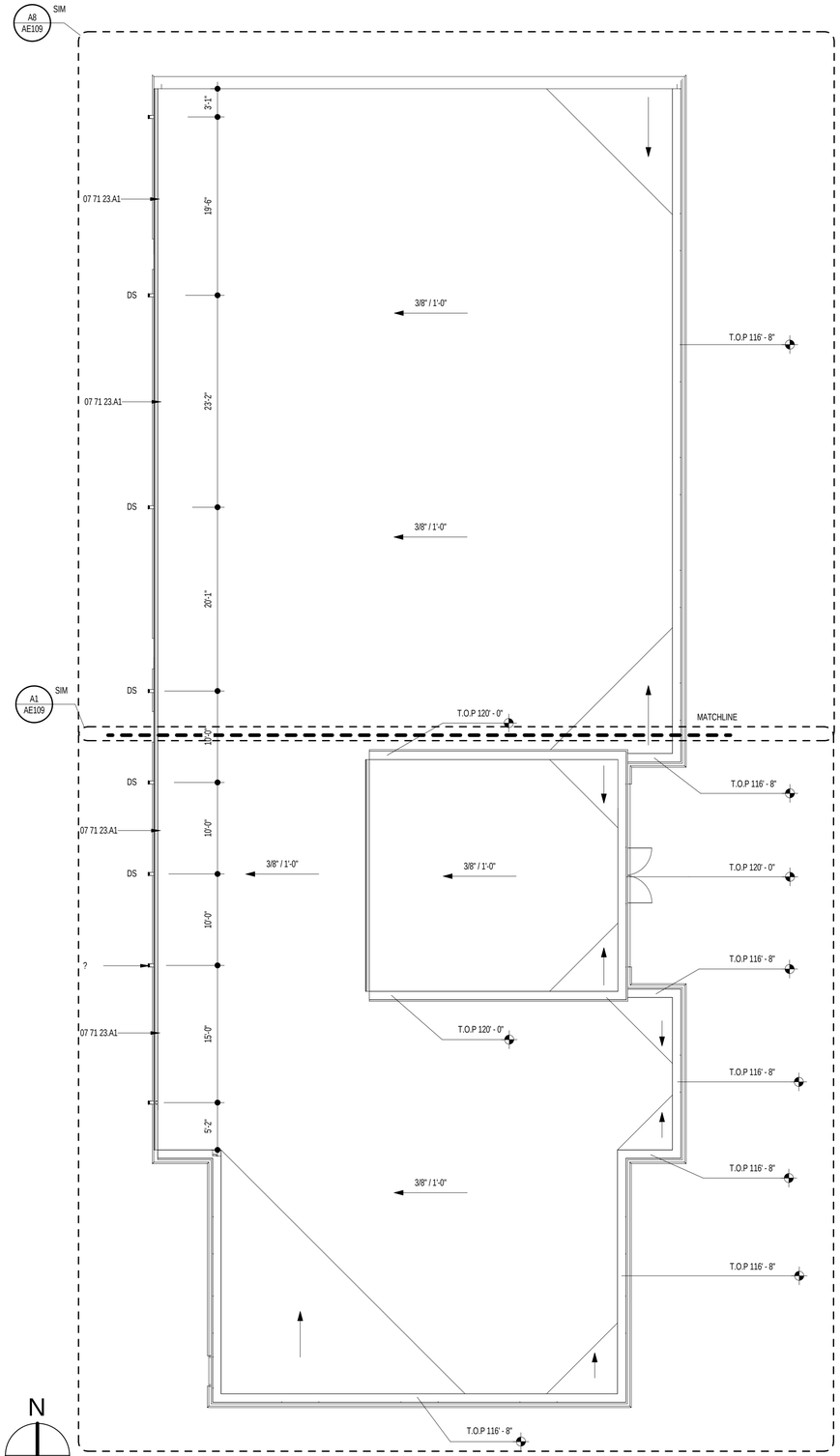
PROJECT NO.:	12014
DRAWN BY:	YIPG
CHECKED BY:	YIPG

SHEET TITLE: ROOF PLAN - MAINTENANCE

AE107

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A1 COMPOSITE ROOF PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

ROOF PLAN GENERAL NOTES

1. PROVIDE TAPERED INSULATION CRICKETS (1/2" MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS. SMOKE VENTS, ROOF HATCHES & OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND & TO ENSURE POSITIVE ROOF DRAINAGE.

2. PROVIDE ADDITIONAL FULLY ADHERED MEMBRANES AS PROTECTION AT "SERVICE SIDE" OF ALL MECH. EQUIPEMENT. FIELD VERIFY LOCATIONS AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS. FIELD VERIFY LOCATIONS AT DOWNSPOUT LOCATIONS.

3. ALL WOOD BLOCKING AT ROOF EDGES ARE TO BE FABRICATED FROM CONT. 2X FR-WD BOARDS. PROVIDE LARGER 2X FR-WD AS REQUIRED PER DIMENSIONED DETAILED OR AS FIELD CONDITIONS DICTATE ALL COPING TO BE SLOPED TOWARD THE INTERIOR.

4. ALL EXPOSED FLASHING, COPING (IF APPLICABLE) AND THEIR ACCESSORIES SHALL BE SPECIFIED. PAINT ALL METAL FLASHING THAT IS NOT PREFINISHED (TYP) AND VISIBLE FROM THE GROUND.

5. ALL THROUGH FLASHING SYSTEM TO ACCOMADATE 8" MININUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.

6. ANY CRACKS OR VOIDS IN RISE WALLS ABOVE COUNTER FLASHING SHALL BE REPAIRED WITH COMPATIBLE SEALANT.

7. ALL METAL FLASHING SHALL EXTEND BEYOND ROOF EDGE MIN. 8" WHERE FLASHING ABUTS VERTICAL WALL SURFACE AS DETAILED. ALL FLASHING SHALL BE INSTALLED IN SHINGLE FLASHING.

8. PROVIDE CONCRETE SPLASH BLOCKS BENEATH ALL DOWNSPOUTS.

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10. PROVIDE PRE-FINISHED METAL END CLOSURE 8" BEYOND CANOPY BELOW W/ END DRAINS IN THROUGH WALL FLASHING AT THESE LOCATIONS.

11. REFER MEP DRAWINGS FOR ADDITIONAL INFORMATION.

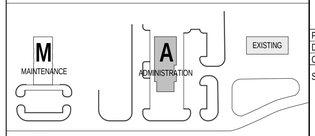
ROOF PLAN LEGEND:

METAL ROOF PANELS

FLEECE BACKED ELVALOY ROOFING MEMBRANE ON TAPERED ROOF INSULATION

KEYNOTE LEGEND

07 71 23.A1 GUTTER



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Architect: 18160

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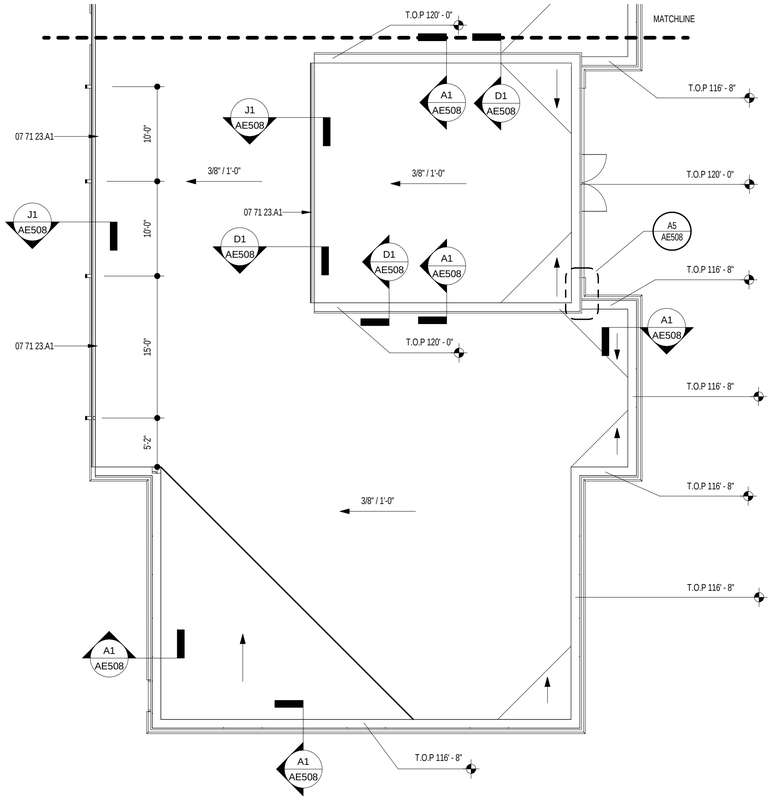
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DRAWN BY: E.S.
CHECKED BY: M. HINOJOSA

SHEET TITLE: COMPOSITE ROOF PLAN - ADMINISTRATION

AE108

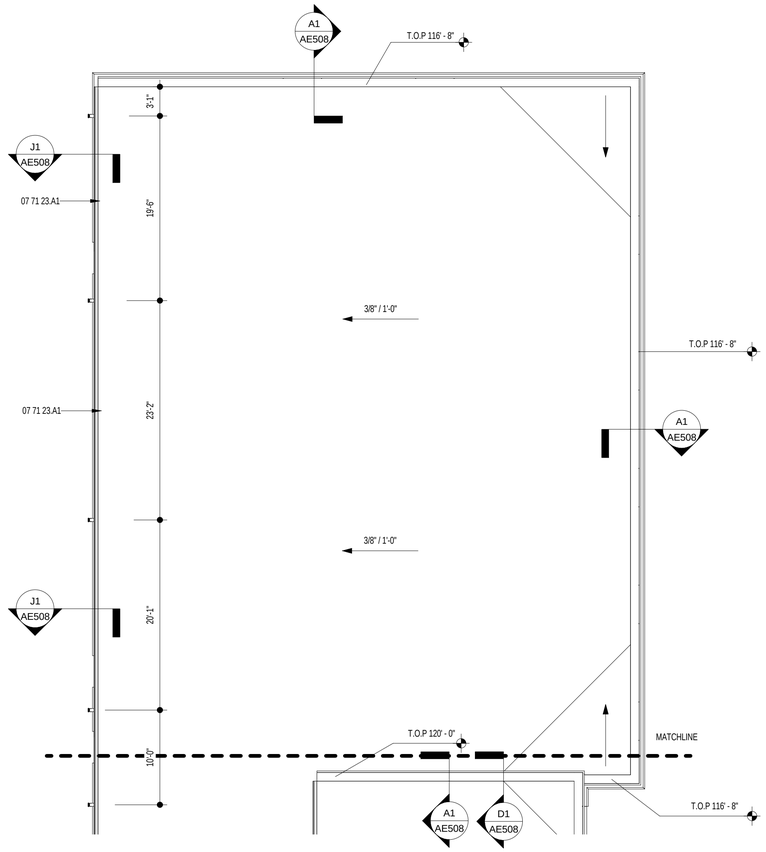
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A1 COMPOSITE ROOF PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

N
PLAN NORTH



A8 COMPOSITE ROOF PLAN - ADMINISTRATION BLDG
1/8" = 1'-0"

N
PLAN NORTH

ROOF PLAN GENERAL NOTES

1. PROVIDE TAPERED INSULATION CRICKETS (1/2" MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS. SMOKE VENTS, ROOF HATCHES & OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND & TO ENSURE POSITIVE ROOF DRAINAGE.

2. PROVIDE ADDITIONAL FULLY ADHERED MEMBRANES AS PROTECTION AT "SERVICE SIDE" OF ALL MECH. EQUIPEMENT. FIELD VERIFY LOCATIONS AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS. FIELD VERIFY LOCATIONS AT DOWNSPOUT LOCATIONS.

3. ALL WOOD BLOCKING AT ROOF EDGES ARE TO BE FABRICATED FROM CONT. 2X FR-WD BOARDS. PROVIDE LARGER 2X FR-WD AS REQUIRED PER DIMENSIONED DETAILED OR AS FIELD CONDITIONS DICTATE ALL COPING TO BE SLOPED TOWARD THE INTERIOR.

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5. ALL THROUGH FLASHING SYSTEM TO ACCOMADATE 8" MININUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.

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8. PROVIDE CONCRETE SPLASH BLOCKS BENEATH ALL DOWNSPOUTS.

9. TAPER WATER AWAY FROM ALL HVAC UNITS AND PARAPET WALLS.

10. PROVIDE PRE-FINISHED METAL END CLOSURE 8" BEYOND CANOPY BELOW W/ END DRAINS IN THROUGH WALL FLASHING AT THESE LOCATIONS.

11. REFER MEP DRAWINGS FOR ADDITIONAL INFORMATION.

ROOF PLAN LEGEND:

METAL ROOF PANELS

FLEECE BACKED ELVALOY ROOFING MEMBRANE ON TAPERED ROOF INSULATION

KEYNOTE LEGEND

07 71 23.A1 GUTTER

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

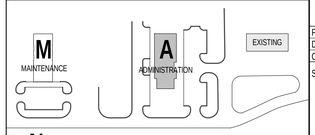
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.:	12014
DRAWN BY:	E.S.
CHECKED BY:	M. HINOJOSA

SHEET TITLE: ROOF PLAN - ADMINISTRATION

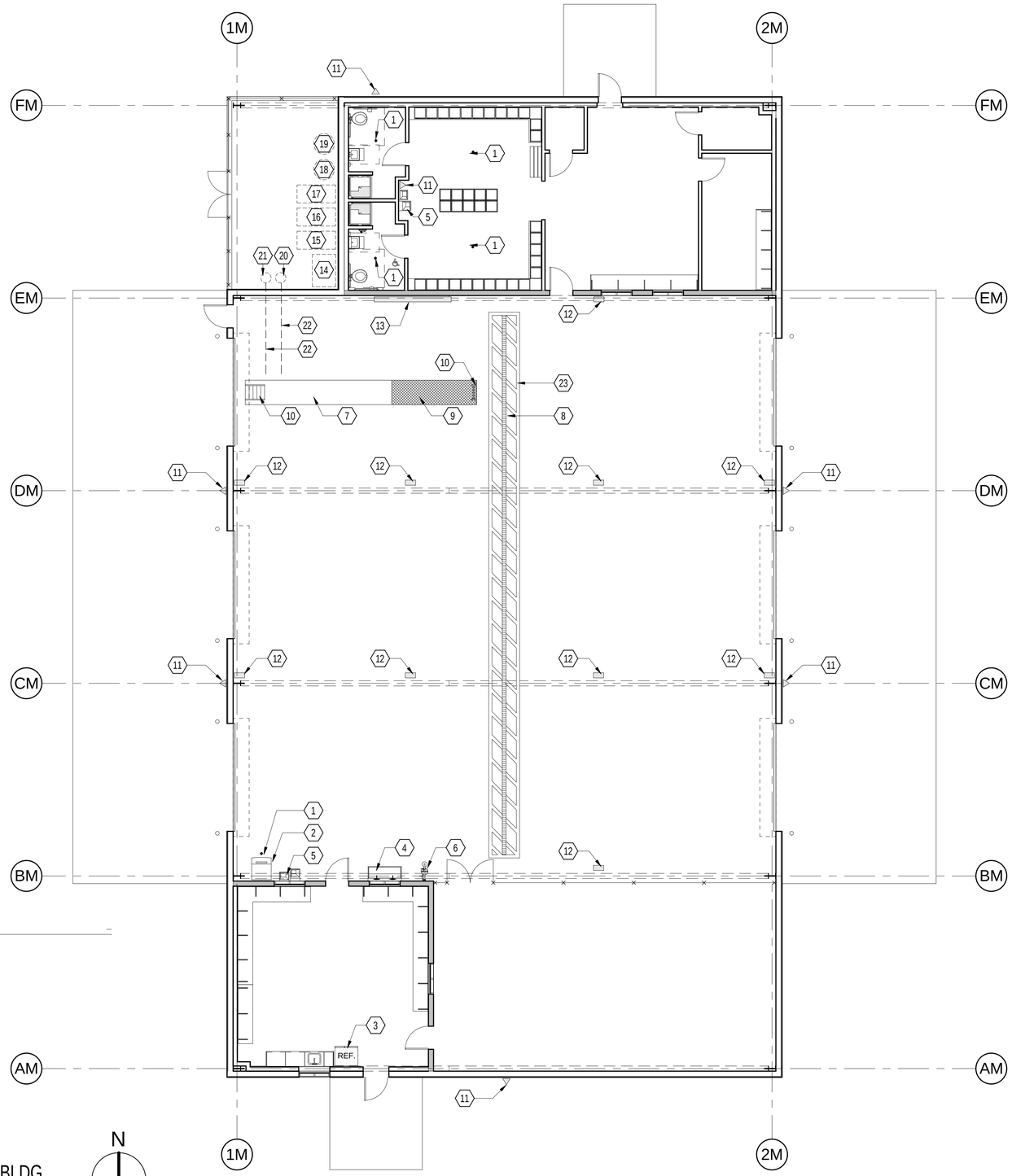


KEY PLAN

AE109

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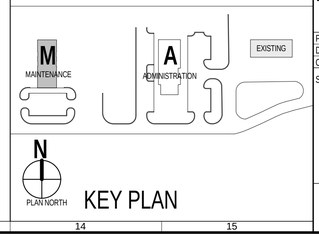
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A1 EQUIPMENT LAYOUT - MAINTENANCE BLDG.
1/8" = 1'-0"

SHEET KEYNOTES

1. FLOOR DRAIN TO BE INSTALLED FOR ICE MAKER (RE: MEP)
2. ICE MAKER PROVIDED AND INSTALLED BY OWNER
3. REFRIGERATOR PROVIDED AND INSTALLED BY OWNER
4. DEEP HANDWASH SINK PROVIDED BY G.C. (RE: MEP)
5. DRINKING FOUNTAIN PROVIDED BY G.C. (RE: MEP)
6. EYE WASH STATION PROVIDED BY G.C. (RE: MEP)
7. OIL CHANGE PIT (RE: STRUCTURAL)
8. TROUGH DRAIN (RE: MEP)
9. PIT PLATFORM
10. STEEL STAIR/LADDER
11. HOSE BIB
12. COMPRESED HOSE REEL PROVIDED BY OWNER
13. WALL MOUNTED LUBE REELS PROVIDED BY OWNER. COORDINATE FINAL LOCATION.
14. GENERAL AIR COMPRESSOR 50-60 GALLON TANK
15. OIL TANK 15W - 40 WITH REELS
16. OIL TANK 5W - 20 WITH REELS
17. OIL TANK 5W - 30 WITH REELS
18. HYDRAULIC OIL TANK - 55 GALLON DRUM WITH REELS
19. ENGINE COOLANT TANK - 55 GALLON DRUM WITH REELS
20. CHASSE GREASE TANK - 120 LBS DRUM WITH REELS
21. GEAR LUBE TANK WITH REELS
22. 4" SLEEVE
23. STRIPPING



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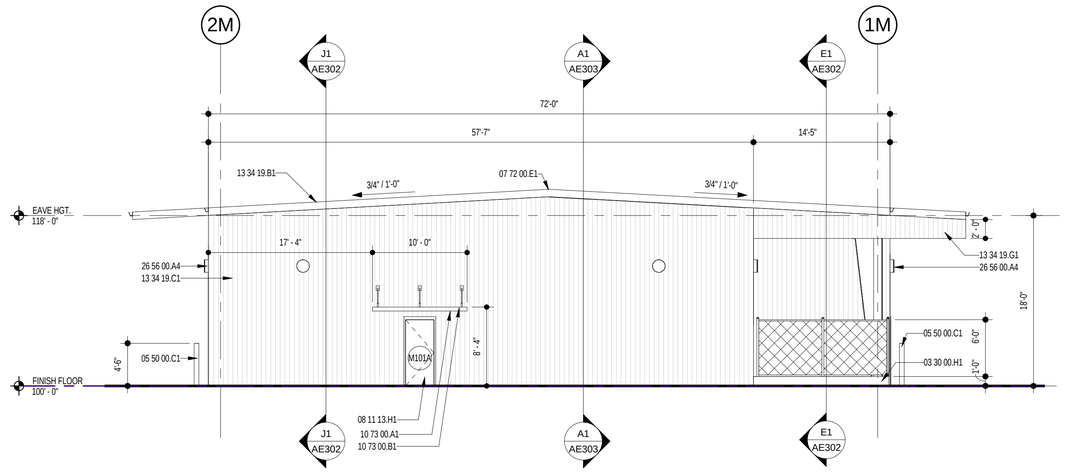
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DRAWN BY:	YIPG
CHECKED BY:	YIPG

SHEET TITLE: EQUIPMENT LAYOUT - MAINTENANCE

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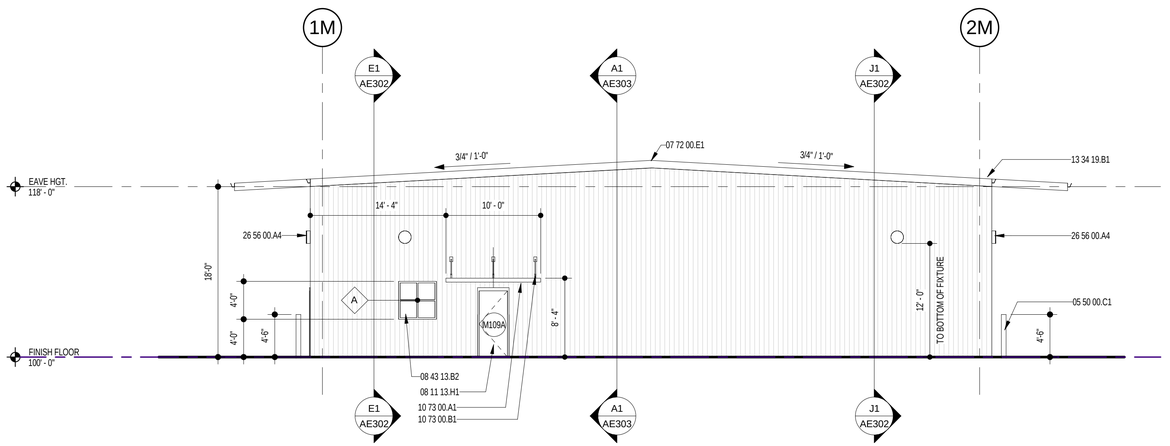
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K1 NORTH ELEVATION - MAINTENANCE BLDG.

1/8" = 1'-0"

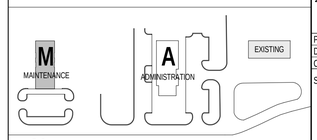


G1 SOUTH ELEVATION - MAINTENANCE BLDG.

1/8" = 1'-0"

KEYNOTE LEGEND

03 30 00.H1	CONCRETE CURB. REFER TO STRUCTURAL
05 50 00.C1	GUARD POST BOLLARDS
07 72 00.E1	ROOF VENTS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
10 73 00.A1	CANOPY SYSTEM
10 73 00.B1	
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.G1	EAVE CLOSURE. REFER TO P.E.M.B. MANUFACTURER AND INSTALL PER ITS PSECIFICATIONS.
26 56 00.A4	EXTERIOR LIGHTING. REFER TO MEP AND SPECIFICATIONS



KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

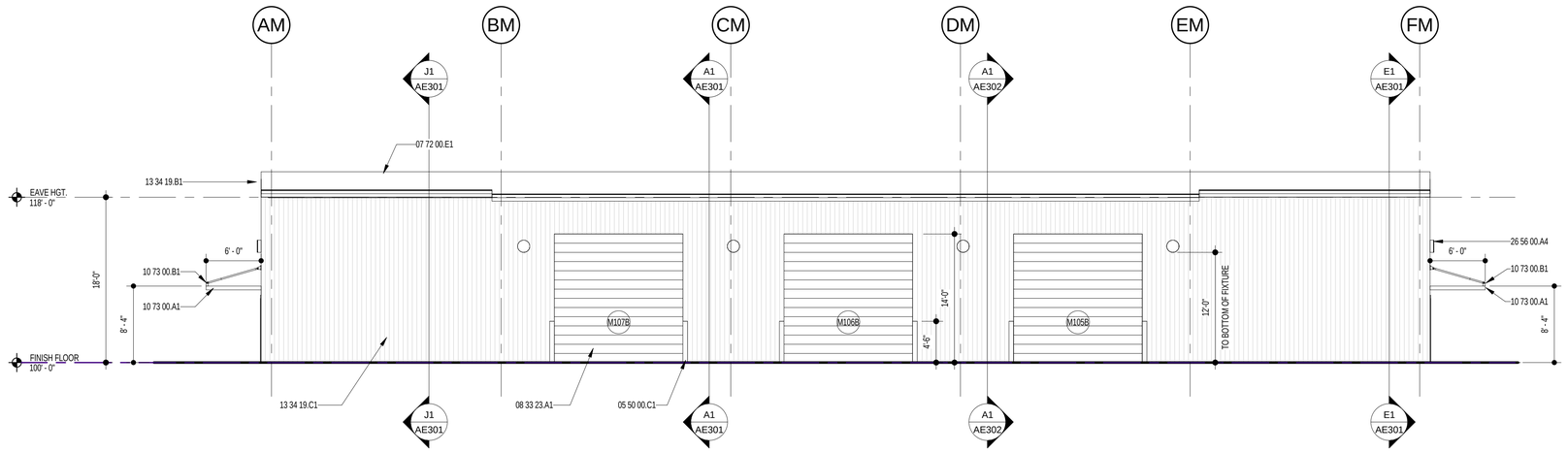
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CHECKED BY:	YIPG

SHEET TITLE: EXTERIOR ELEVATIONS - MAINTENANCE

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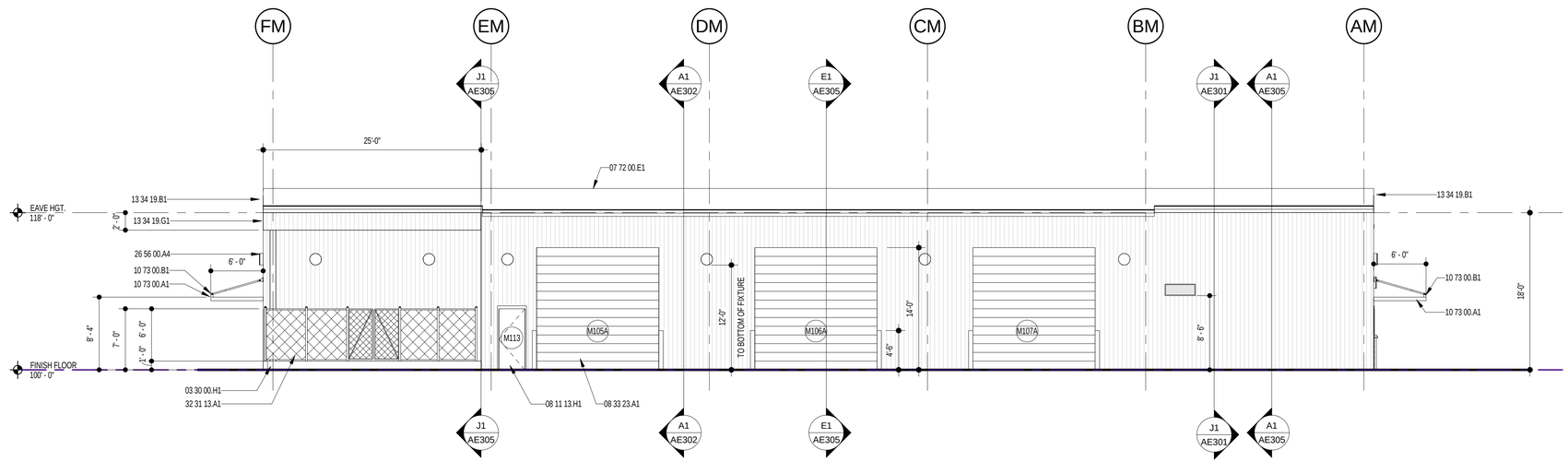
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G1 EAST ELEVATION - MAINTENANCE BLDG.

1/8" = 1'-0"



A1 WEST ELEVATION - MAINTENANCE BLDG.

1/8" = 1'-0"

KEYNOTE LEGEND

03 30 00.H1	CONCRETE CURB. REFER TO STRUCTURAL
05 50 00.C1	GUARD POST BOLLARDS
07 72 00.E1	ROOF VENTS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 33 23.A1	14' X 14' OVERHEAD COILING DOOR
10 73 00.A1	CANOPY SYSTEM
10 73 00.B1	
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.G1	EAVE CLOSURE. REFER TO P.E.M.B. MANUFACTURER AND INSTALL PER ITS PSECIFICATIONS.
26 56 00.A4	EXTERIOR LIGHTING. REFER TO MEP AND SPECIFICATIONS
32 31 13.A1	CHAIN LINK FENCE

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CONSULTANTS

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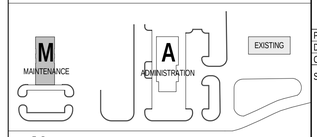
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

PROJECT NO.:	12014
DRAWN BY:	YIPG
CHECKED BY:	YIPG

SHEET TITLE: EXTERIOR ELEVATIONS - MAINTENANCE

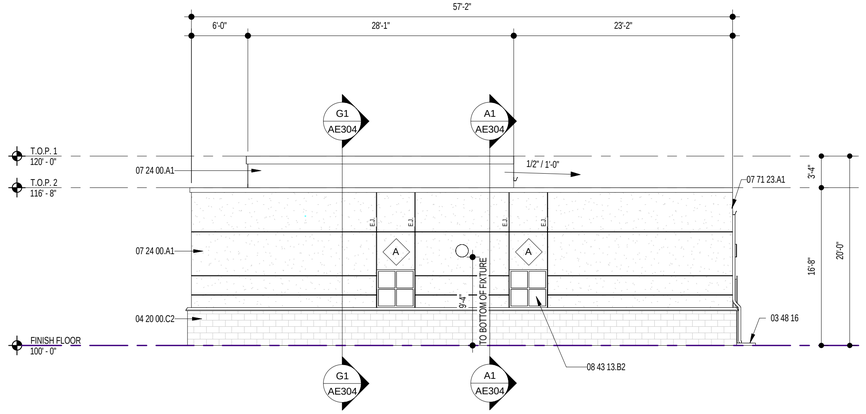


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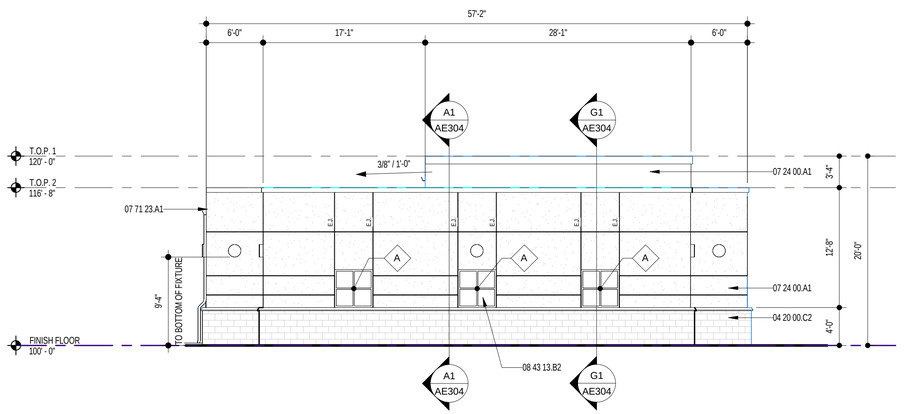
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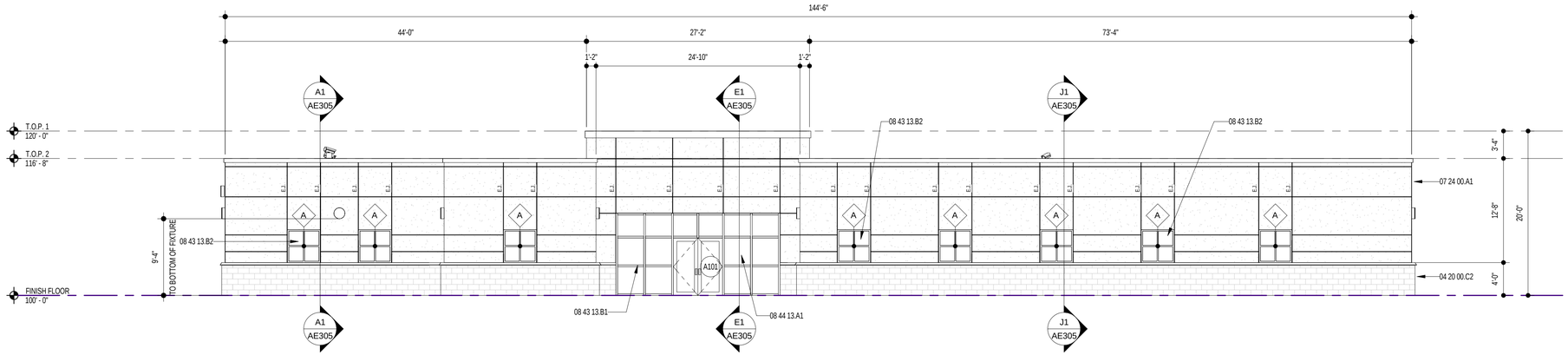
J1 NORTH ELEVATION - ADMINISTRATION BLDG.

1/8" = 1'-0"



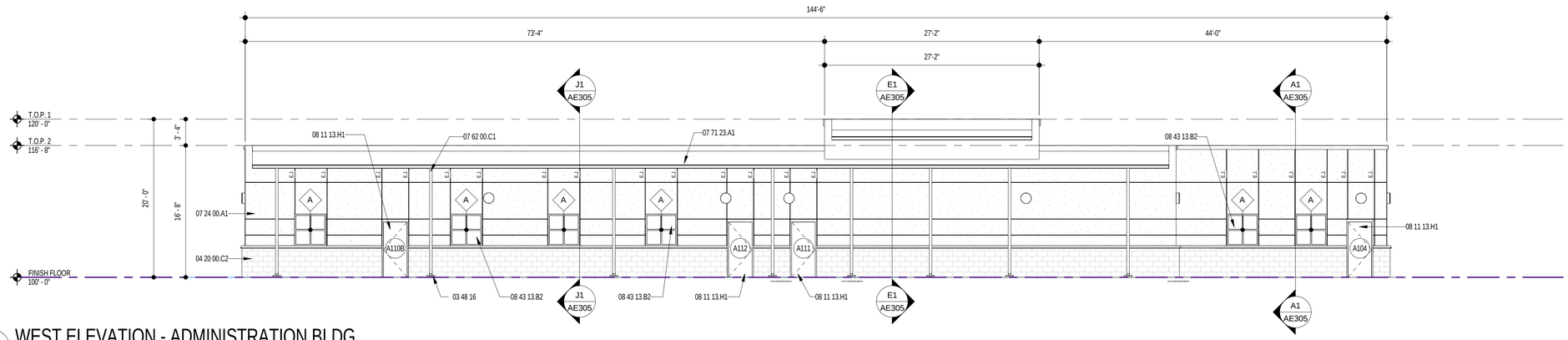
J7 SOUTH ELEVATION - ADMINISTRATION BLDG.

1/8" = 1'-0"



E1 EAST ELEVATION - ADMINISTRATION BLDG.

1/8" = 1'-0"



A1 WEST ELEVATION - ADMINISTRATION BLDG.

1/8" = 1'-0"

KEYNOTE LEGEND

03 48 16	PRECAST CONCRETE SPLASH BLOCK
04 20 00.C2	4" SPLIT FACE CMU
07 24 00.A1	EIFS, 3" THICK
07 62 00.C1	DOWNSPOUT
07 71 23.A1	GUTTER
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 43 13.B1	TYPE B - STOREFRONT SYSTEM, 1" INSULATED GLASS
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
08 44 13.A1	CURTAIN WALL

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Architect: 18160

CONSULTANTS

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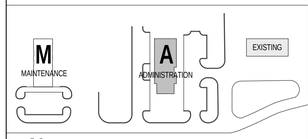
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CHECKED BY:	YIPG

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

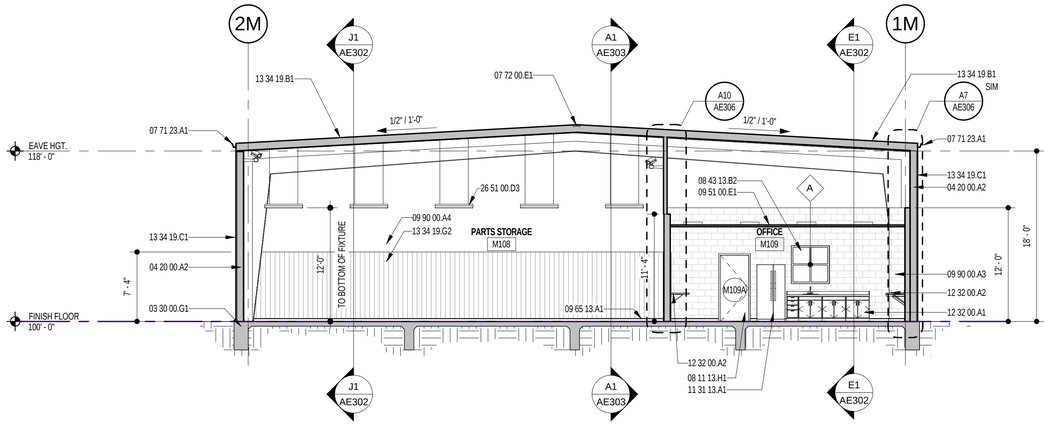
SHEET TITLE: EXTERIOR ELEVATIONS - ADMINISTRATION



KEY PLAN

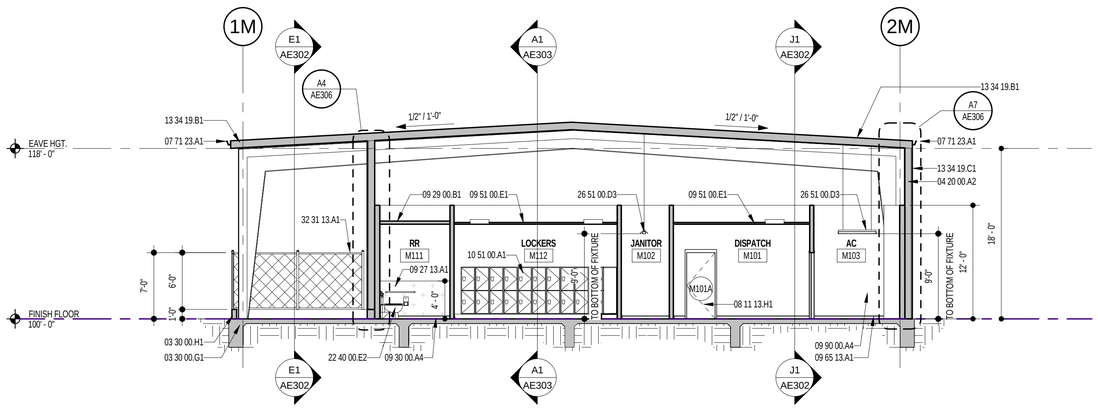
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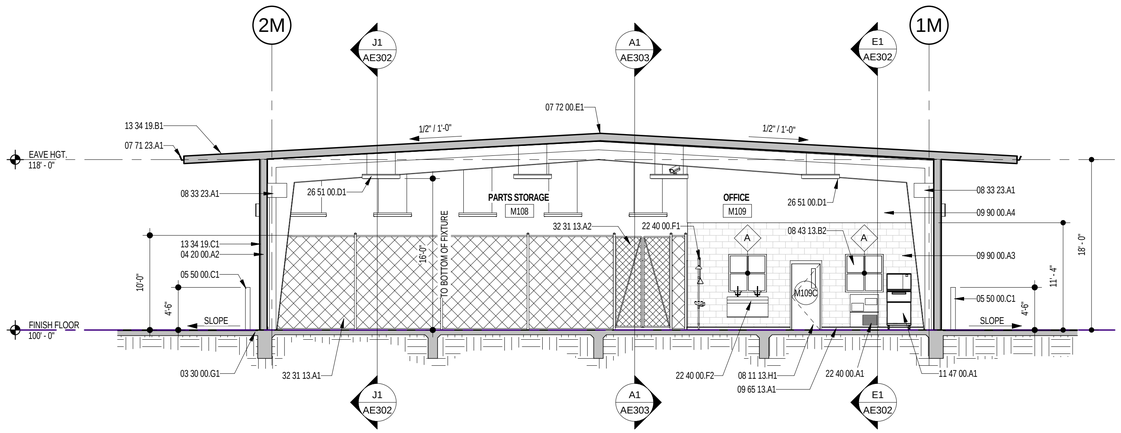
J1 BUILDING SECTION - MAINTENANCE BLDG.

1/8" = 1'-0"



E1 BUILDING SECTION - MAINTENANCE BLDG.

1/8" = 1'-0"

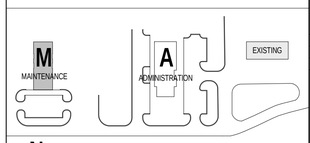


A1 BUILDING SECTION - MAINTENANCE BLDG.

1/8" = 1'-0"

KEYNOTE LEGEND

03 30 00.G1	CAST-IN-PLACE FOUNDATION. REFER TO STRUCTURAL
03 30 00.H1	CONCRETE CURB. REFER TO STRUCTURAL
04 20 00.A2	CONCRETE BLOCK, 8" THICK
05 50 00.C1	GUARD POST BOLLARDS
07 71 23.A1	GUTTER
07 72 00.E1	ROOF VENTS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 33 23.A1	14' X 14' OVERHEAD COILING DOOR
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 27 13.A1	FRP BOARD
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 30 00.A4	CERAMIC TILE BASE
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 51 00.A1	METAL LOCKERS
11 31 13.A1	REFRIGERATOR. NOT IN CONTRACT
11 47 00.A1	ICE MACHINE
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.G2	
22 40 00.A1	DRINKING FOUNTAIN
22 40 00.E2	Water Closet
22 40 00.F1	EMERGENCY WASH STATION
22 40 00.F2	SCRUB SINK
26 51 00.D1	FLUORESCENT HIGH BAY FIXTURE
26 51 00.D3	FLUORESCENT STRIP FIXTURE
32 31 13.A1	CHAIN LINK FENCE
32 31 13.A2	CHAIN LINK GATE



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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

No.	Date	Description

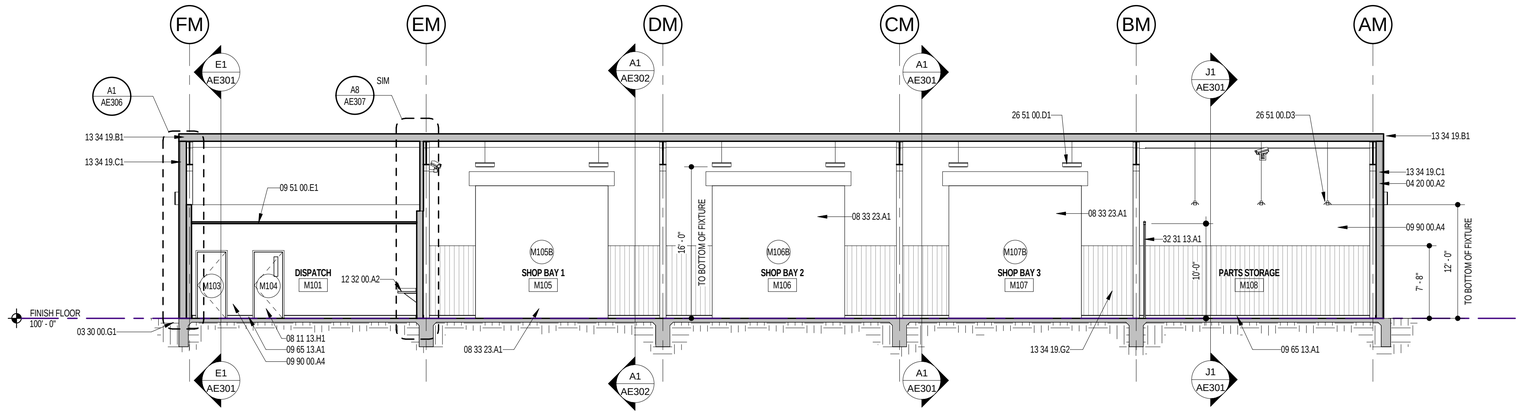
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DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: BUILDING SECTIONS - MAINTENANCE

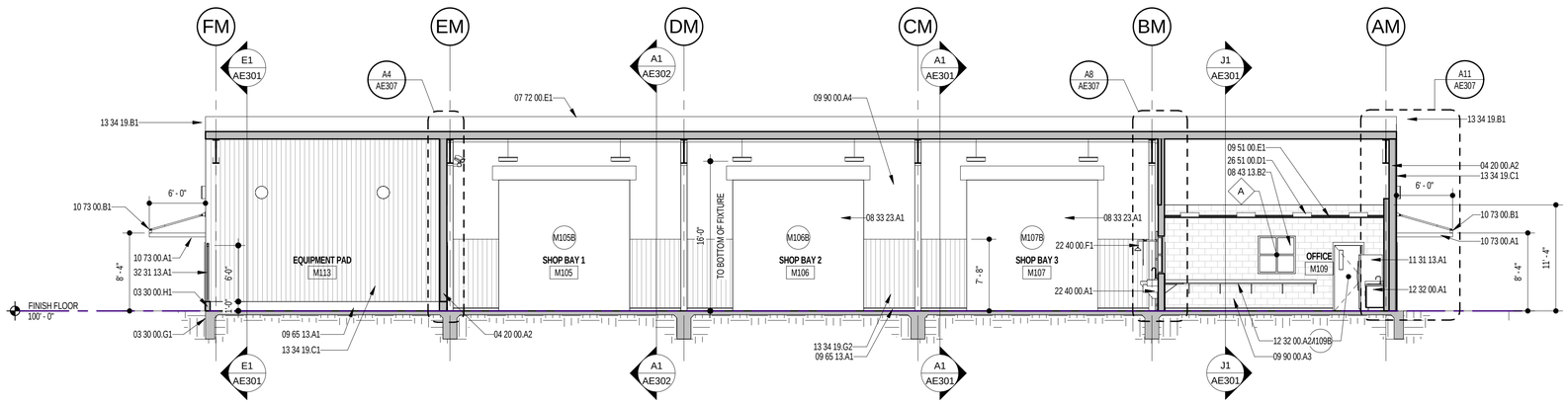
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

AE301

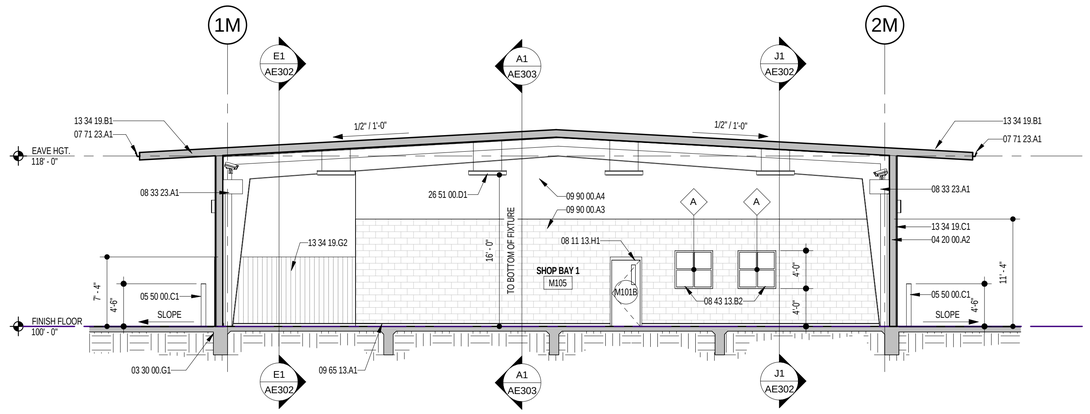
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J1 BUILDING SECTION - MAINTENANCE BLDG.
1/8" = 1'-0"



E1 BUILDING SECTION - MAINTENANCE BLDG.
1/8" = 1'-0"



A1 BUILDING SECTION - MAINTENANCE BLDG.
1/8" = 1'-0"

KEYNOTE LEGEND

03 30 00.G1	CAST-IN-PLACE FOUNDATION. REFER TO STRUCTURAL
03 30 00.H1	CONCRETE CURB. REFER TO STRUCTURAL
04 20 00.A2	CONCRETE BLOCK, 8" THICK
05 50 00.C1	GUARD POST BOLLARDS
07 71 23.A1	GUTTER
07 72 00.E1	ROOF VENTS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 33 23.A1	14' X 14' OVERHEAD COILING DOOR
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 73 00.A1	CANOPY SYSTEM
10 73 00.B1	
11 31 13.A1	REFRIGERATOR. NOT IN CONTRACT
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.G2	
22 40 00.A1	DRINKING FOUNTAIN
22 40 00.F1	EMERGENCY WASH STATION
26 51 00.D1	FLUORESCENT HIGH BAY FIXTURE
26 51 00.D3	FLUORESCENT STRIP FIXTURE
32 31 13.A1	CHAIN LINK FENCE

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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

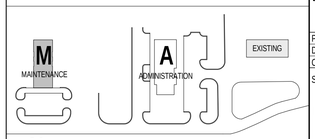
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PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE:
BUILDING SECTIONS - MAINTENANCE



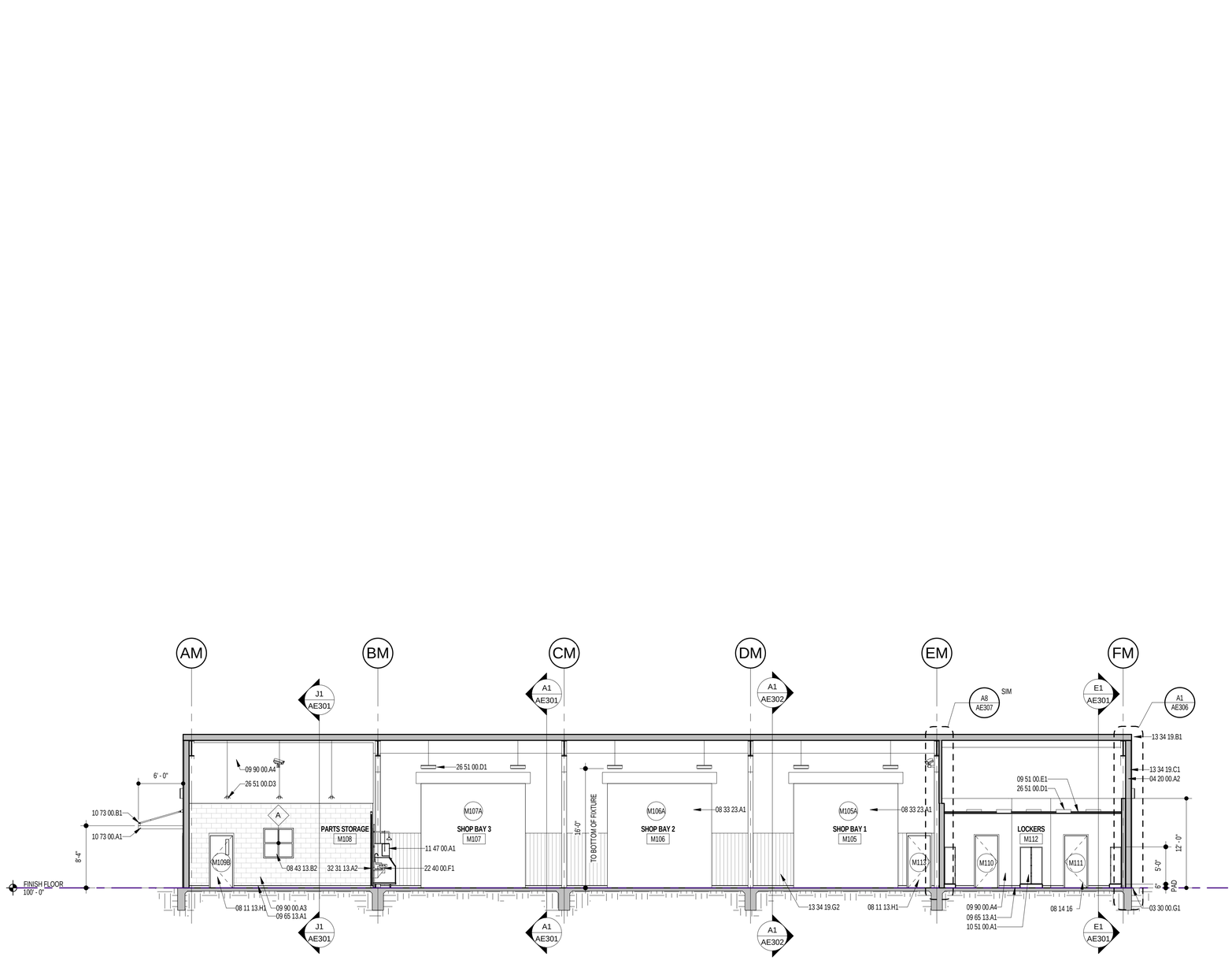
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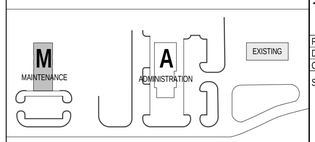
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A1 BUILDING SECTION - MAINTENANCE BLDG.
1/8" = 1'-0"

KEYNOTE LEGEND

03 30 00.G1	CAST-IN-PLACE FOUNDATION. REFER TO STRUCTURAL
04 20 00.A2	CONCRETE BLOCK, 8" THICK
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 14 16	FLUSH WOOD DOORS
08 33 23.A1	14' X 14' OVERHEAD COILING DOOR
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 51 00.A1	METAL LOCKERS
10 73 00.A1	CANOPY SYSTEM
10 73 00.B1	
11 47 00.A1	ICE MACHINE
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.G2	
22 40 00.F1	EMERGENCY WASH STATION
26 51 00.D1	FLUORESCENT HIGH BAY FIXTURE
26 51 00.D3	FLUORESCENT STRIP FIXTURE
32 31 13.A2	CHAIN LINK GATE





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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

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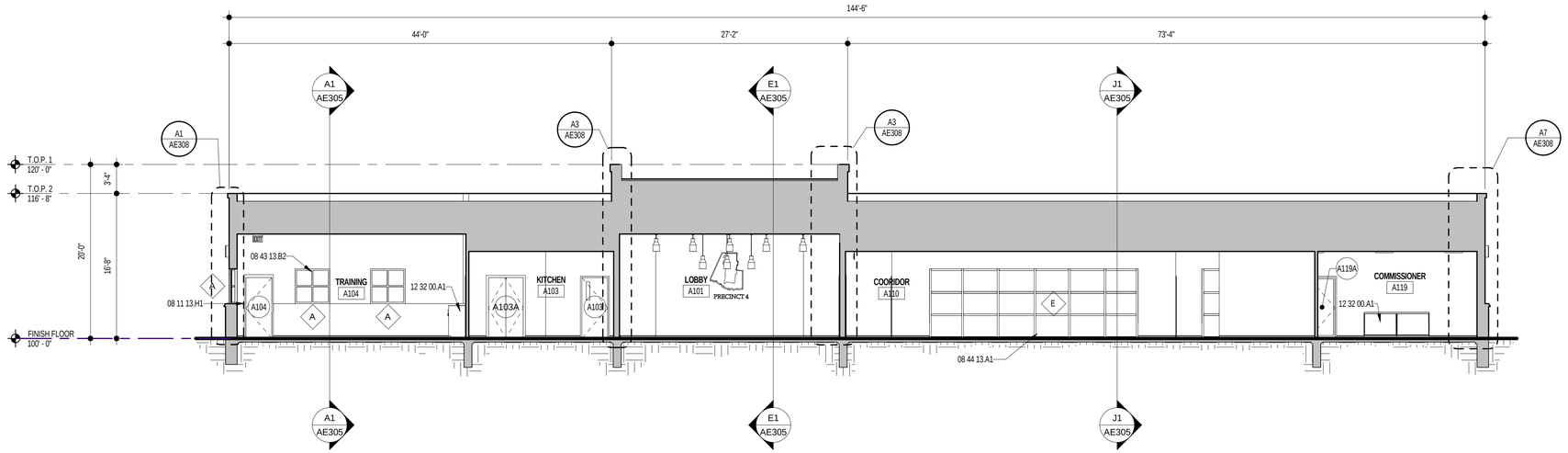
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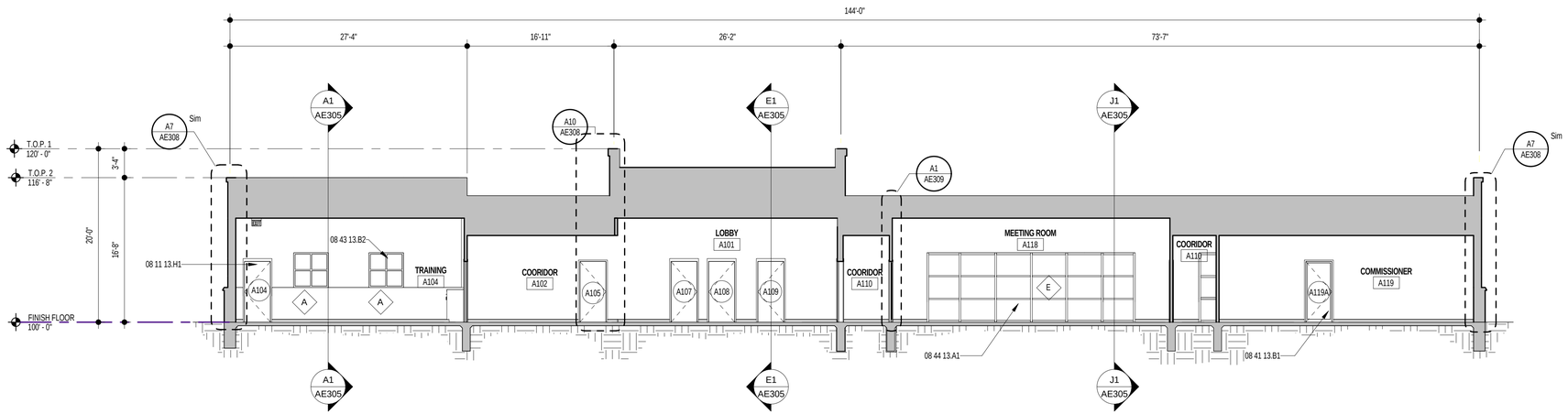
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7/5/2012 9:15:40 AM



G1 BUILDING SECTION - ADMINISTRATION BLDG
1/8" = 1'-0"



A1 BUILDING SECTION - ADMINISTRATION BLDG
1/8" = 1'-0"

KEYNOTE LEGEND

08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 41 13.B1	INTERIOR ALUMINUM STOREFRONT DOOR
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
08 44 13.A1	CURTAIN WALL
12 32 00.A1	BASE CABINET

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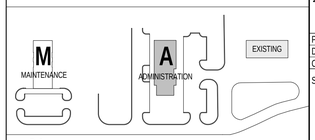
CONSULTANTS

No.	Description	Date

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

PROJECT NO.:	12014
DRAWN BY:	E. S.
CHECKED BY:	M. HINOJOSA

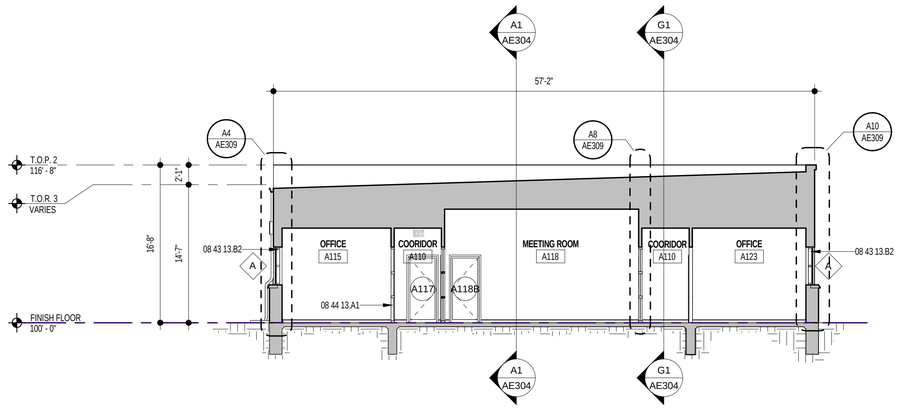
SHEET TITLE: BUILDING SECTIONS - ADMINISTRATION



KEY PLAN

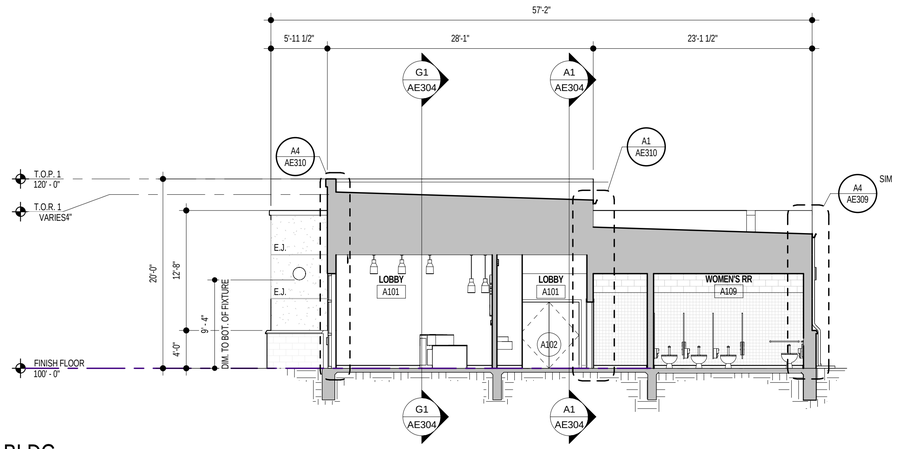
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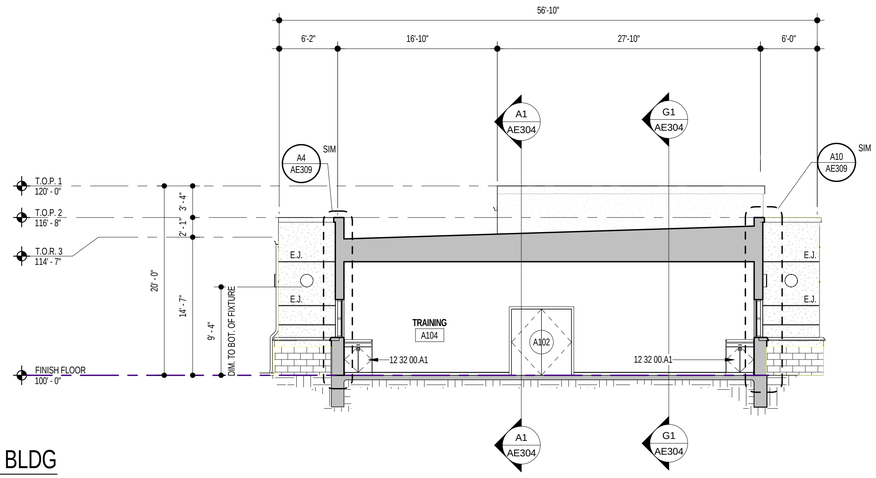
J1 BUILDING SECTION - ADMINISTRATION BLDG

1/8" = 1'-0"



E1 BUILDING SECTION - ADMINISTRATION BLDG

1/8" = 1'-0"

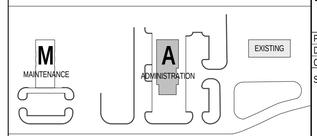


A1 BUILDING SECTION - ADMINISTRATION BLDG

1/8" = 1'-0"

KEYNOTE LEGEND

08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
08 44 13.A1	CURTAIN WALL
12 32 00.A1	BASE CABINET



KEY PLAN

ero architects
300 South 8th Street,
McAllen, Texas 78501
956.661.0400
www.eroarchitects.com

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

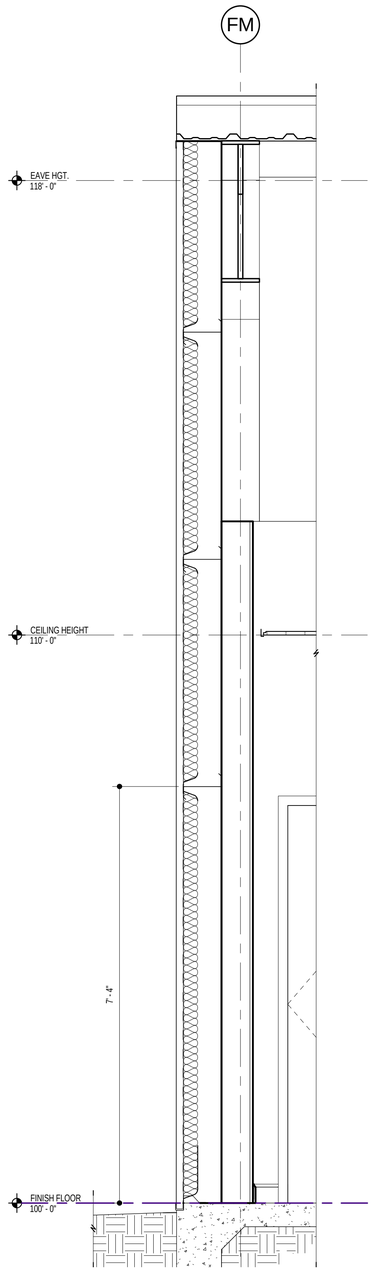
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CHECKED BY: Checker

SHEET TITLE: BUILDING SECTIONS - ADMINISTRATION

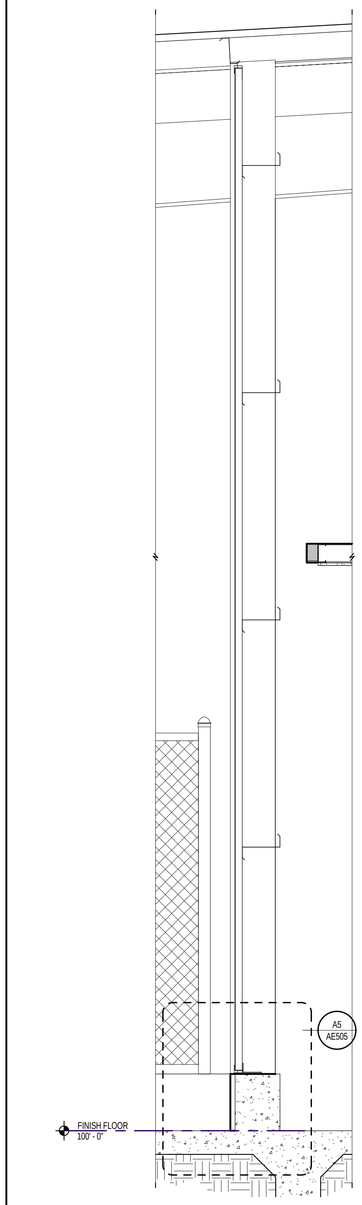
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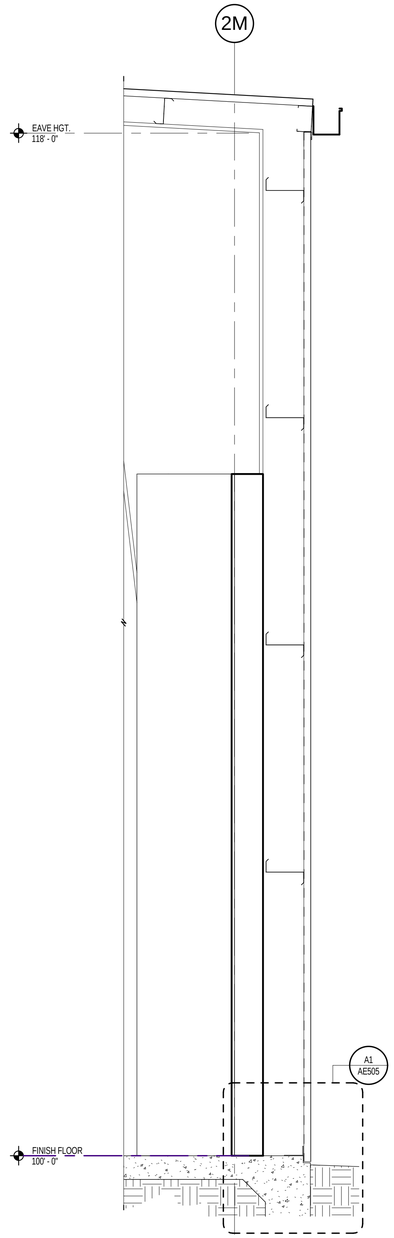
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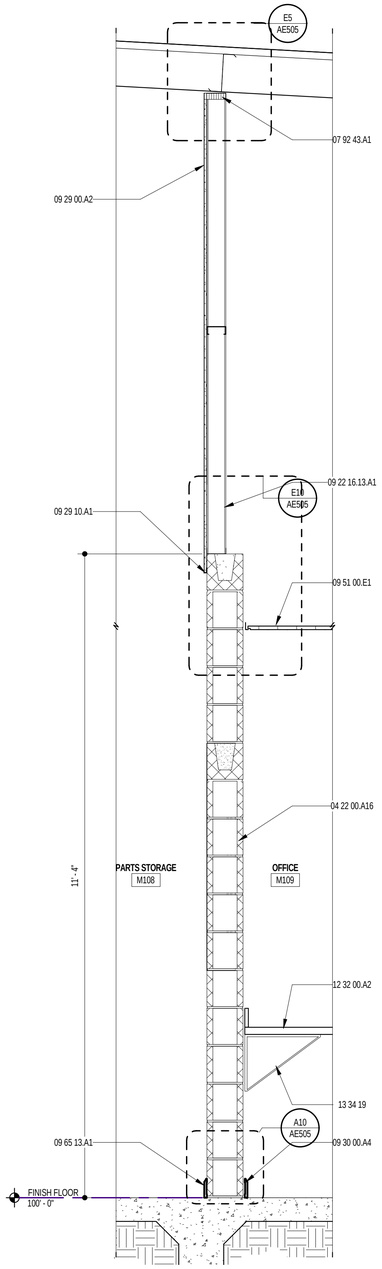
A1 WALL SECTION 9 - MAINTENANCE
3/4" = 1'-0"



A4 WALL SECTION 2 - MAINTENANCE
3/4" = 1'-0"



A7 WALL SECTION 3 - MAINTENANCE
3/4" = 1'-0"



A10 WALL SECTION 4 - MAINTENANCE
3/4" = 1'-0"

WALL SECTION NOTES

1. CONTRACTOR SHALL CROSS-REFERENCE STRUCTURAL COMPONENT DIMENSIONS WITH STRUCTURAL DRAWINGS AND NOTIFY ARCHITECT OF DISCREPANCIES PRIOR TO INSTALLATION.

2. PROVIDE MASONRY WEEP HOLES AT 32" O.C. MAX.

3. AT PERIMETER JOINT BETWEEN ALUMINUM FRAMES AND DISSIMILAR MATERIALS, PROVIDE MINIMUM OF 3/8" JOINT WITH BACKER ROD AND SEALANT.

4. AT ALL REFERENCES TO ALUMINUM SUB-SILL, PROVIDE ALUMINUM SUB-SILL WITH END DAMS. TURN END DAMS UP A MINIMUM OF 6".

5. ALL EXPOSED METALS (INTERIOR AND EXTERIOR), EXCEPT GALVANIZED AND PRE-FINISHED ITEMS, SHALL BE FINISH PAINTED - COLOR SELECTED BY ARCHITECT.

6. EXPOSED CONCRETE WALLS, COLUMNS AND BEAMS TO HAVE "RUBBED OR THOROSEAL" FINISH - COLOR SELECTED BY ARCHITECT.

7. SEE INTERIOR ELEVATIONS FOR MATERIALS FINISH TRANSITION AT EACH ROOM.

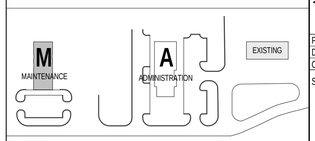
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10. REFERENCE EXTERIOR ELEVATIONS FOR VENEER FINISH PATTERNS.

KEYNOTE LEGEND

04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
07 92 43.A1	SILICONE BUILDING SEALANT
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
09 29 10.A1	TYPE A - EXTRUDED ALUMINUM REVEAL MOLDING
09 30 00.A4	CERAMIC TILE BASE
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
12 32 00.A2	COUNTERTOP WITH OPEN BASE
13 34 19	METAL BUILDING SYSTEMS



KEY PLAN

ero architects
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Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

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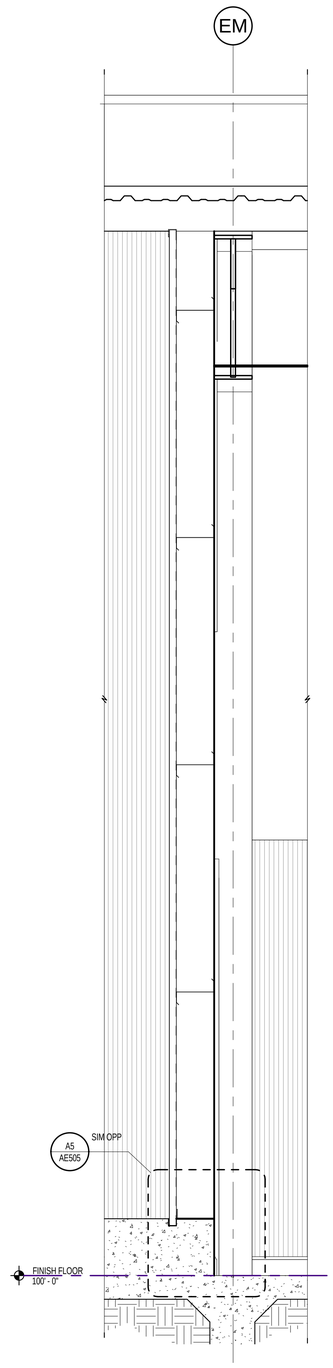
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SHEET TITLE: WALL SECTIONS - MAINTENANCE

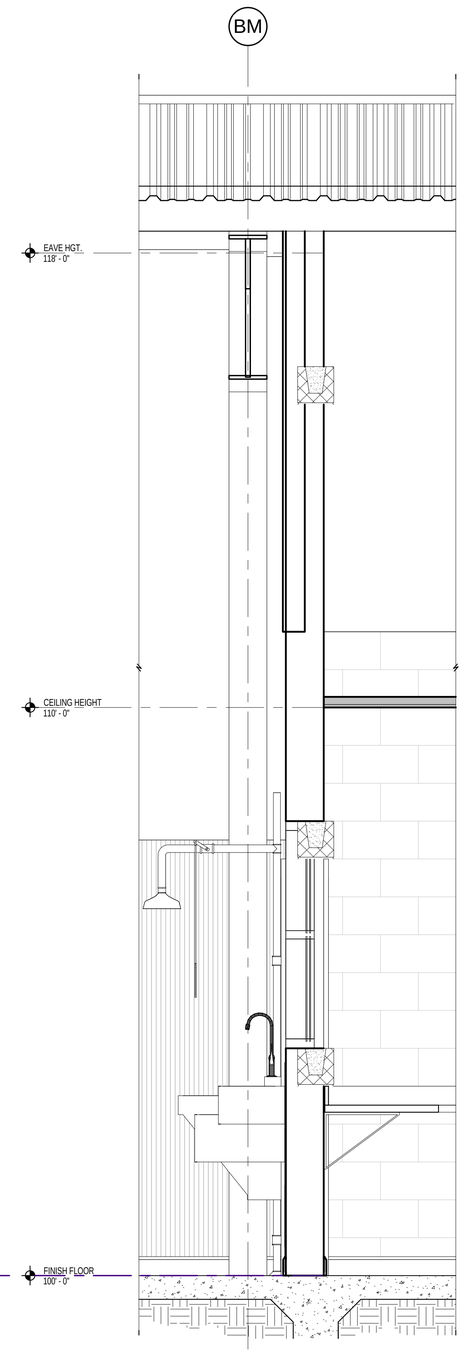
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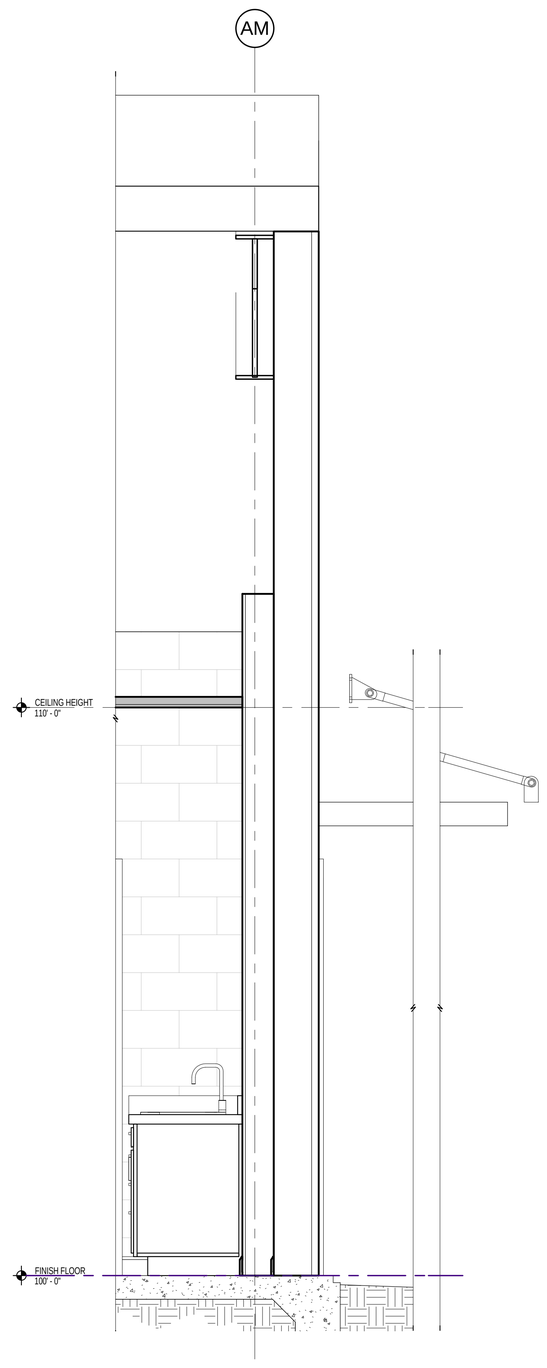
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A4 WALL SECTION 6 - MAINTENANCE
3/4" = 1'-0"



A8 WALL SECTION 7 - MAINTENANCE
3/4" = 1'-0"



A11 WALL SECTION 8 - MAINTENANCE
3/4" = 1'-0"

WALL SECTION NOTES

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9. REFER TO ROOF PLAN, ROOF DETAILS IN SHEETS AE107, AE107, AE 108, AE509 AND AE510 FOR TYPICAL ROOF AND FLASHING DETAILS.

10. REFERENCE EXTERIOR ELEVATIONS FOR VENEER FINISH PATTERNS.

KEYNOTE LEGEND

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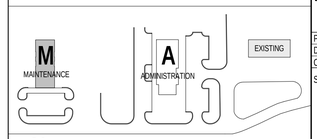
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: Author
CHECKED BY: Checker

SHEET TITLE: WALL SECTIONS - MAINTENANCE

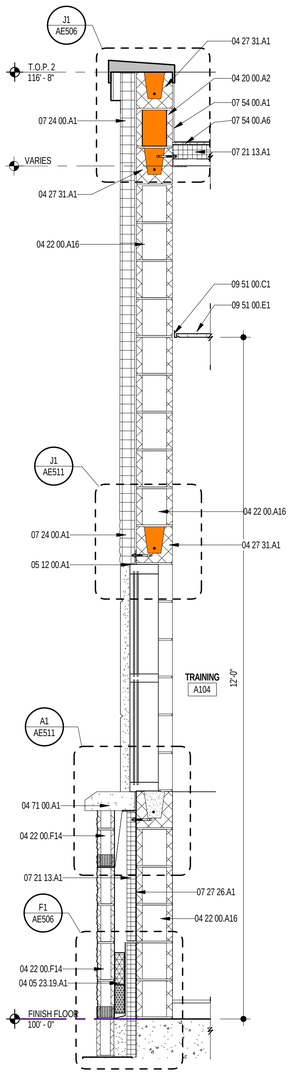


KEY PLAN

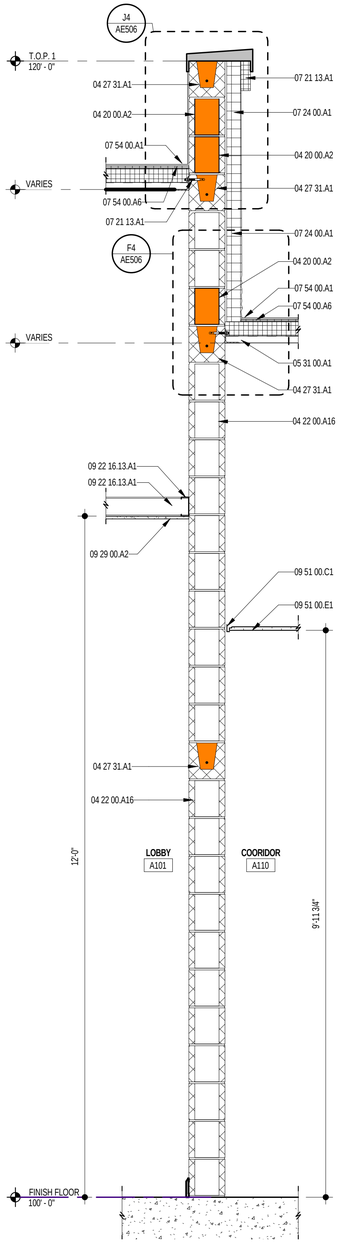
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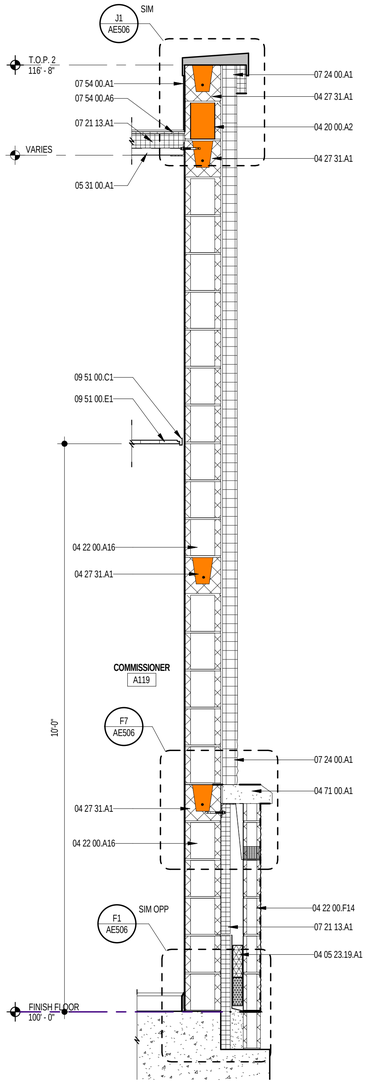
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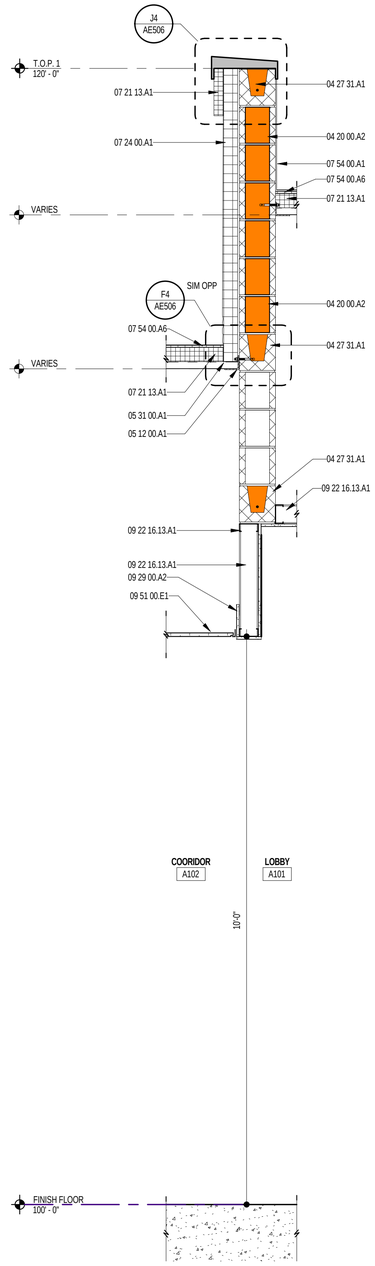
A1 WALL SECTION
3/4" = 1'-0"



A3 WALL SECTION
3/4" = 1'-0"



A7 WALL SECTION
3/4" = 1'-0"



A10 WALL SECTION
3/4" = 1'-0"

WALL SECTION NOTES

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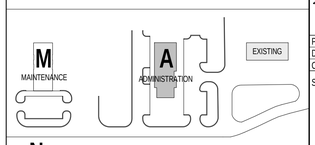
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10. REFERENCE EXTERIOR ELEVATIONS FOR VENEER FINISH PATTERNS.

KEYNOTE LEGEND

04 05 23.19.A1	
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
04 22 00.F14	4" x 8" x 16" Split Face CMU
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
04 71 00.A1	CAST STONE WATERTABLE
05 12 00.A1	CONT. STEEL ANGLE, REFER STRUCTURE
05 31 00.A1	STEEL DECK, REFER STRUCTURE
07 21 13.A1	EXTRUDED POLYSTYRENE BOARD, 2" THICK
07 24 00.A1	EIFS, 3" THICK
07 27 26.A1	
07 54 00.A1	
07 54 00.A6	
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
09 51 00.C1	9/16" Wall Angle
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS



KEY PLAN

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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
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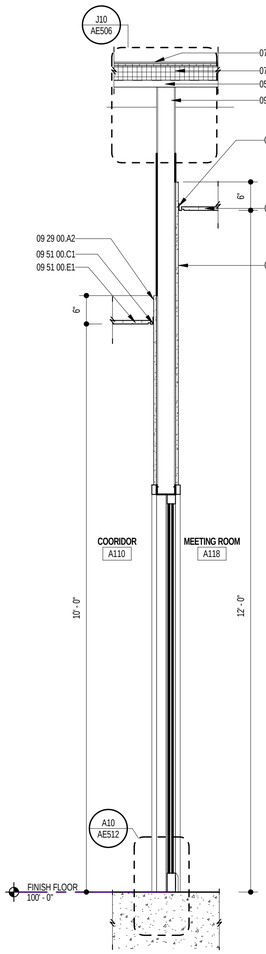
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SHEET TITLE: WALL SECTIONS - ADMINISTRATION

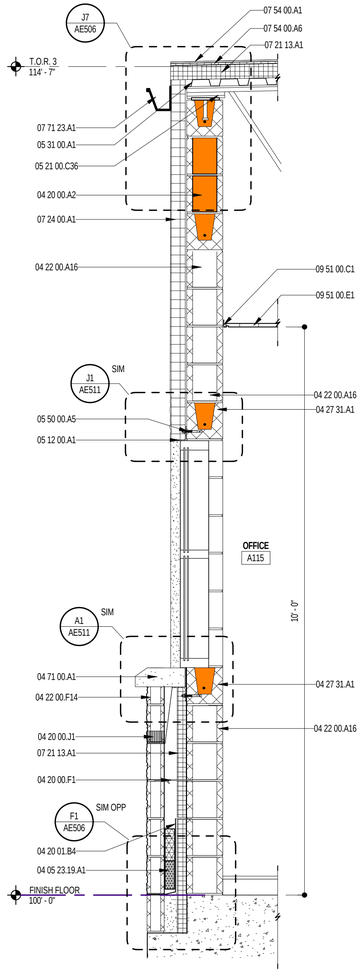
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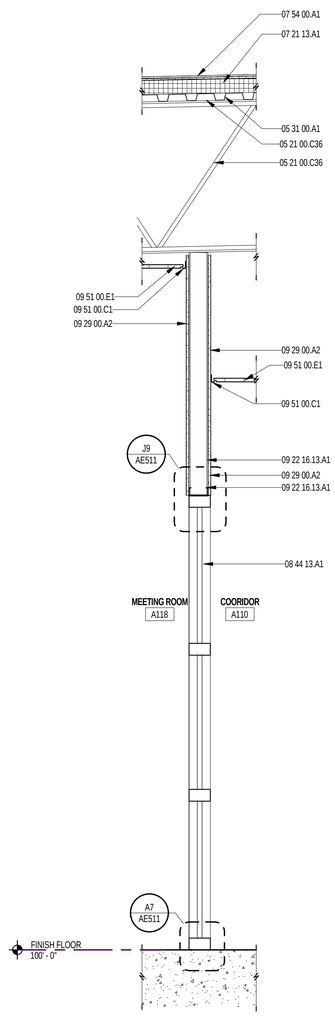
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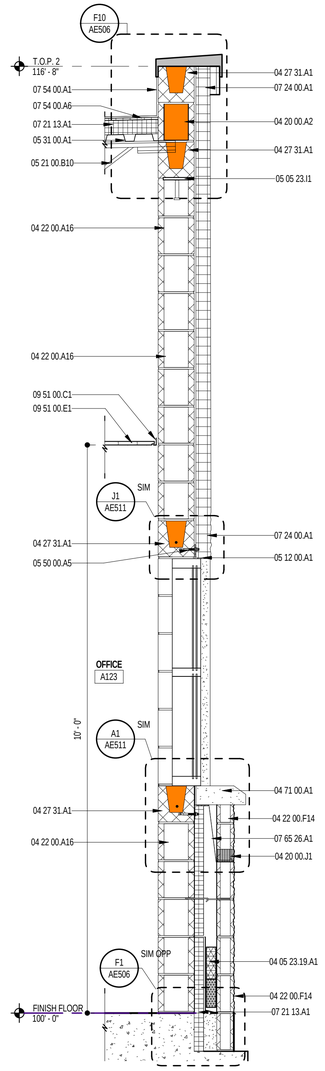
A1 WALL SECTION
3/4" = 1'-0"



A4 WALL SECTION
3/4" = 1'-0"



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A10 WALL SECTION
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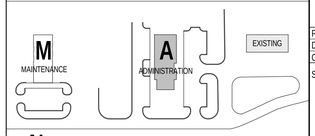
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KEYNOTE LEGEND

04 05 23.19.A1	
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.F1	RIGID STEEL TIE
04 20 00.J1	WEEP/CAVITY VENT
04 20 01.B4	
04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
04 22 00.F14	4" x 8" x 16" Split Face CMU
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
04 71 00.A1	CAST STONE WATERTABLE
05 05 23.I1	1/2" Steel Plate
05 12 00.A1	CONT. STEEL ANGLE, REFER STRUCTURE
05 21 00.B10	16K2 Steel Joist
05 21 00.C36	32LH06 JOIST, REFER TO STRUCTURAL
05 31 00.A1	STEEL DECK, REFER STRUCTURE
05 50 00.A5	MASONRY STUD ANCHOR BOLT, REFER TO STRUCTURAL .
07 21 13.A1	EXTRUDED POLYSTYRENE BOARD, 2" THICK
07 24 00.A1	EIFS, 3" THICK
07 54 00.A1	
07 54 00.A6	
07 65 26.A1	THROUGH WALL FLASHING
07 71 23.A1	GUTTER
08 44 13.A1	CURTAIN WALL
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
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PROJECT OWNER: HIDALGO COUNTY

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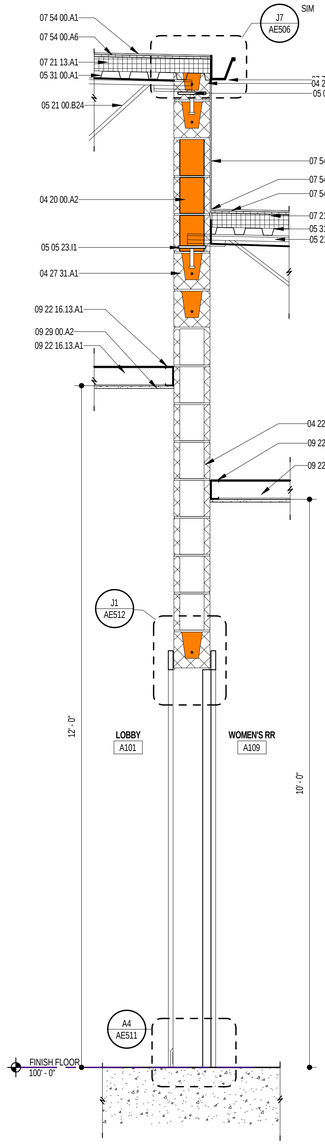
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DRAWN BY: ES
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SHEET TITLE: WALL SECTIONS - ADMINISTRATION

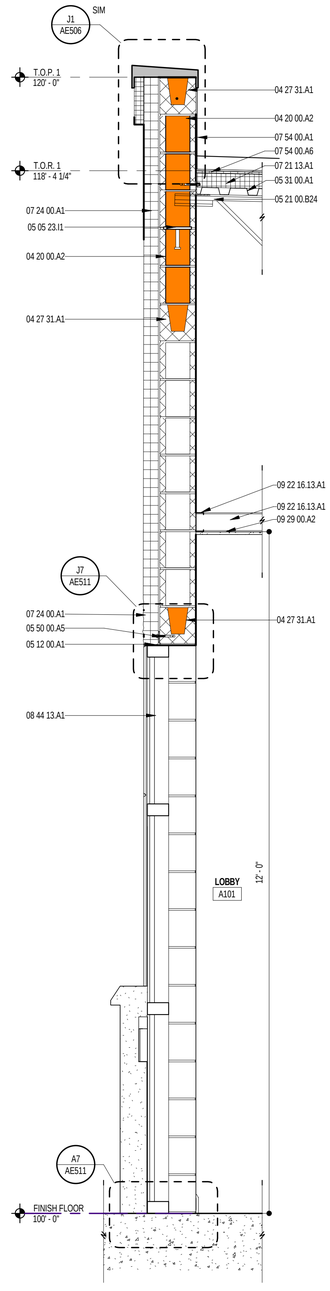
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A1 WALL SECTION
3/4" = 1'-0"



A4 WALL SECTION
3/4" = 1'-0"

WALL SECTION NOTES

1. CONTRACTOR SHALL CROSS-REFERENCE STRUCTURAL COMPONENT DIMENSIONS WITH STRUCTURAL DRAWINGS AND NOTIFY ARCHITECT OF DISCREPANCIES PRIOR TO INSTALLATION.

2. PROVIDE MASONRY WEEP HOLES AT 32" O.C. MAX.

3. AT PERIMETER JOINT BETWEEN ALUMINUM FRAMES AND DISSIMILAR MATERIALS, PROVIDE MINIMUM OF 3/8" JOINT WITH BACKER ROD AND SEALANT.

4. AT ALL REFERENCES TO ALUMINUM SUB-SILL, PROVIDE ALUMINUM SUB-SILL WITH END DAMS. TURN END DAMS UP A MINIMUM OF 6".

5. ALL EXPOSED METALS (INTERIOR AND EXTERIOR), EXCEPT GALVANIZED AND PRE-FINISHED ITEMS, SHALL BE FINISH PAINTED - COLOR SELECTED BY ARCHITECT.

6. EXPOSED CONCRETE WALLS, COLUMNS AND BEAMS TO HAVE "RUBBED OR THOROSEAL" FINISH - COLOR SELECTED BY ARCHITECT.

7. SEE INTERIOR ELEVATIONS FOR MATERIALS FINISH TRANSITION AT EACH ROOM.

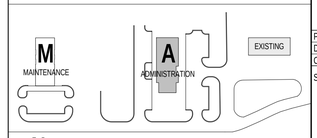
8. DAMPPROOFING SHALL BE TROWELLED ON APPLICATION.

9. REFER TO ROOF PLAN, ROOF DETAILS IN SHEETS AE107, AE107, AE 108, AE509 AND AE510 FOR TYPICAL ROOF AND FLASHING DETAILS.

10. REFERENCE EXTERIOR ELEVATIONS FOR VENEER FINISH PATTERNS.

KEYNOTE LEGEND

04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
05 05 23.I1	1/2" Steel Plate
05 12 00.A1	CONT. STEEL ANGLE, REFER STRUCTURE
05 21 00.B10	16K2 Steel Joist
05 21 00.B24	20K3 Steel Joist
05 31 00.A1	STEEL DECK, REFER STRUCTURE
05 50 00.A5	MASONRY STUD ANCHOR BOLT, REFER TO STRUCTURAL .
07 21 13.A1	EXTRUDED POLYSTYRENE BOARD, 2" THICK
07 24 00.A1	EIFS, 3" THICK
07 54 00.A1	
07 54 00.A6	
07 71 23.A1	GUTTER
08 44 13.A1	CURTAIN WALL
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK



KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

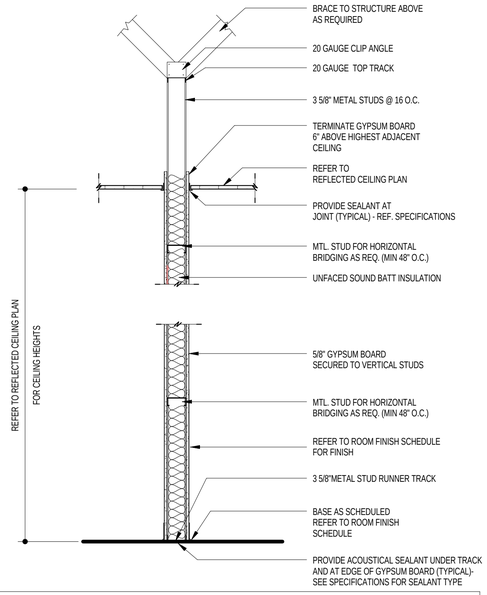
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CHECKED BY: Checker

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AE310

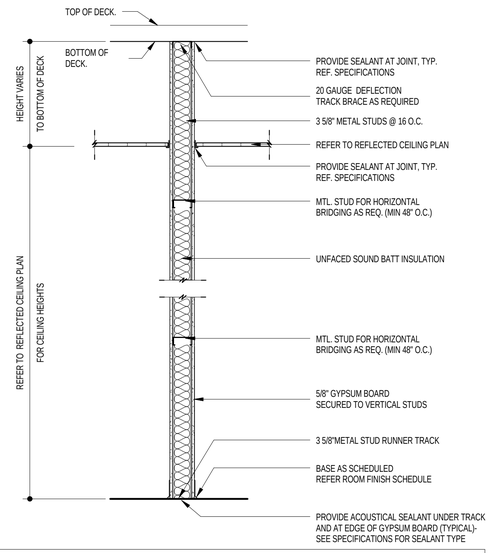
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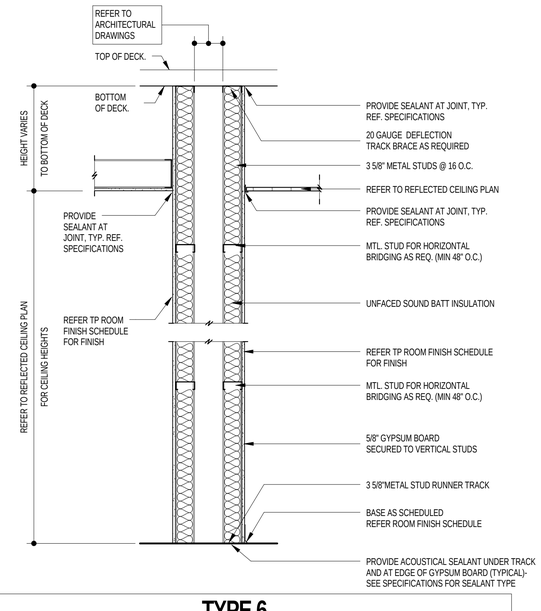
TYPE 4

TYPE	RATING	STC	DESCRIPTION
4	--	--	INTERIOR PARTITION AT MAINTENANCE AND ADMINISTRATION BUILDING
4A	--	--	3-5/8" METAL STUDS SPACED @ 16" O.C. WITH 5/8" GYPSUM BOARD ON EACH SIDE. PROVDE A 4'-0" FRP BOARD WAINSCOT ON THE RESTROOM SIDE. PROVIDE SOUND BATT INSULATION. THIS PARTITION SHALL BE BRACED TO STRUCTURE ABOVE.



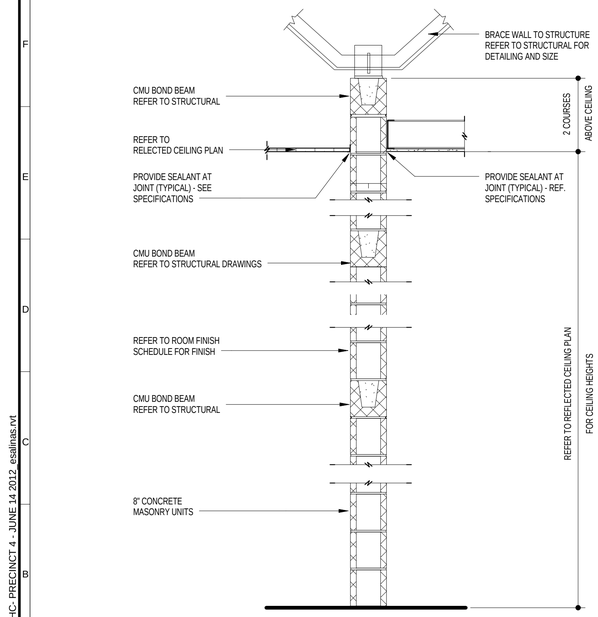
TYPE 5

TYPE	RATING	STC	DESCRIPTION
5	--	--	INTERIOR PARTITION AT MAINTENANCE AND ADMINISTRATION BUILDINGS



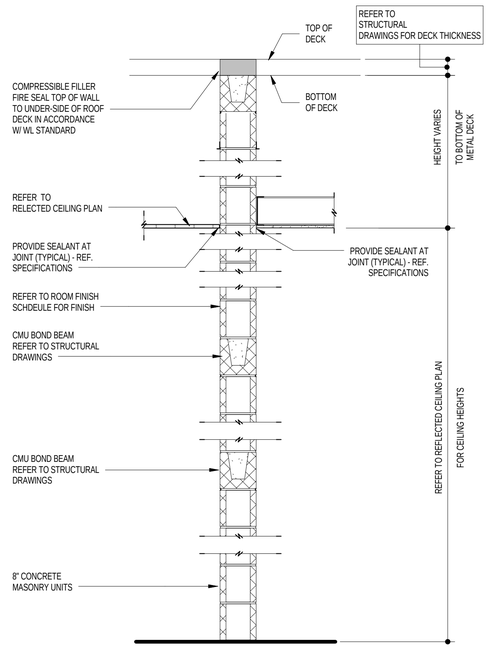
TYPE 6

TYPE	RATING	STC	DESCRIPTION
6	--	--	CHASE WALLS AT ADMINISTRATION BUILDING RESTROOM



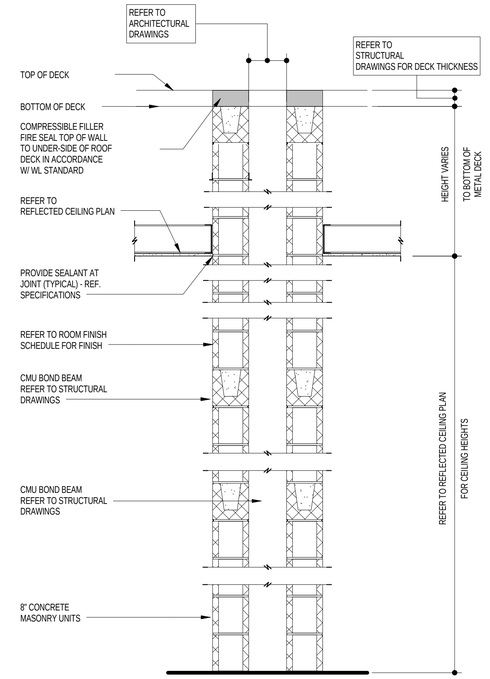
TYPE 1

TYPE	RATING	STC	DESCRIPTION
1	--	--	INTERIOR PARTITION AT MAINTENANCE AND ADMINISTRATION BUILDINGS
1A	--	--	8" CMU WITH 7/8" HAT CHANNELS @ 16" O.C. WITH 5/8" GYPSUM BOARD ON ONE SIDE.



TYPE 2

TYPE	RATING	STC	DESCRIPTION
2	--	--	INTERIOR PARTITION AT MAINTENANCE AND ADMINISTRATION BUILDINGS
2A	--	--	8" CMU WITH 7/8" HAT CHANNELS @ 16" O.C. WITH 5/8" GYPSUM BOARD ON ONE SIDE.



TYPE 3

TYPE	RATING	STC	DESCRIPTION
3	--	--	CHASE WALL AT ADMINISTRATION BUILDING RESTROOM

WALL TYPES GENERAL NOTES

1. ALL DRYWALL CONSTRUCTION SHALL BE WALL TYPE "5", UNLESS NOTED OTHERWISE.

2. ALL CMU WALL CONSTRUCTION SHALL BE WALL TYPE "2", UNLESS NOTED OTHERWISE.

3. EVERY WALL SHOWN ON THE PLAN(S) SHALL BE ONE OF THE WALL TYPES SHOWN; WHETHER KEYED ON THE PLAN(S) OR NOT. IF WALL DOES NOT HAVE A KEY, PROVIDE A WALL TYPE TO MATCH ADJACENT OR NEAREST KEY.

4. REFER TO SHEET AF601 FOR ROOM FINISH SCHEDULE.

5. SEALL ALL GAPS AND PENETRATIONS IN FIRE RATED WALLS WITH FIRE RATED BLANKETS AND/OR SEALANTS.

6. ALL EXPOSED WALLS THAT ARE PERPENDICULAR TO ROOF DECK SHOULD BE SEALED TIGHT TO UNDERSIDE OF DECK.

7. WHERE WALLS ARE CALLED TO EXTEND TO UNDERSIDE OF DECK, ALIGN WALL (S) WITH STRUCTURE ABOVE AND/OR WRAP STRUCTURE WITH DRYWALL.

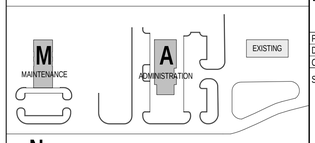
8. SEAL ALL GAPS, CRACKS AND PENETRATIONS THROUGHT WALLS.

9. ALL LOAD BEARING STUDS TO BE 14 GAUGE.

10. FOR HEIGHTS OF WALLS SEE BUILDING SECTIONS AND/OR ELEVATIONS.

11. PROVIDE 1/2" CEMENTITIOUS BACKER BOARD IN LIEU OF 5/8" GYPSUM BOARD AT WALLS BEHIND ALL CERAMIC TILE AT SHOWERS. PROVIDE 5/8" GYPSUM BOARD AT WALL BEHIND ALL CERAMIC TILE AT RESTROOMS.

12. SEE SPECIFICATIONS FOR GUAGES OF NON-LOAD BEARING WALLS.





KEY PLAN

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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

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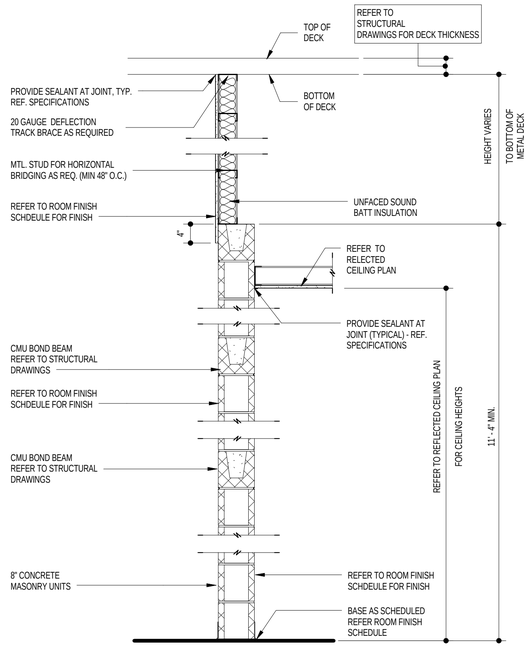
PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: WALL TYPES

AE311

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TYPE 7

TYPE	RATING	STC	DESCRIPTION
7	--	--	INTERIOR PARTITION AT MAINTENANCE BUILDING
7A	--	--	8" CMU UP TO 11' - 4". EXTEND PARTITION TO DECK WITH 3-5/8" METAL STUDS WITH 5/8" GYPSUM BOARD ON THE SHOP BAY SIDE. PROVIDE SOUND BATT INSULATION. FURR-OUT WALL WITH 7/8" HAT CHANNELS @ 16" O.C. AND 5/8" GYPSUM BOARD ON THE OFFICE SIDE.
7B	--	--	8" CMU UP TO 11' - 4". EXTEND PARTITION TO DECK WITH 3-5/8" METAL STUDS WITH 5/8" GYPSUM BOARD ON THE SHOP BAY SIDE. FURR-OUT WALL WITH 7/8" HAT CHANNELS @ 16" O.C. AND 5/8" GYPSUM BOARD WITH A 4' - 0" FRP BOARD WAINSCOT ON THE RESTROOM SIDE.

WALL TYPES GENERAL NOTES

1. ALL DRYWALL CONSTRUCTION SHALL BE WALL TYPE "5", UNLESS NOTED OTHERWISE.

2. ALL CMU WALL CONSTRUCTION SHALL BE WALL TYPE "2", UNLESS NOTED OTHERWISE.

3. EVERY WALL SHOWN ON THE PLAN(S) SHALL BE ONE OF THE WALL TYPES SHOWN; WHETHER KEYED ON THE PLAN(S) OR NOT. IF WALL DOES NOT HAVE A KEY, PROVIDE A WALL TYPE TO MATCH ADJACENT OR NEAREST KEY.

4. REFER TO SHEET AF601 FOR ROOM FINISH SCHEDULE.

5. SEALL ALL GAPS AND PENETRATIONS IN FIRE RATED WALLS WITH FIRE RATED BLANKETS AND/OR SEALANTS.

6. ALL EXPOSED WALLS THAT ARE PERPENDICULAR TO ROOF DECK SHOULD BE SEALED TIGHT TO UNDERSIDE OF DECK.

7. WHERE WALLS ARE CALLED TO EXTEND TO UNDERSIDE OF DECK, ALIGN WALL (S) WITH STRUCTURE ABOVE AND/OR WRAP STRUCTURE WITH DRYWALL.

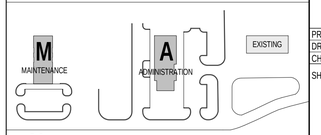
8. SEAL ALL GAPS, CRACKS AND PENETRATIONS THROUGHT WALLS.

9. ALL LOAD BEARING STUDS TO BE 14 GAUGE.

10. FOR HEIGHTS OF WALLS SEE BUILDING SECTIONS AND/OR ELEVATIONS.

11. PROVIDE 1/2" CEMENTITIOUS BACKER BOARD IN LIEU OF 5/8" GYPSUM BOARD AT WALLS BEHIND ALL CERAMIC TILE AT SHOWERS. PROVIDE 5/8" GYPSUM BOARD AT WALL BEHIND ALL CERAMIC TILE AT RESTROOMS.

12. SEE SPECIFICATIONS FOR GUAGES OF NON-LOAD BEARING WALLS.



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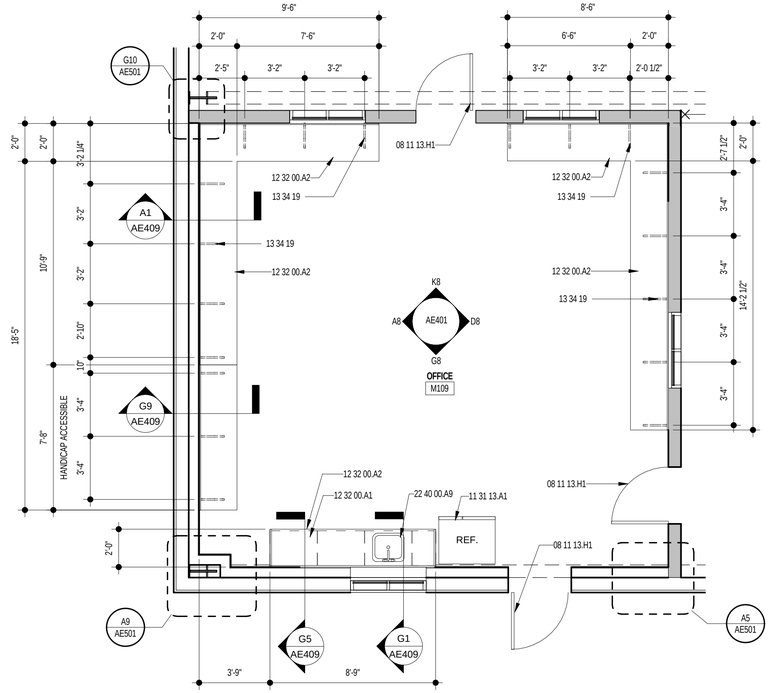
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SHEET TITLE: WALL TYPES

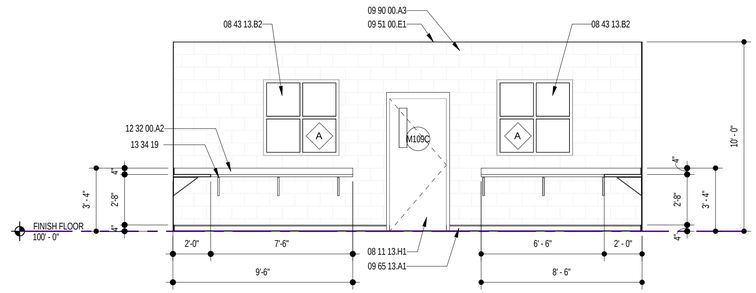
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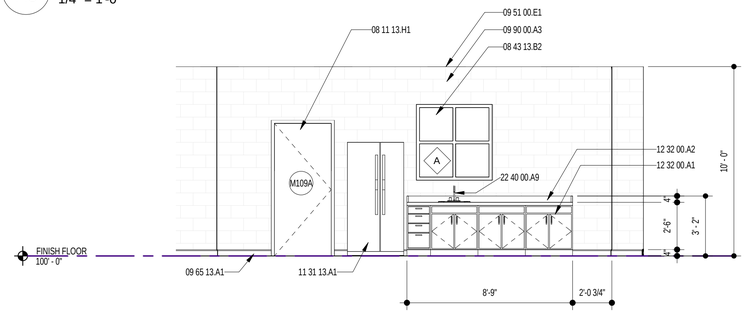
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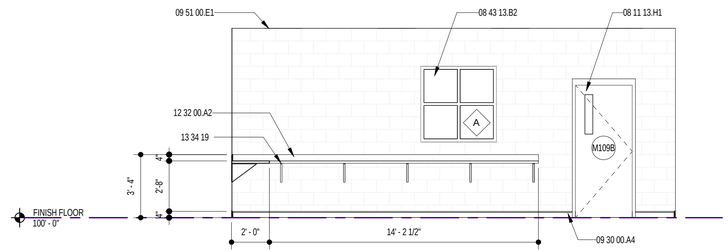
A1 ENLARGED FLOOR PLAN - OFFICE M109 - MAINTENANCE BLDG.
1/4" = 1'-0"



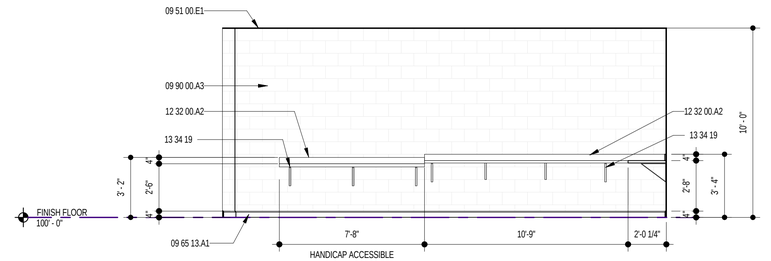
K8 INTERIOR ELEVATION - OFFICE M109
1/4" = 1'-0"



G8 INTERIOR ELEVATION - OFFICE M109
1/4" = 1'-0"



D8 INTERIOR ELEVATION - OFFICE M109
1/4" = 1'-0"



A8 INTERIOR ELEVATION - OFFICE M109
1/4" = 1'-0"

INTERIOR GENERAL NOTES

1. PROVIDE CONTROL JOINTS AS SHOWN AND SPECIFIED.

2. REFER TO SHEET GI003 FOR ALL TOILET ACCESSORIES.

3. REFER TO SHEET AE408 AND AE409 FOR CASEWORK GENERAL NOTES.

4. ALL APPLIANCES, STOVES, OVENS, REFRIGERATORS, DISHWASHERS, ICE MACHINES AND MICROWAVES SHALL BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

5. CONTRACTOR SHALL COORDINATE WITH THE M.E.P. DRAWINGS AND SHALL THICKEN WALLS AS REQUIRED TO INSTALL M.E.P. ITEMS. VERIFY WITH THE ARCHITECT THAT THICKENING OF WALLS DOESN'T AFFECT HANDICAPPED ACCESSIBLE REQUIREMENTS.

6. SEAL ALL GAPS WHERE M.E.P. SYSTEMS PENETRATE WALLS, FLOORS, CEILINGS, FIRE ASSEMBLIES AND ROOFING.

7. WHERE STRUCTURE IS SCHEDULED TO BE EXPOSED, LEAVE CLEAN, BLEMISH FREE DECK WITH FACTORY FINISH EXPOSED TO VIEW.

8. PROVIDE 3/4" PLYWOOD, PAINTED, OVER TAPED & FLOATED GYPSUM BOARD ON WALLS OF I.D.F. AND M.D.F. ROOMS.

9. PAINT ALL HOLLOW METAL FRAMES.

10. PROVIDE EPOXY PAINT ON ALL MASONRY WALLS SCHEDULED TO RECEIVE PAINT.

11. PAINT ALL GYPSUM BOARD SURFACES.

12. REVIEW INTERIOR ELEVATIONS ON SHEETS AE401 THRU AE407 FOR SPECIAL CONDITIONS, COLOR, FLOOR AND WALL PATTERNS.

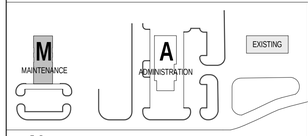
13. REFER TO REFLECTED CEILING PLANS, SHEETS AE105 AND AE106, FOR SPECIAL CONDITIONS, PATTERNS, CEILING HEIGHT VARIATIONS.

14. ALL EXPOSED WOOD ON ENTIRE PROJECT SHALL BE PREMIUM GRADE "A", PLAIN SLICED, PREMIUM WHITE MAPLE FINISH WITH TRANSPARENT FINISH.

15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

06 41 00.A2	BASE CABINETS
08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 30 00.A4	CERAMIC TILE BASE
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
11 31 13.A1	REFRIGERATOR. NOT IN CONTRACT
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
12 32 00.A3	COUNTERTOP
13 34 19	METAL BUILDING SYSTEMS
22 40 00.A9	UTILITY SINK



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DRAWN BY: EBS
CHECKED BY: YIPG

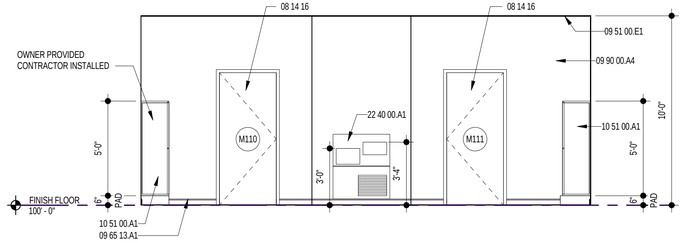
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AE401

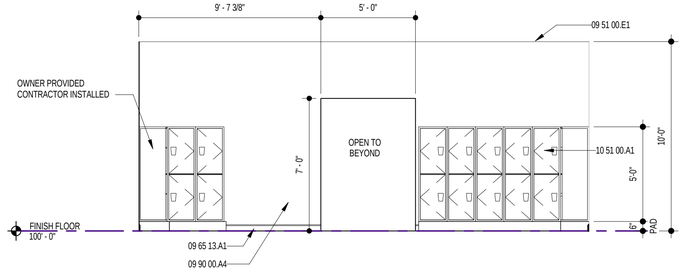
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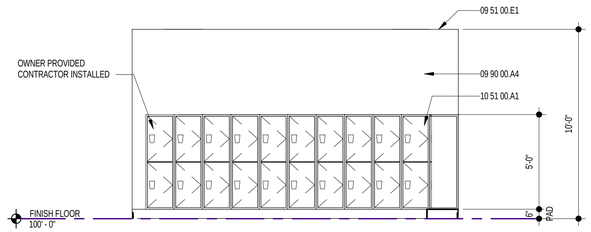
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1/4" = 1'-0"



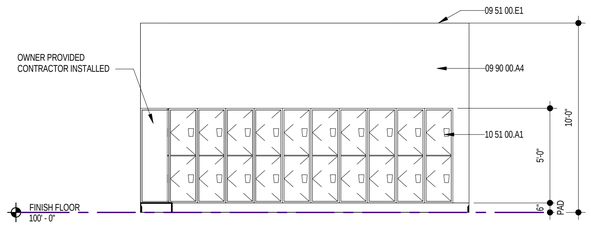
K8 INTERIOR ELEVATION - LOCKERS M112
1/4" = 1'-0"



G8 INTERIOR ELEVATION - LOCKERS M112
1/4" = 1'-0"



D8 INTERIOR ELEVATION - LOCKERS M112
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A8 INTERIOR ELEVATION - LOCKERS M112
1/4" = 1'-0"

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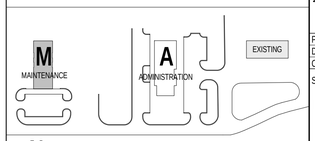
13. REFER TO REFLECTED CEILING PLANS, SHEETS AE105 AND AE106, FOR SPECIAL CONDITIONS, PATTERNS, CEILING HEIGHT VARIATIONS.

14. ALL EXPOSED WOOD ON ENTIRE PROJECT SHALL BE PREMIUM GRADE "A", PLAIN SLICED, PREMIUM WHITE MAPLE FINISH WITH TRANSPARENT FINISH.

15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

08 14 16	FLUSH WOOD DOORS
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 51 00.A1	METAL LOCKERS
22 40 00.A1	DRINKING FOUNTAIN



KEY PLAN

ero architects
300 South 8th Street,
McAllen, Texas 78501
956.661.0400
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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

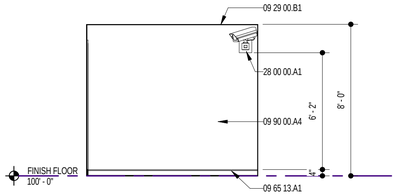
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DRAWN BY:	EBS
CHECKED BY:	YIPG

SHEET TITLE: ENLARGED F.P. & INT. ELEV. - LOCKERS - MAINTENANCE

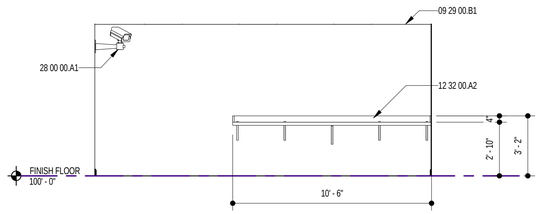
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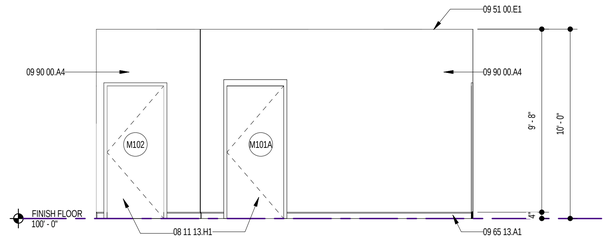
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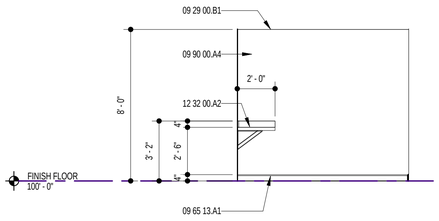
K1 INTERIOR ELEVATION - COMM M104
1/4" = 1'-0"



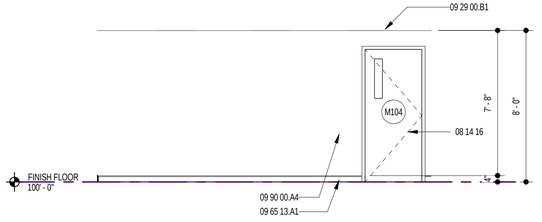
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1/4" = 1'-0"



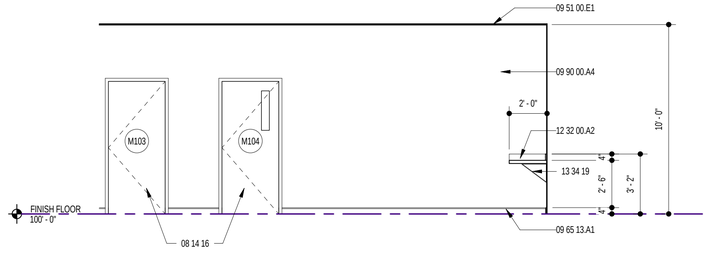
K8 INTERIOR ELEVATION - DISPATCH M101
1/4" = 1'-0"



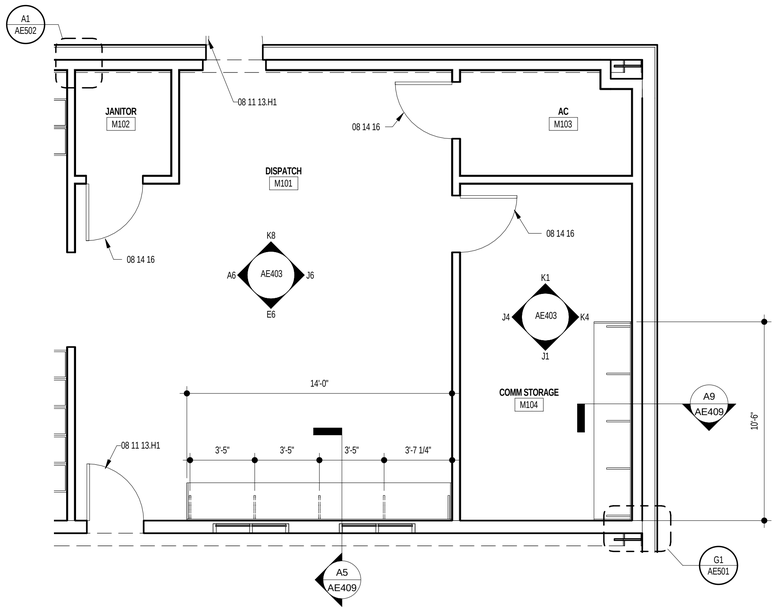
J1 INTERIOR ELEVATION - COMM M104
1/4" = 1'-0"



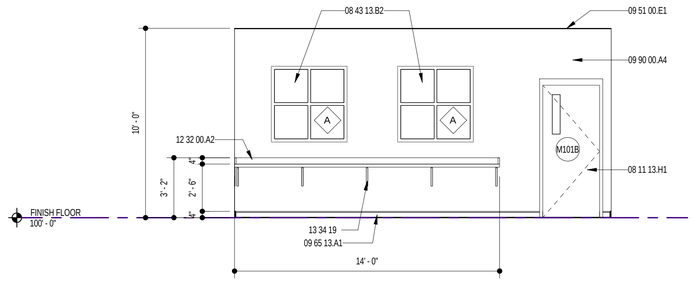
J4 INTERIOR ELEVATION - COMM M104
1/4" = 1'-0"



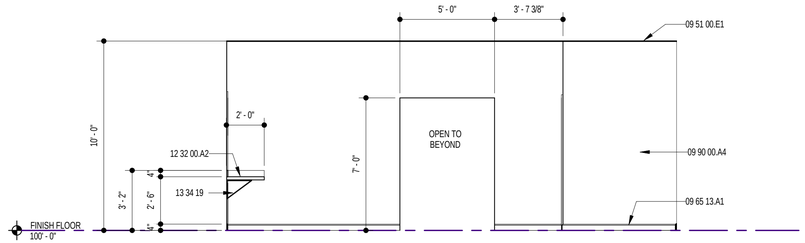
J6 INTERIOR ELEVATION - DISPATCH M101
1/4" = 1'-0"



A1 ENLARGED FLOOR PLAN - DISPATCH M 101 & COMM. STORAGE M104 - MAINTENANCE BLDG.
1/4" = 1'-0"



E6 INTERIOR ELEVATION - DISPATCH M101
1/4" = 1'-0"



A6 INTERIOR ELEVATION - DISPATCH M101
1/4" = 1'-0"

INTERIOR GENERAL NOTES

1. PROVIDE CONTROL JOINTS AS SHOWN AND SPECIFIED.

2. REFER TO SHEET GI003 FOR ALL TOILET ACCESSORIES.

3. REFER TO SHEET AE408 AND AE409 FOR CASEWORK GENERAL NOTES.

4. ALL APPLIANCES, STOVES, OVENS, REFRIGERATORS, DISHWASHERS, ICE MACHINES AND MICROWAVES SHALL BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

5. CONTRACTOR SHALL COORDINATE WITH THE M.E.P. DRAWINGS AND SHALL THICKEN WALLS AS REQUIRED TO INSTALL M.E.P. ITEMS. VERIFY WITH THE ARCHITECT THAT THICKENING OF WALLS DOESN'T AFFECT HANDICAPPED ACCESSIBLE REQUIREMENTS.

6. SEAL ALL GAPS WHERE M.E.P. SYSTEMS PENETRATE WALLS, FLOORS, CEILINGS, FIRE ASSEMBLIES AND ROOFING.

7. WHERE STRUCTURE IS SCHEDULED TO BE EXPOSED, LEAVE CLEAN, BLEMISH FREE DECK WITH FACTORY FINISH EXPOSED TO VIEW.

8. PROVIDE 3/4" PLYWOOD, PAINTED, OVER TAPED & FLOATED GYPSUM BOARD ON WALLS OF I.D.F. AND M.D.F. ROOMS.

9. PAINT ALL HOLLOW METAL FRAMES.

10. PROVIDE EPOXY PAINT ON ALL MASONRY WALLS SCHEDULED TO RECEIVE PAINT.

11. PAINT ALL GYPSUM BOARD SURFACES.

12. REVIEW INTERIOR ELEVATIONS ON SHEETS AE401 THRU AE407 FOR SPECIAL CONDITIONS, COLOR, FLOOR AND WALL PATTERNS.

13. REFER TO REFLECTED CEILING PLANS, SHEETS AE105 AND AE106, FOR SPECIAL CONDITIONS, PATTERNS, CEILING HEIGHT VARIATIONS.

14. ALL EXPOSED WOOD ON ENTIRE PROJECT SHALL BE PREMIUM GRADE "A", PLAIN SLICED, PREMIUM WHITE MAPLE FINISH WITH TRANSPARENT FINISH.

15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

08 11 13.H1	HOLLOW METAL DOOR & FRAME
08 14 16	FLUSH WOOD DOORS
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
12 32 00.A2	COUNTERTOP WITH OPEN BASE
13 34 19	METAL BUILDING SYSTEMS
28 00 00.A1	

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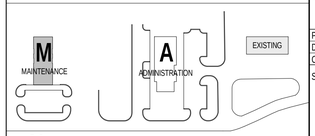
ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG



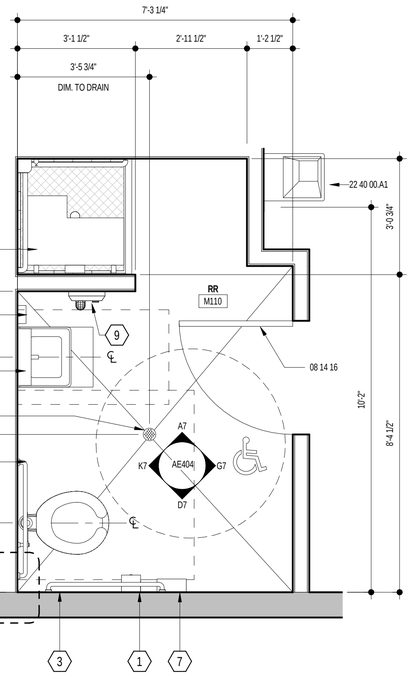
KEY PLAN

ENLARGED F.P. & INT. ELEV. - DISPATCH M101 & COMMUNICATION STORAGE M104 - MAINTENANCE

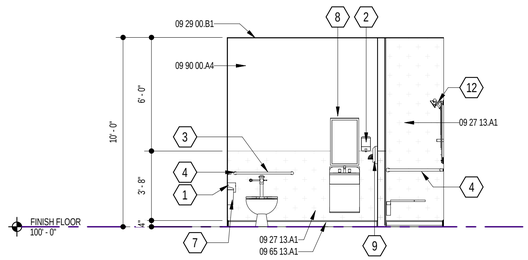
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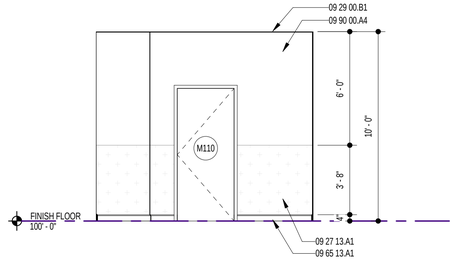
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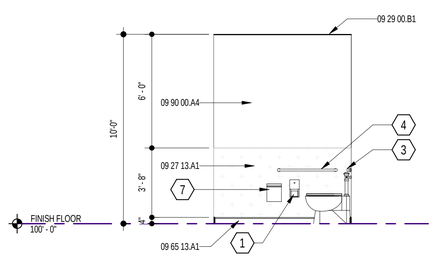
A1 ENLARGED FLOOR PLAN - RR M110 - MAINTENANCE BLDG.
1/2" = 1'-0"



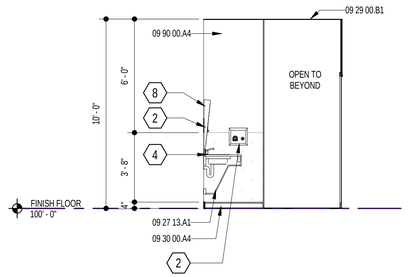
K7 INTERIOR ELEVATION - RESTROOM M110
1/4" = 1'-0"



G7 INTERIOR ELEVATION - RESTROOM M110
1/4" = 1'-0"



D7 INTERIOR ELEVATION - RESTROOM M110
1/4" = 1'-0"



A7 INTERIOR ELEVATION - RESTROOM M110
1/4" = 1'-0"

INTERIOR GENERAL NOTES

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3. REFER TO SHEET AE408 AND AE409 FOR CASEWORK GENERAL NOTES.

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8. PROVIDE 3/4" PLYWOOD, PAINTED, OVER TAPED & FLOATED GYPSUM BOARD ON WALLS OF I.D.F. AND M.D.F. ROOMS.

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15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

08 14 16	FLUSH WOOD DOORS
09 27 13.A1	FRP BOARD
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 30 00.A3	CERAMIC TILE
09 30 00.A4	CERAMIC TILE BASE
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
22 13 16.A2	FLOOR DRAIN
22 40 00.A1	DRINKING FOUNTAIN

ACCESSORIES SCHEDULE

TOILET ACCESSORIES

MARK	DESCRIPTION
1	MULTI-ROLL TOILET TISSUE DISPENSER
2	LIQUID-SOAP DISPENSER
3	GRAB BAR - 42" LONG
4	GRAB BAR - 36" LONG
5	WASTE RECEPTABLE
6	PAPER TOWEL DISPENSER UNIT
7	SANITARY-NAPKIN DISPENSER UNIT
8	MIRROR UNIT
9	WARM-AIR DRYER

UTILITY ACCESSORIES

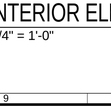
MARK	DESCRIPTION
10	COMBINATION UTILITY SHELF/MOP AND BROOM HOLDER

OTHER EQUIPMENT

MARK	DESCRIPTION
11	TOILET PARTITIONS REF. 10 28 00.
12	SHOWER COMPARTMENT REF. 09 30 13.A3

NOTE: REFER TO SPECIFICATIONS FOR MODEL NUMBERS





KEY PLAN

ero architects
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McAllen, Texas 78501
956.661.0400
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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

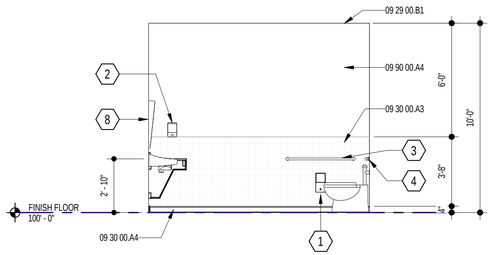
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CHECKED BY: YIPG

SHEET TITLE: ENLARGED F.P. & INT. ELEV. - RESTROOM M110 - MAINTENANCE

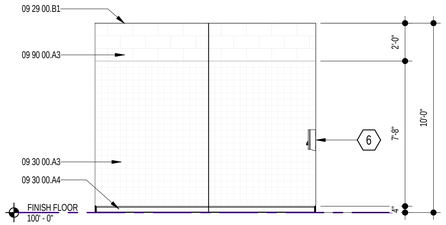
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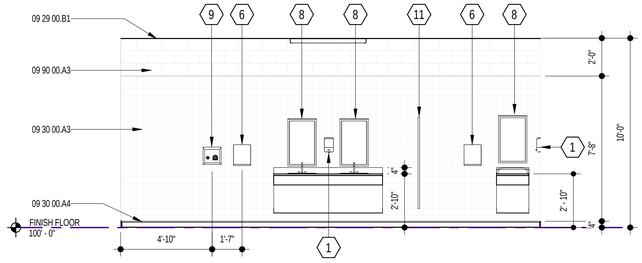
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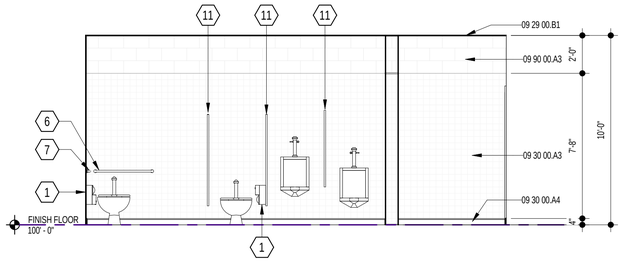
K1 INTERIOR ELEVATION - MEN'S RESTROOM A107
1/4" = 1'-0"



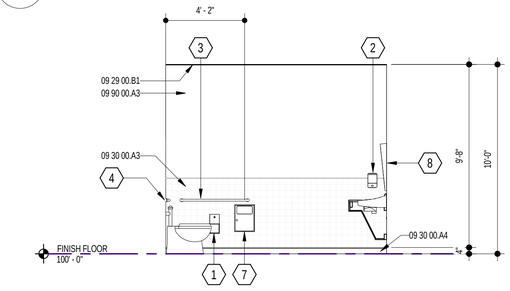
K5 INTERIOR ELEVATION - MEN'S RESTROOM A107
1/4" = 1'-0"



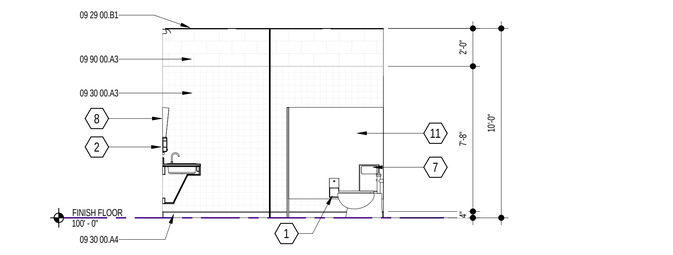
K8 INTERIOR ELEVATION - MEN'S RESTROOM A107
1/4" = 1'-0"



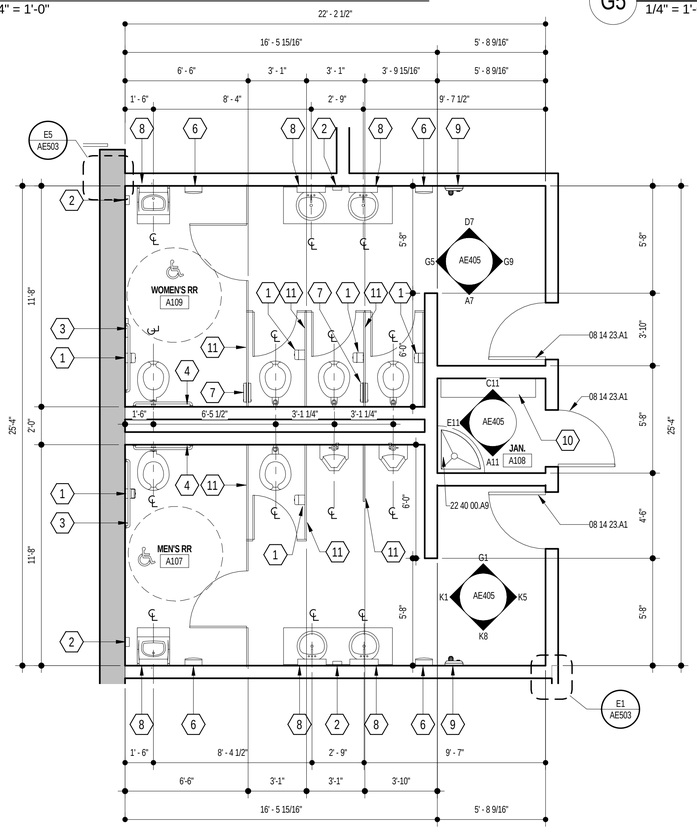
G1 INTERIOR ELEVATION - MEN'S RESTROOM A107
1/4" = 1'-0"



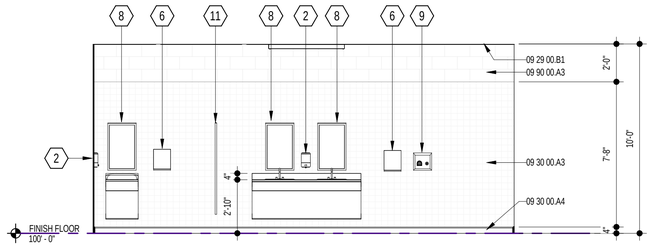
G5 INTERIOR ELEVATION - WOMENS RESTROOM A109
1/4" = 1'-0"



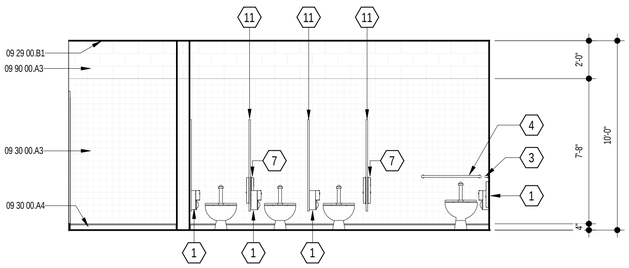
G9 INTERIOR ELEVATION - WOMENS RESTROOM A109
1/4" = 1'-0"



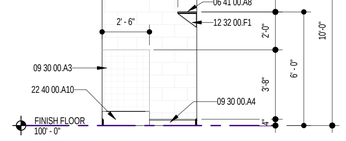
A1 ENLARGED FLOOR PLANS - MENS A107 & WOMENS A109
1/4" = 1'-0"



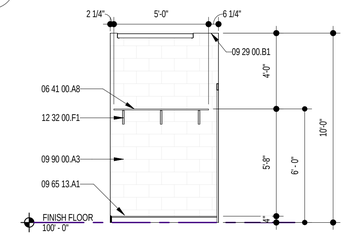
D7 INTERIOR ELEVATION - WOMENS RESTROOM
1/4" = 1'-0"



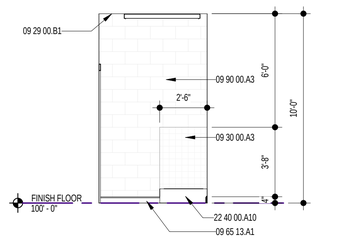
A7 INTERIOR ELEVATION - WOMENS RESTROOM A109
1/4" = 1'-0"



E11 INTERIOR ELEVATION - JAN. A108
1/4" = 1'-0"



C11 INTERIOR ELEVATION - JAN. A108
1/4" = 1'-0"



A11 INTERIOR ELEVATION - JAN. A108
1/4" = 1'-0"

INTERIOR GENERAL NOTES

1. PROVIDE CONTROL JOINTS AS SHOWN AND SPECIFIED.

2. REFER TO SHEET GI003 FOR ALL TOILET ACCESSORIES.

3. REFER TO SHEET AE408 AND AE409 FOR CASEWORK GENERAL NOTES.

4. ALL APPLIANCES, STOVES, OVENS, REFRIGERATORS, DISHWASHERS, ICE MACHINES AND MICROWAVES SHALL BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

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6. SEAL ALL GAPS WHERE M.E.P. SYSTEMS PENETRATE WALLS, FLOORS, CEILINGS, FIRE ASSEMBLIES AND ROOFING.

7. WHERE STRUCTURE IS SCHEDULED TO BE EXPOSED, LEAVE CLEAN, BLEMISH FREE DECK WITH FACTORY FINISH EXPOSED TO VIEW.

8. PROVIDE 3/4" PLYWOOD, PAINTED, OVER TAPED & FLOATED GYPSUM BOARD ON WALLS OF I.D.F. AND M.D.F. ROOMS.

9. PAINT ALL HOLLOW METAL FRAMES.

10. PROVIDE EPOXY PAINT ON ALL MASONRY WALLS SCHEDULED TO RECEIVE PAINT.

11. PAINT ALL GYPSUM BOARD SURFACES.

12. REVIEW INTERIOR ELEVATIONS ON SHEETS AE401 THRU AE407 FOR SPECIAL CONDITIONS, COLOR, FLOOR AND WALL PATTERNS.

13. REFER TO REFLECTED CEILING PLANS, SHEETS AE105 AND AE106, FOR SPECIAL CONDITIONS, PATTERNS, CEILING HEIGHT VARIATIONS.

14. ALL EXPOSED WOOD ON ENTIRE PROJECT SHALL BE PREMIUM GRADE "A", PLAIN SLICED, PREMIUM WHITE MAPLE FINISH WITH TRANSPARENT FINISH.

15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

06 41 00.A8	SHELVING
08 14 23.A1	PLASTIC-LAMINATE - FACED WOOD DOOR
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 30 00.A3	CERAMIC TILE
09 30 00.A4	CERAMIC TILE BASE
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 28 00.G1	MIRROR, TA-8
12 32 00.F1	METAL BRACKET
22 40 00.A9	UTILITY SINK
22 40 00.A10	Mop Sink

ACCESSORIES SCHEDULE

TOILET ACCESSORIES

MARK	DESCRIPTION
1	MULTI-ROLL TOILET TISSUE DISPENSER
2	LIQUID-SOAP DISPENSER
3	GRAB BAR - 42" LONG
4	GRAB BAR - 36" LONG
5	WASTE RECEPTABLE
6	PAPER TOWEL DISPENSER UNIT
7	SANITARY-NAPKIN DISPENSER UNIT
8	MIRROR UNIT
9	WARM-AIR DRYER

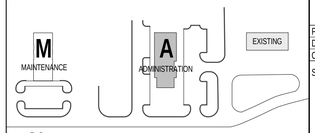
UTILITY ACCESSORIES

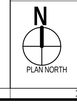
MARK	DESCRIPTION
10	COMBINATION UTILITY SHELF/MOP AND BROOM HOLDER

OTHER EQUIPMENT

MARK	DESCRIPTION
11	TOILET PARTITIONS REF. 10 28 00.
12	SHOWER COMPARTMENT REF. 09 30 13.A3

NOTE: REFER TO SPECIFICATIONS FOR MODEL NUMBERS





KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

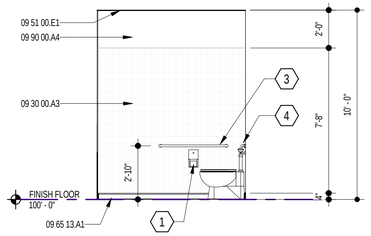
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DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE: ENLARGED F.P. & INT. ELEV. - RESTROOMS - ADMINISTRATION

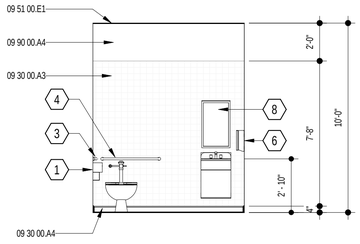
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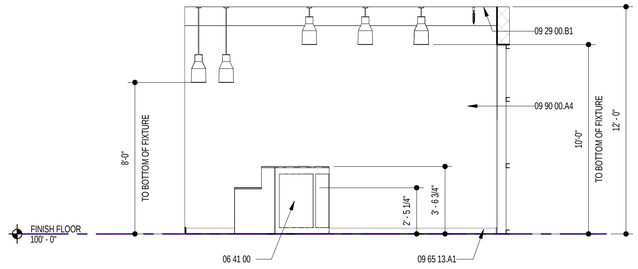
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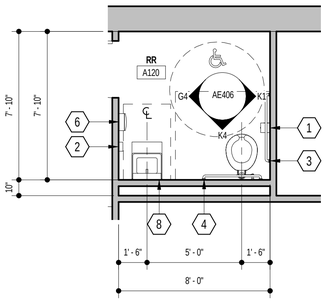
K1 INTERIOR ELEVATION - RR A120
1/4" = 1'-0"



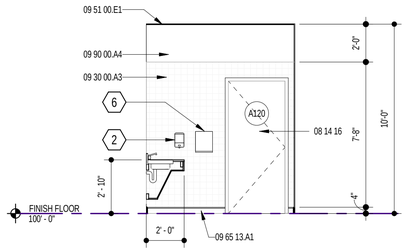
K4 INTERIOR ELEVATION - RR A120
1/4" = 1'-0"



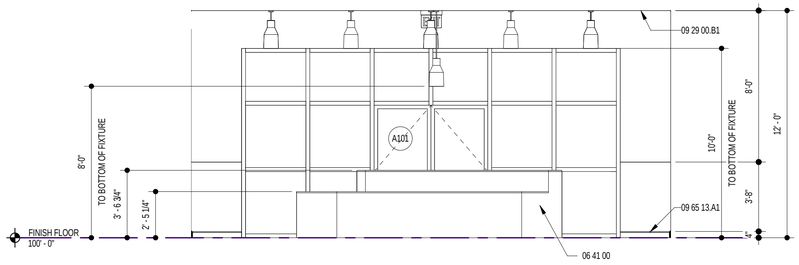
K7 INTERIOR ELEVATION - LOBBY A101
1/4" = 1'-0"



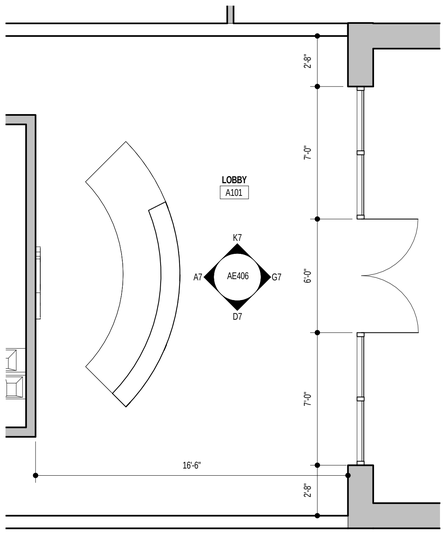
G1 ENLARGED FLOOR PLAN - RR A120
1/4" = 1'-0"



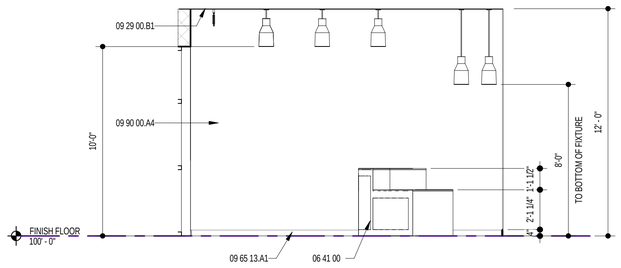
G4 INTERIOR ELEVATION - RR A120
1/4" = 1'-0"



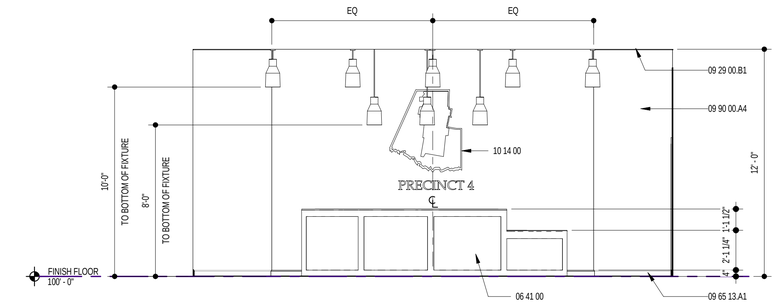
G7 INTERIOR ELEVATION - LOBBY A101
1/4" = 1'-0"



A1 ENLARGED FLOOR PLAN - ADMIN A101
1/4" = 1'-0"



D7 INTERIOR ELEVATION - LOBBY A101
1/4" = 1'-0"



A7 INTERIOR ELEVATION - LOBBY A101
1/4" = 1'-0"

INTERIOR GENERAL NOTES

1. PROVIDE CONTROL JOINTS AS SHOWN AND SPECIFIED.
2. REFER TO SHEET GI003 FOR ALL TOILET ACCESSORIES.
3. REFER TO SHEET AE408 AND AE409 FOR CASEWORK GENERAL NOTES.
4. ALL APPLIANCES, STOVES, OVENS, REFRIGERATORS, DISHWASHERS, ICE MACHINES AND MICROWAVES SHALL BE PROVIDED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.
5. CONTRACTOR SHALL COORDINATE WITH THE M.E.P. DRAWINGS AND SHALL THICKEN WALLS AS REQUIRED TO INSTALL M.E.P. ITEMS. VERIFY WITH THE ARCHITECT THAT THICKENING OF WALLS DOESN'T AFFECT HANDICAPPED ACCESSIBLE REQUIREMENTS.
6. SEAL ALL GAPS WHERE M.E.P. SYSTEMS PENETRATE WALLS, FLOORS, CEILINGS, FIRE ASSEMBLIES AND ROOFING.
7. WHERE STRUCTURE IS SCHEDULED TO BE EXPOSED, LEAVE CLEAN, BLEMISH FREE DECK WITH FACTORY FINISH EXPOSED TO VIEW.
8. PROVIDE 3/4" PLYWOOD, PAINTED, OVER TAPED & FLOATED GYPSUM BOARD ON WALLS OF I.D.F. AND M.D.F. ROOMS.
9. PAINT ALL HOLLOW METAL FRAMES.
10. PROVIDE EPOXY PAINT ON ALL MASONRY WALLS SCHEDULED TO RECEIVE PAINT.
11. PAINT ALL GYPSUM BOARD SURFACES.
12. REVIEW INTERIOR ELEVATIONS ON SHEETS AE401 THRU AE407 FOR SPECIAL CONDITIONS, COLOR, FLOOR AND WALL PATTERNS.
13. REFER TO REFLECTED CEILING PLANS, SHEETS AE105 AND AE106, FOR SPECIAL CONDITIONS, PATTERNS, CEILING HEIGHT VARIATIONS.
14. ALL EXPOSED WOOD ON ENTIRE PROJECT SHALL BE PREMIUM GRADE "A", PLAIN SLICED, PREMIUM WHITE MAPLE FINISH WITH TRANSPARENT FINISH.
15. PROVIDE FLOOR TRANSITION STRIPS AT ALL DISSIMILAR FLOOR MATERIALS/FINISHES.

KEYNOTE LEGEND

06 41 00	ARCHITECTURAL MILLWORK
08 14 16	FLUSH WOOD DOORS
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 30 00.A3	CERAMIC TILE
09 30 00.A4	CERAMIC TILE BASE
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
10 14 00	SIGNAGE

ACCESSORIES SCHEDULE

TOILET ACCESSORIES

MARK	DESCRIPTION
1	MULTI-ROLL TOILET TISSUE DISPENSER
2	LIQUID-SOAP DISPENSER
3	GRAB BAR - 42" LONG
4	GRAB BAR - 36" LONG
5	WASTE RECEPTABLE
6	PAPER TOWEL DISPENSER UNIT
7	SANITARY-NAPKIN DISPENSER UNIT
8	MIRROR UNIT
9	WARM-AIR DRYER

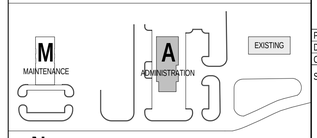
UTILITY ACCESSORIES

MARK	DESCRIPTION
10	COMBINATION UTILITY SHELF/MOP AND BROOM HOLDER

OTHER EQUIPMENT

MARK	DESCRIPTION
11	TOILET PARTITIONS REF. 10 28 00.
12	SHOWER COMPARTMENT REF. 09 30 13.A3

NOTE: REFER TO SPECIFICATIONS FOR MODEL NUMBERS



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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

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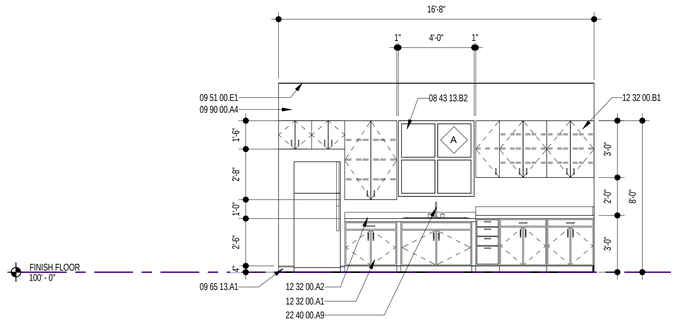
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DRAWN BY: ES
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SHEET TITLE: ENLARGED F.P. & INT. ELEV. - LOBBY & PRIVATE RR - ADMINISTRATION

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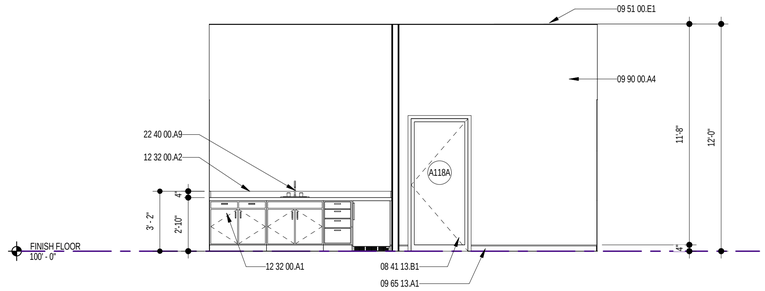
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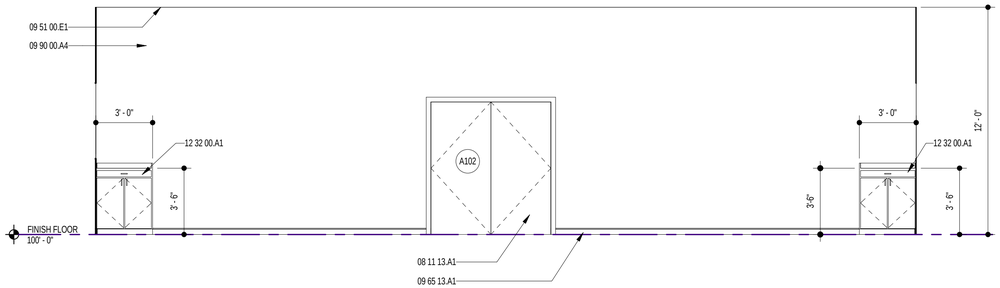
J1 INTERIOR ELEVATION - KITCHEN A103

1/4" = 1'-0"



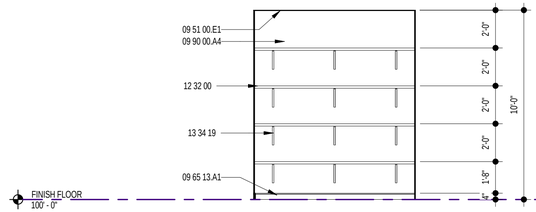
J8 INTERIOR ELEVATION - MEETING ROOM A118

1/4" = 1'-0"



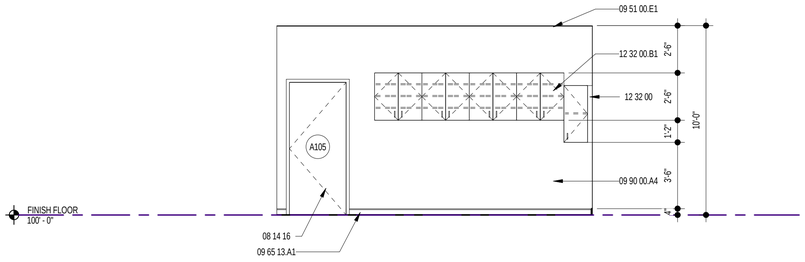
E1 INTERIOR ELEVATION - TRAINING A104

1/4" = 1'-0"



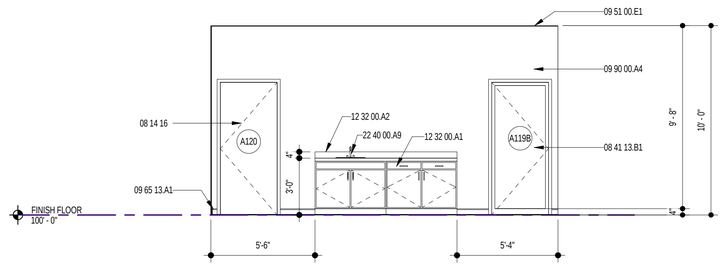
E8 INTERIOR ELEVATION - PANTRY A103A

1/4" = 1'-0"



A1 INTERIOR ELEVATION - STORAGE A105

1/4" = 1'-0"



A8 INTERIOR ELEVATION - COMMISSIONER'S OFFICE A119

1/4" = 1'-0"

CASEWORK GENERAL NOTES

AS1. PROVIDE CLEAR SEALED SELECT WHITE MAPLE ON ALL EXPOSED SURFACES AND EDGES OF CASEWORK, ENDS, ETC. UNLESS NOTED OTHERWISE.

2. PROVIDE PLASTIC LAMINATE ON COUNTERTOPS UNLESS OTHERWISE NOTED.

3. ALL PLASTIC LAMINATE COUNTERTOPS TO HAVE PLASTIC LAMINATE ON ALL EXPOSED SURFACES AND EDGES UNLESS NOTED OTHERWISE. PLASTIC LAMINATE COLOR AND PATTERN TO BE SELECTED BY THE ARCHITECT.

4. EXPOSED WALL UNDER COUNTER(S) TO RECEIVE FINISH AS SCHEDULED.

5. ARCHITECT TO SELECT ALL COLORS AND PATTERNS.

6. ALL SHELVES IN CABINETS AND BOOK CASES SHALL BE ADJUSTABLE. UNLESS OTHERWISE NOTED.

7. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATING CASEWORK TO ASSURE PROPER FIT WITH AS-BUILT CONDITIONS.

8. CONTRACTOR TO VERIFY WITH OWNER EXACT SIZE OF ALL EQUIPMENT FURNISHED BY OWNER FOR PROPER FIT WITH CONTRACTOR SUPPLIED CASEWORK.

9. MODIFY CASEWORK AS REQUIRED FOR COLUMN BUMPOUT(S) AND FURRING TO CONCEAL CONDUITS, PIPES, ETC. REF: ARCHITECTURAL, STRUCTURAL, STRUCTURAL AND M.E.P. DRAWINGS FOR POTENTIAL LOCATIONS.

10. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL CASEWORK TO BE REVIEWED BY THE ARCHITECT.

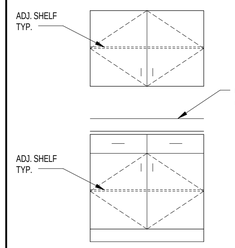
11. REFER TO SHEETS GI001, GI002 AND GI003 FOR A.D.A. COMPLIANCE, DETAILS, NOTES AND MOUTING HEIGHTS.

14. PROVIDE LOCKS AT CABINETS AS NOTED OR REFER TO SPECIFICATIONS.

15. PROVIDE ALL PULLS, HINGES, K-V STANDARDS, SLIDES AND MISC. HARDWARE ON ALL CASEWORK. REFER TO SPECIFICATIONS.

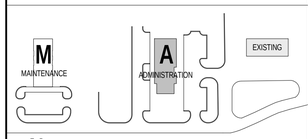
16. PROVIDE TREATED WOOD BLOCKING OR METAL BLOCKING IN WALLS WHERE REQUIRED TO SUPPORT CASEWORK.

CASEWORK KEY



KEYNOTE LEGEND

08 11 13.A1	HOLLOW METAL DOOR FRAME
08 14 16	FLUSH WOOD DOORS
08 41 13.B1	INTERIOR ALUMINUM STOREFRONT DOOR
08 43 13.B2	TYPE C - STOREFRONT SYSTEM, THERMALLY BROKEN, 1" INSULATED GLASS
09 51 00.E1	ACOUSTICAL CEILING SYSTEM AS SCHEDULES. REFER TO RCP AND SPECIFICATIONS
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A4	PAINTED GYPSUM BOARD. REFER TO SPECIFICATIONS
12 32 00	MANUFACTURED WOOD CASEWORK
12 32 00.A1	BASE CABINET
12 32 00.A2	COUNTERTOP WITH OPEN BASE
12 32 00.B1	WALL CABINET
13 34 19	METAL BUILDING SYSTEMS
22 40 00.A9	UTILITY SINK



KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

No.	Date	Description

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

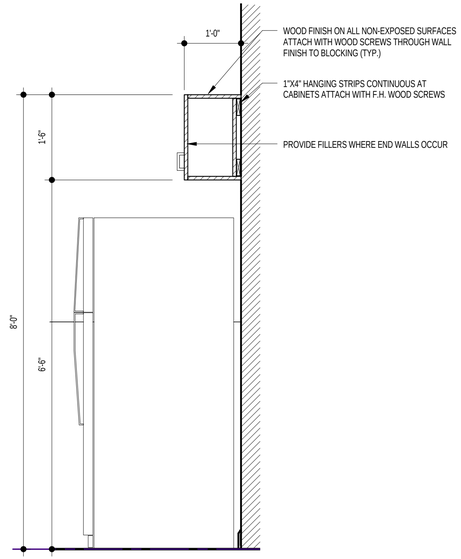
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SHEET TITLE: ENLARGED F.P & INT. ELEV. - ADMINISTRATION

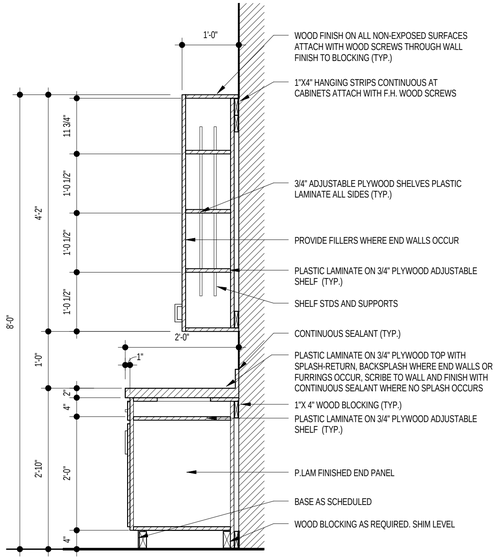
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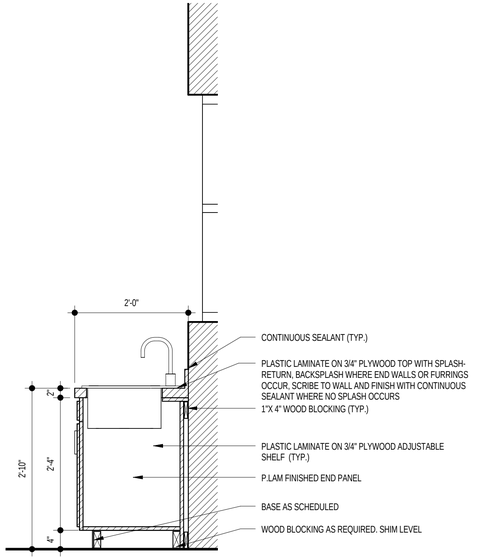
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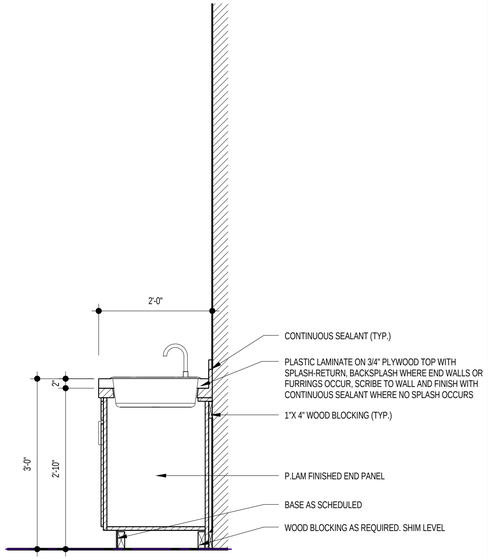
G1 MILLWORK SECTION - KITCHEN A103
3/4" = 1'-0"



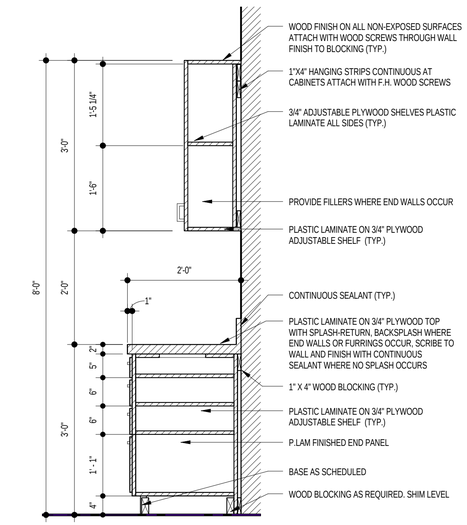
G4 MILLWORK SECTION - KITCHEN A103
3/4" = 1'-0"



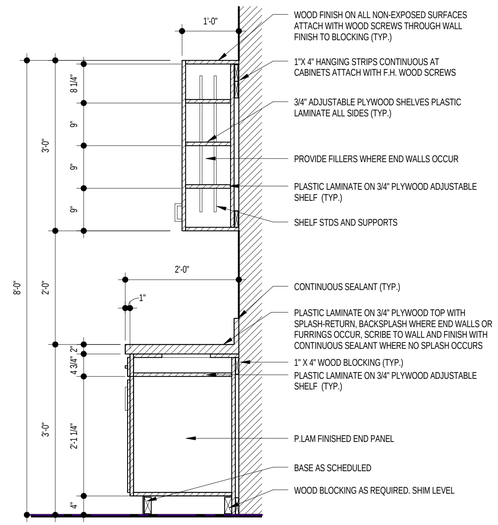
G7 MILLWORK SECTION - KITCHEN A103
3/4" = 1'-0"



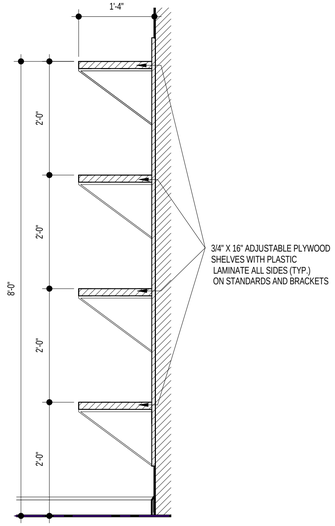
G10 MILLWORK SECTION - OFFICE A119
3/4" = 1'-0"



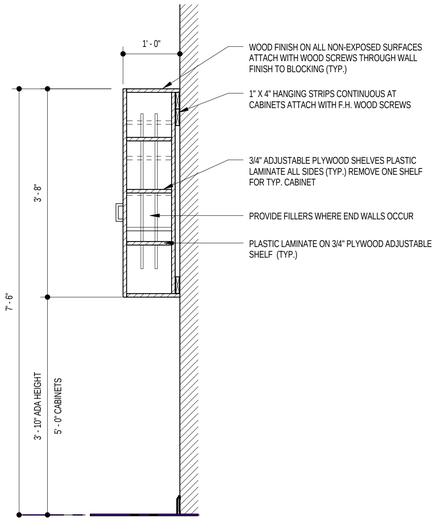
A1 MILLWORK SECTION - KITCHEN A103
3/4" = 1'-0"



A4 MILLWORK SECTION - KITCHEN A103
3/4" = 1'-0"



A7 MILLWORK SECTION - PANTRY A103A
3/4" = 1'-0"



A10 MILLWORK SECTION - STORAGE A105
3/4" = 1'-0"

CASEWORK SECTIONS NOTES

1. PROVIDE CLEAR SEALED SELECT WHITE MAPLE ON ALL EXPOSED SURFACES AND EDGES OF CASEWORK, ENDS, ETC. UNLESS NOTED OTHERWISE.

2. PROVIDE PLASTIC LAMINATE ON COUNTERTOPS UNLESS OTHERWISE NOTED.

3. ALL PLASTIC LAMINATE COUNTERTOPS TO HAVE PLASTIC LAMINATE ON ALL EXPOSED SURFACES AND EDGES UNLESS NOTED OTHERWISE. PLASTIC LAMINATE COLOR AND PATTERN TO BE SELECTED BY THE ARCHITECT.

4. EXPOSED WALL UNDER COUNTER(S) TO RECEIVE FINISH AS SCHEDULED.

5. ARCHITECT TO SELECT ALL COLORS AND PATTERNS.

6. ALL SHELVES IN CABINETS AND BOOK CASES SHALL BE ADJUSTABLE. UNLESS OTHERWISE NOTED.

7. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATING CASEWORK TO ASSURE PROPER FIT WITH AS-BUILT CONDITIONS.

8. CONTRACTOR TO VERIFY WITH OWNER EXACT SIZE OF ALL EQUIPMENT FURNISHED BY OWNER FOR PROPER FIT WITH CONTRACTOR SUPPLIED CASEWORK.

9. MODIFY CASEWORK AS REQUIRED FOR COLUMN BUMPOUT(S) AND FURRING TO CONCEAL CONDUITS, PIPES, ETC. REF: ARCHITECTURAL, STRUCTURAL, STRUCTURAL AND M.E.P. DRAWINGS FOR POTENTIAL LOCATIONS.

10. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL CASEWORK TO BE REVIEWED BY THE ARCHITECT.

11. REFER TO SHEETS GI002 AND GI003 FOR A.D.A. COMPLIANCE, DETAILS, NOTES AND MOUTING HEIGHTS.

12. PROVIDE LOCKS AT CABINETS AS NOTED OR REFER TO SPECIFICATIONS.

13. PROVIDE ALL PULLS, HINGES, K-V STANDARDS, SLIDES AND MISC. HARDWARE ON ALL CASEWORK. REFER TO SPECIFICATIONS.

14. PROVIDE TREATED WOOD BLOCKING OR METAL BLOCKING IN WALLS WHERE REQUIRED TO SUPPORT CASEWORK.

KEYNOTE LEGEND

ero architects
300 South 8th Street,
McAllen, Texas 78501
956.661.0400
www.eroarchitects.com

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

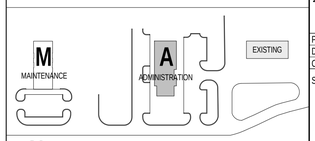
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE: ADMINISTRATION MILLWORK SECTIONS



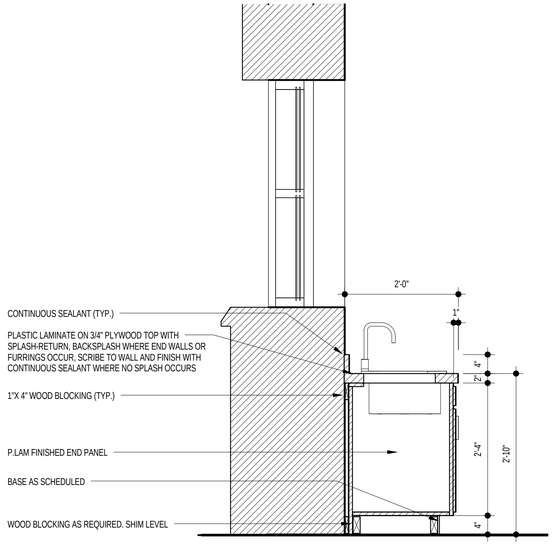


KEY PLAN

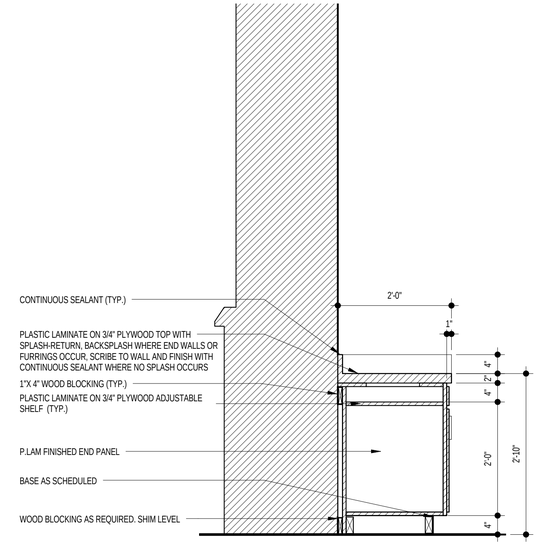
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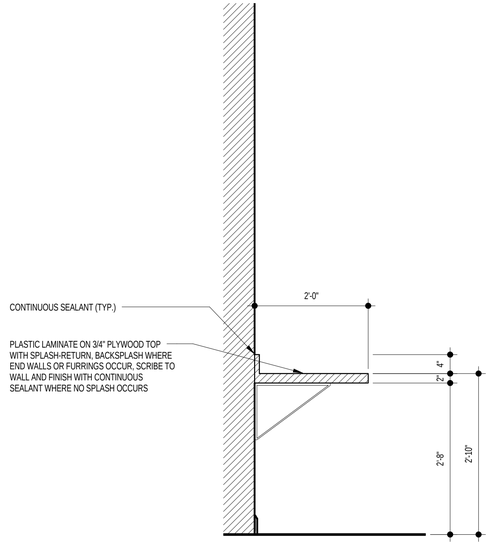
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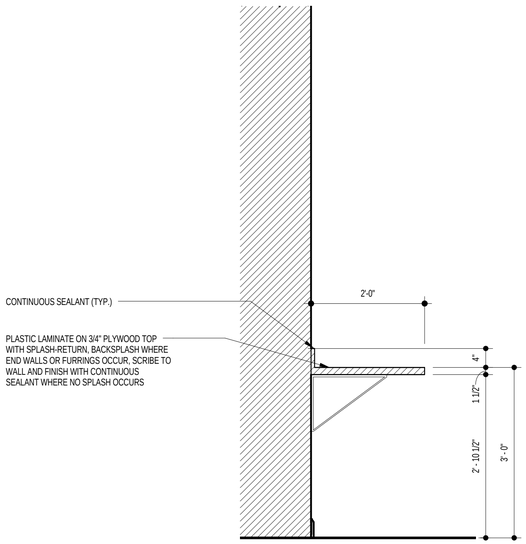
G1 MILLWORK SECTION - OFFICE M109
3/4" = 1'-0"



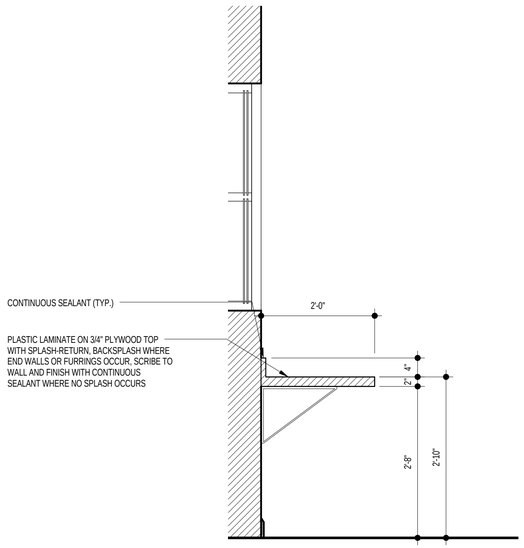
G5 MILLWORK SECTION - OFFICE M109
3/4" = 1'-0"



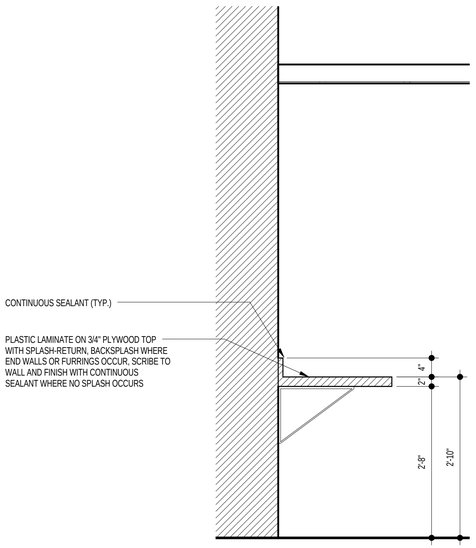
G9 MILLWORK SECTION - OFFICE M109 @ ADA COUNTER
3/4" = 1'-0"



A1 MILLWORK SECTION - OFFICE M109
3/4" = 1'-0"



A5 MILLWORK SECTION - DISPATCH M101
3/4" = 1'-0"



A9 MILLWORK SECTION - COMM STORAGE M104
3/4" = 1'-0"

CASEWORK GENERAL NOTES

AS1. PROVIDE CLEAR SEALED SELECT WHITE MAPLE ON ALL EXPOSED SURFACES AND EDGES OF CASEWORK, ENDS, ETC. UNLESS NOTED OTHERWISE.

2. PROVIDE PLASTIC LAMINATE ON COUNTERTOPS UNLESS OTHERWISE NOTED.

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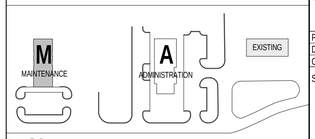
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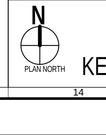
11. REFER TO SHEETS GI001, GI002 AND GI003 FOR A.D.A. COMPLIANCE, DETAILS, NOTES AND MOUTING HEIGHTS.

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

PROJECT NO.:	12014
DRAWN BY:	YIPG
CHECKED BY:	YIPG

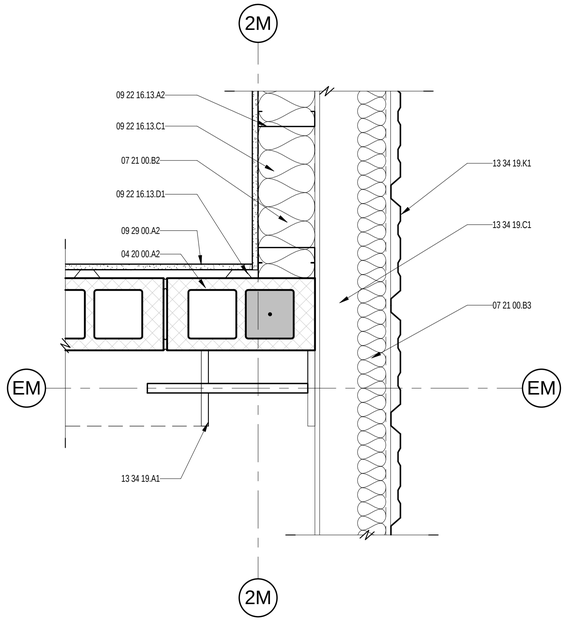
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MAINTENANCE MILLWORK SECTIONS

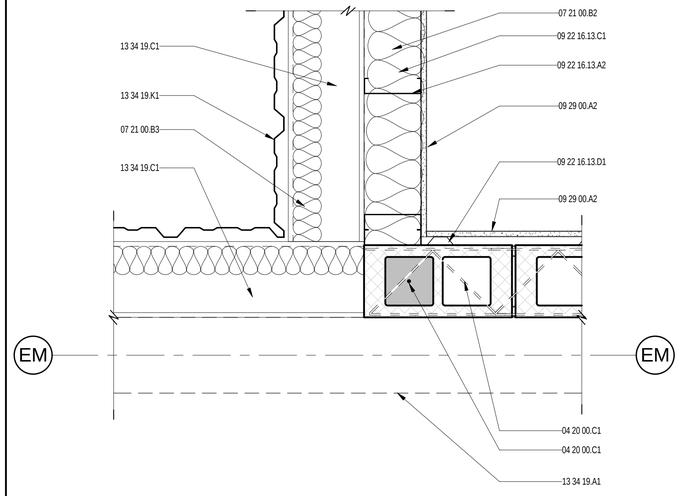
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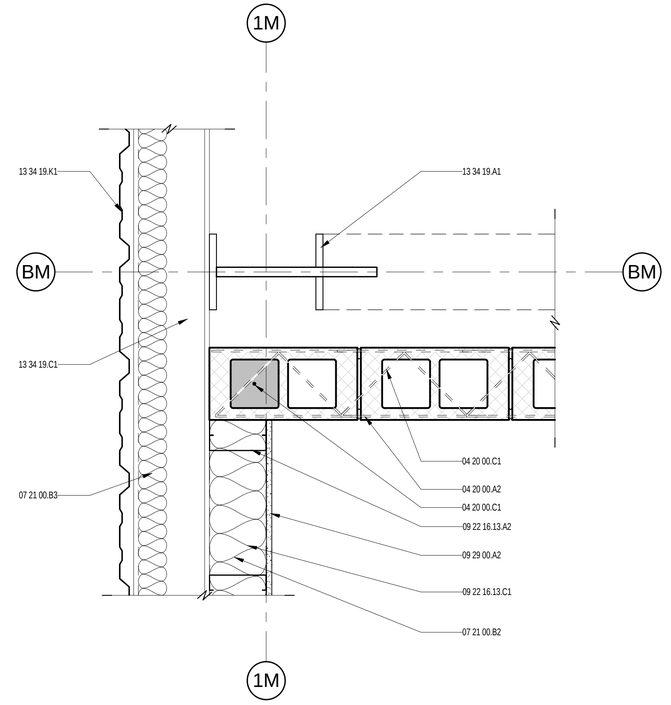
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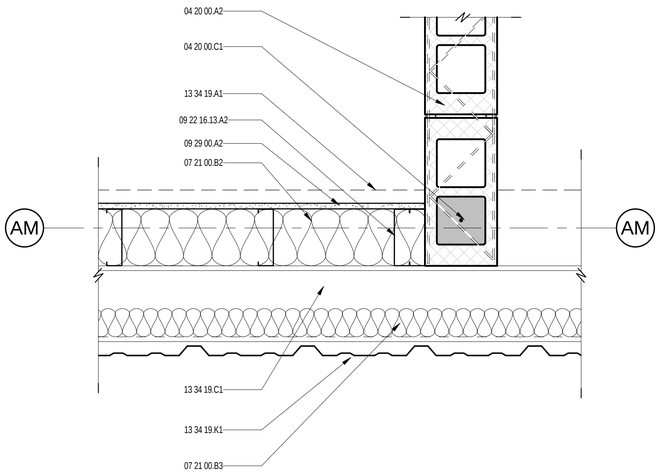
G1 PLAN DETAIL EM/2M - MAINTENANCE
1 1/2" = 1'-0"



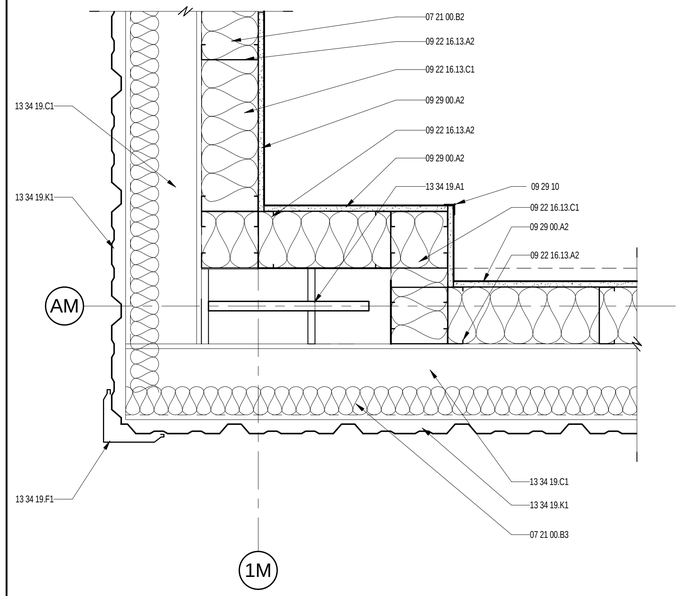
G5 PLAN DETAIL EM - MAINTENANCE
1 1/2" = 1'-0"



G10 PLAN DETAIL BM/1M - MAINTENANCE
1 1/2" = 1'-0"



A5 PLAN DETAIL AM/2M - MAINTENANCE
1 1/2" = 1'-0"



A9 PLAN DETAIL AM/1M - MAINTENANCE
1 1/2" = 1'-0"

PLAN DETAILS GENERAL NOTES

1. CONTRACTOR SHALL CROSS-REFERENCE STRUCTURAL COMPONENT DIMENSIONS WITH STRUCTURAL DRAWINGS AND NOTIFY ARCHITECT OF DISCREPANCIES PRIOR TO INSTALLATION.

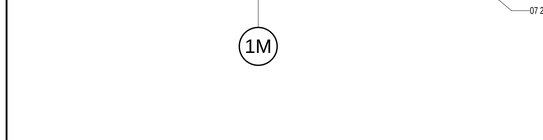
2. REFER TO STRUCTURAL DRAWINGS FOR HORIZONTAL AND VERTICAL REINFORCING AT CMU WALLS.

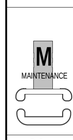
3. DAMPPROOFING SHALL BE TROWELLED ON APPLICATION.

4. PROVIDE MINIMUM OF 3/8" JOINT WITH BACKER ROD AND SEALANT BETWEEN DISSIMILAR MATERIALS.

KEYNOTE LEGEND

04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.C1	REINFORCING STEEL
07 21 00.B2	BATT INSULATION, R-19
07 21 00.B3	3" WHITE VYNIL FACE BATT INSULATION
09 22 16.13.A2	METAL STUDS, 6", 20GA
09 22 16.13.C1	METAL STUD TRACK
09 22 16.13.D1	METAL FURRING CHANNEL
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
09 29 10	GYPSUM BOARD ACCESSORIES
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
13 34 19.A1	PRE-ENGINEERED METAL STRUCTURE. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.F1	PRE-FINISHED METAL GUTER. REFER TO P.E.M.B. MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS.
13 34 19.K1	PRE-ENGINEERED METAL BUILDING LINER WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS





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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

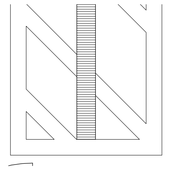
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DRAWN BY: Author
CHECKED BY: Checker

SHEET TITLE: PLAN DETAILS - MAINTENANCE

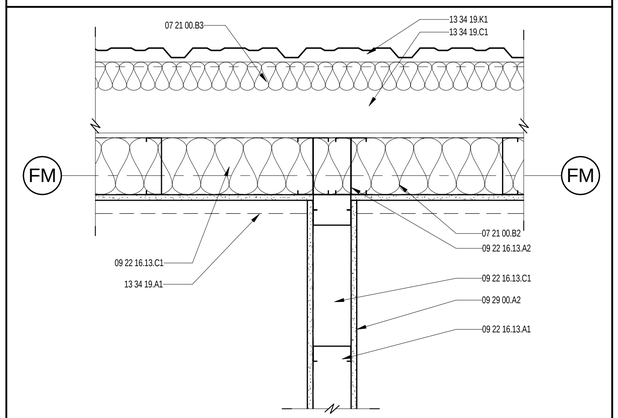
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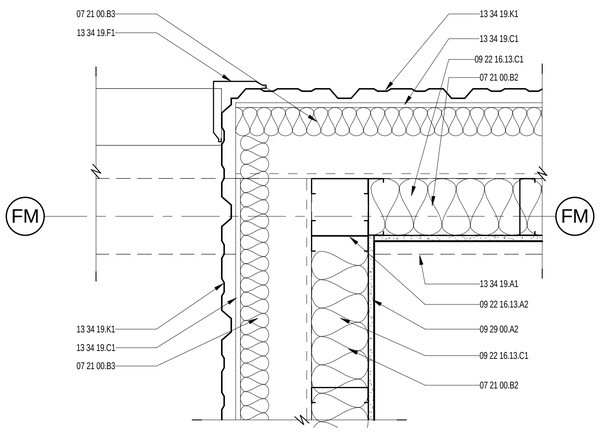
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1 PLAN DETAIL @ TRENCH DRAIN
1/2" = 1'-0"



A1 PLAN DETAIL FM - MAINTENANCE 2
1 1/2" = 1'-0"



A9 PLAN DETAIL FM - MAINTENANCE
1 1/2" = 1'-0"

PLAN DETAILS GENERAL NOTES

1. CONTRACTOR SHALL CROSS-REFERENCE STRUCTURAL COMPONENT DIMENSIONS WITH STRUCTURAL DRAWINGS AND NOTIFY ARCHITECT OF DISCREPANCIES PRIOR TO INSTALLATION.

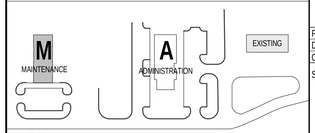
2. REFER TO STRUCTURAL DRAWINGS FOR HORIZONTAL AND VERTICAL REINFORCING AT CMU WALLS.

3. DAMPPROOFING SHALL BE TROWELLED ON APPLICATION.

4. PROVIDE MINIMUM OF 3/8" JOINT WITH BACKER ROD AND SEALANT BETWEEN DISSIMILAR MATERIALS.

KEYNOTE LEGEND

07 21 00.B2	BATT INSULATION, R-19
07 21 00.B3	3" WHITE VYNIL FACE BATT INSULATION
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 22 16.13.A2	METAL STUDS, 6", 20GA
09 22 16.13.C1	METAL STUD TRACK
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13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
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N
PLAN NORTH

KEY PLAN

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Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

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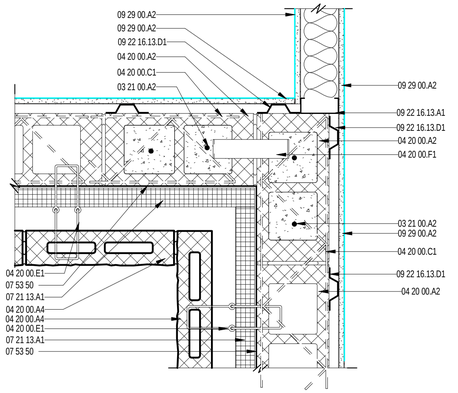
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SHEET TITLE: PLAN DETAILS - MAINTENANCE

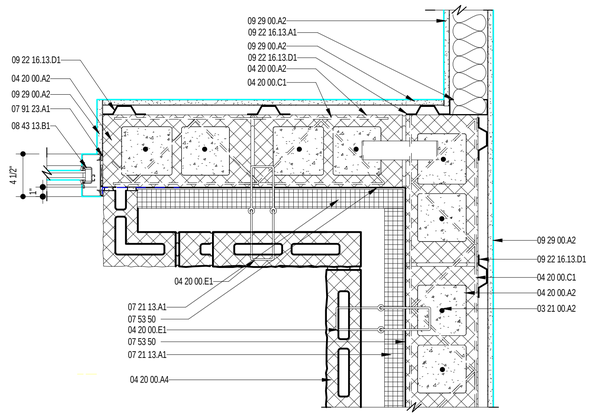
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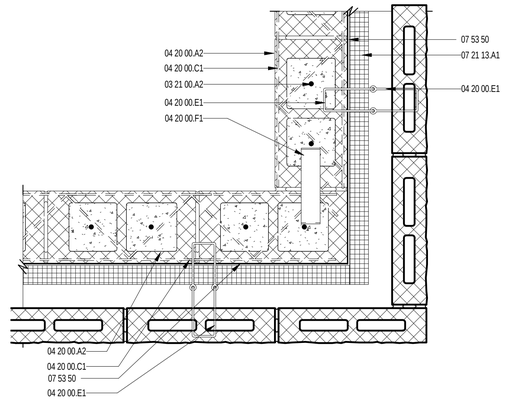
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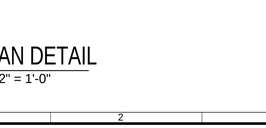
J1 PLAN DETAIL
1 1/2" = 1'-0"



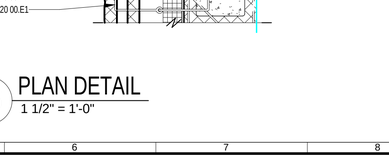
J5 PLAN DETAIL
1 1/2" = 1'-0"



J10 PLAN DETAIL
1 1/2" = 1'-0"



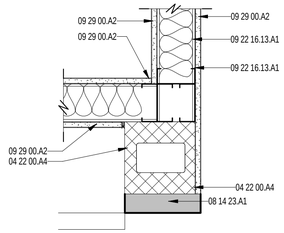
E1 PLAN DETAIL
1 1/2" = 1'-0"



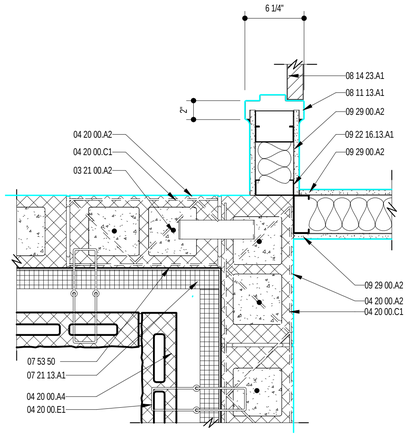
E5 PLAN DETAIL
1 1/2" = 1'-0"



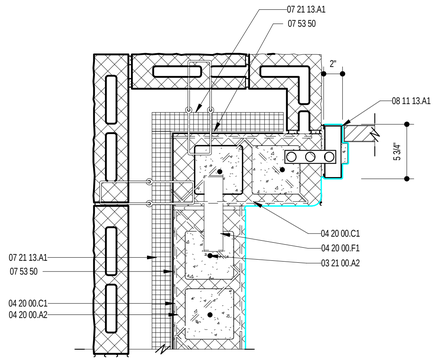
E10 PLAN DETAIL
1 1/2" = 1'-0"



A1 PLAN DETAIL
1 1/2" = 1'-0"



A5 PLAN DETAIL
1 1/2" = 1'-0"



A10 PLAN DETAIL
1 1/2" = 1'-0"

PLAN DETAILS GENERAL NOTES

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KEYNOTE LEGEND

03 21 00.A2	CONTINUOUS RE-BAR REFER TO STRUCTURAL FOR SIZE AND QUANTITY
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.A4	CONCRETE BLOCK 12" THICK
04 20 00.C1	REINFORCING STEEL
04 20 00.E1	ADJUSTABLE REINFORCEMENT SYSTEM WITH ADJUSTABLE PINTLE TIE
04 20 00.F1	RIGID STEEL TIE
04 22 00.A4	8" X 8" X 8" CMU - 1 CORE
07 21 13.A1	EXTRUDED POLYSTYRENE BOARD, 2" THICK
07 53 50	FULLY ADHERED MULTI-PLY ROOF SYSTEM
07 90 05.A1	
07 91 23.A1	BACKER RODS
08 11 13.A1	HOLLOW METAL DOOR FRAME
08 14 23.A1	PLASTIC-LAMINATE - FACED WOOD DOOR
08 43 13.B1	TYPE B - STOREFRONT SYSTEM, 1" INSULATED GLASS
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 22 16.13.D1	METAL FURRING CHANNEL
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

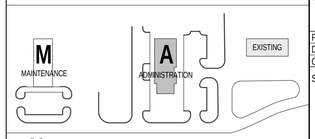
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

PROJECT NO.: 12014
DRAWN BY: MC
CHECKED BY: Checker

SHEET TITLE: PLAN DETAILS - ADMINISTRATION



KEY PLAN

AE503

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PLAN DETAILS
GENERAL NOTES

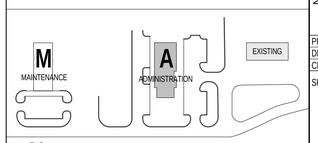
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2. REFER TO STRUCTURAL DRAWINGS FOR HORIZONTAL AND VERTICAL REINFORCING AT CMU WALLS.

3. DAMPPROOFING SHALL BE TROWELLED ON APPLICATION.

4. PROVIDE MINIMUM OF 3/8" JOINT WITH BACKER ROD AND SEALANT BETWEEN DISSIMILAR MATERIALS.

KEYNOTE LEGEND



KEY PLAN

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CONSULTANTS

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EDINBURG, TX 78542

PROJECT OWNER
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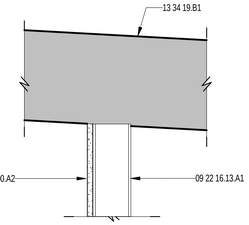
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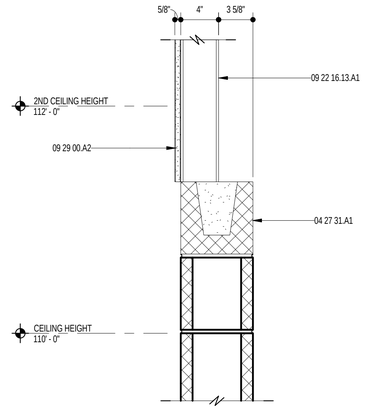
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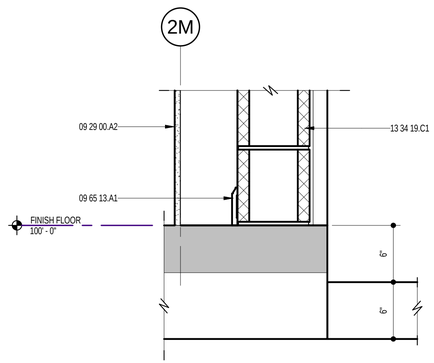
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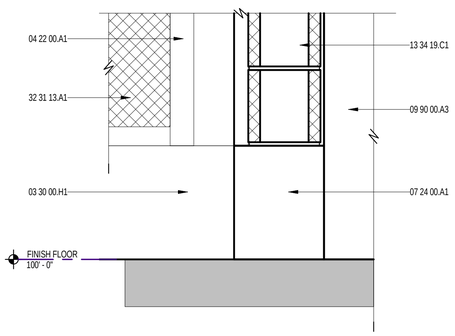
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1 1/2" = 1'-0"



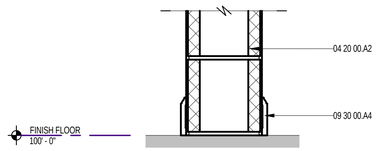
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A1 SECTION DETAIL
1 1/2" = 1'-0"



A5 SECTION DETAIL
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A10 SECTION DETAIL
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WALL SECTION NOTES

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7. SEE INTERIOR ELEVATIONS FOR MATERIALS FINISH TRANSITION AT EACH ROOM.

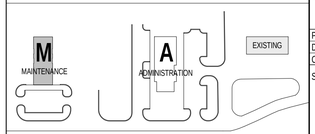
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10. REFERENCE EXTERIOR ELEVATIONS FOR VENEER FINISH PATTERNS.

KEYNOTE LEGEND

03 30 00.H1	CONCRETE CURB. REFER TO STRUCTURAL
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 22 00.A1	2" x 8" x 8" CMU
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
07 24 00.A1	EIFS, 3" THICK
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
09 30 00.A4	CERAMIC TILE BASE
09 65 13.A1	RESILIENT BASE, RUBBER
09 90 00.A3	PAINTED CMU. REFER TO SPECIFICATIONS
13 34 19.B1	PRE-ENGINEERED METAL BUILDING ROOF. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
13 34 19.C1	PRE-ENGINEERED METAL BUILDING WALL PANEL. REFER TO METAL BUILDING MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS
32 31 13.A1	CHAIN LINK FENCE



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CONSULTANTS

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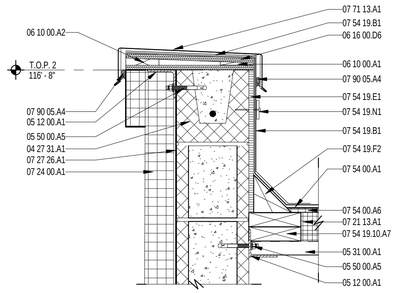
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CHECKED BY: YIPG

SHEET TITLE: SECTION DETAILS - MAINTENANCE

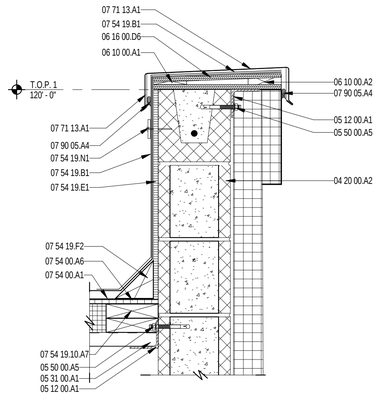
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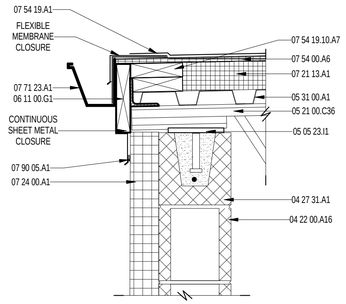
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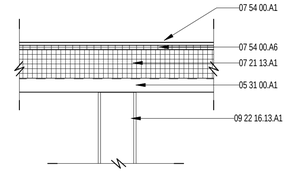
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1 1/2" = 1'-0"



J4 SECTION DETAIL
1 1/2" = 1'-0"



J7 SECTION DETAIL
1 1/2" = 1'-0"



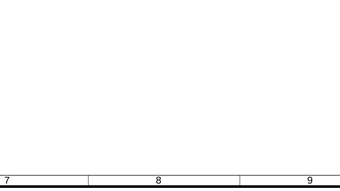
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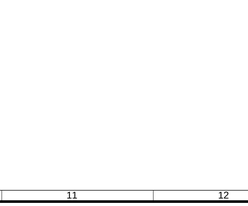
F1 SECTION DETAIL
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F7 SECTION DETAIL
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F10 SECTION DETAIL
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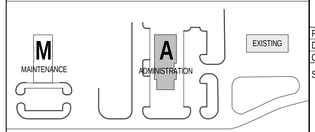
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KEYNOTE LEGEND

04 05 23.19.A1	
04 20 00	UNIT MASONRY ASSEMBLIES
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.J1	WEEP/CAVITY VENT
04 20 01.B4	
04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
04 22 00.F14	4" x 8" x 16" Split Face CMU
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
04 71 00.A1	CAST STONE WATERTABLE
05 05 23.I1	1/2" Steel Plate
05 12 00.A1	CONT. STEEL ANGLE, REFER STRUCTURE
05 21 00.C36	32LH06 JOIST. REFER TO STRUCTURAL
05 31 00.A1	STEEL DECK, REFER STRUCTURE
05 50 00.A5	MASONRY STUD ANCHOR BOLT, REFER TO STRUCTURAL .
06 10 00.A1	PRESSURE TREATED WOOD, 1X
06 10 00.A2	PRESSURE TREATED WOOD, 2X
06 11 00.G1	2x8
06 16 00.D6	1/2" Plywood
07 21 13.A1	EXTRUDED POLYSTYRENE BOARD, 2" THICK
07 24 00.A1	EIFS, 3" THICK
07 27 26.A1	
07 54 00.A1	
07 54 00.A6	
07 54 19.10.A7	
07 54 19.A1	
07 54 19.B1	
07 54 19.E1	
07 54 19.F2	
07 54 19.N1	
07 65 26.A1	THROUGH WALL FLASHING
07 71 13.A1	METAL COPING
07 71 23.A1	GUTTER
07 90 05.A1	
07 90 05.A4	
09 22 16.13.A1	METAL STUDS, 4", 20GA
CONTINUOUS SHEET METAL CLOSURE	
FLEXIBLE MEMBRANE CLOSURE	



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Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

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PROJECT NO.: 12014
DRAWN BY: MC
CHECKED BY: Checker

SHEET TITLE: SECTION DETAILS - ADMINISTRATION

AE506

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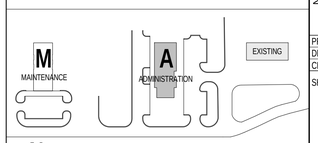
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KEYNOTE LEGEND



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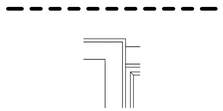
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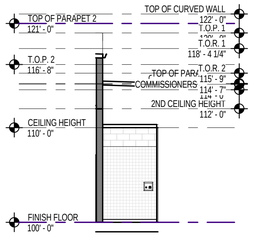
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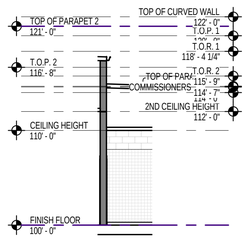
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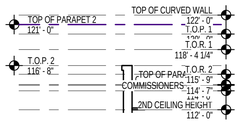


A5 Callout of ROOF PLAN - ADMIN
1/4" = 1'-0"

D1 RCP SECTION2
1/8" = 1'-0"



J1 RCP SECTION1
1/8" = 1'-0"



A1 RCP SECTION
1/8" = 1'-0"

ROOF PLAN GENERAL NOTES

1. PROVIDE TAPERED INSULATION CRICKETS (1/2" MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS. SMOKE VENTS, ROOF HATCHES & OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND & TO ENSURE POSITIVE ROOF DRAINAGE.

2. PROVIDE ADDITIONAL FULLY ADHERED MEMBRANES AS PROTECTION AT "SERVICE SIDE" OF ALL MECH. EQUIPEMENT. FIELD VERIFY LOCATIONS AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS. FIELD VERIFY LOCATIONS AT DOWNSPOUT LOCATIONS.

3. ALL WOOD BLOCKING AT ROOF EDGES ARE TO BE FABRICATED FROM CONT. 2X FR-WD BOARDS. PROVIDE LARGER 2X FR-WD AS REQUIRED PER DIMENSIONED DETAILED OR AS FIELD CONDITIONS DICTATE ALL COPING TO BE SLOPED TOWARD THE INTERIOR.

4. ALL EXPOSED FLASHING, COPING (IF APPLICABLE) AND THEIR ACCESSORIES SHALL BE SPECIFIED. PAINT ALL METAL FLASHING THAT IS NOT PREFINISHED (TYP) AND VISIBLE FROM THE GROUND.

5. ALL THROUGH FLASHING SYSTEM TO ACCOMADATE 8" MININUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.

6. ANY CRACKS OR VOIDS IN RISE WALLS ABOVE COUNTER FLASHING SHALL BE REPAIRED WITH COMPATIBLE SEALANT.

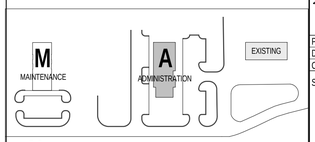
7. ALL METAL FLASHING SHALL EXTEND BEYOND ROOF EDGE MIN. 8" WHERE FLASHING ABUTS VERTICAL WALL SURFACE AS DETAILED. ALL FLASHING SHALL BE INSTALLED IN SHINGLE FLASHING.

8. PROVIDE CONCRETE SPLASH BLOCKS BENEATH ALL DOWNSPOUTS.

9. TAPER WATER AWAY FROM ALL HVAC UNITS AND PARAPET WALLS.

10. PROVIDE PRE-FINISHED METAL END CLOSURE 8" BEYOND CANOPY BELOW W/ END DRAINS IN THROUGH WALL FLASHING AT THESE LOCATIONS.

11. REFER MEP DRAWINGS FOR ADDITIONAL INFORMATION.





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DRAWN BY: E.S.
CHECKED BY: M. HINOJOSA

SHEET TITLE: ROOF DETAILS

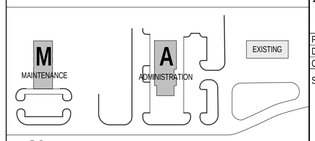
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GENERIC ROOF NOTES

1. PROVIDE TAPERED INSULATION CRICKETS (1/2" MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS. SMOKE VENTS, ROOF HATCHES & OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND & TO ENSURE POSITIVE ROOF DRAINAGE.
2. PROVIDE ADDITIONAL FULLY ADHERED MEMBRANES AS PROTECTION AT "SERVICE SIDE" OF ALL MECH. EQUIPEMENT. FIELD VERIFY LOCATIONS AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS. FIELD VERIFY LOCATIONS AT DOWNSPOUT LOCATIONS.
3. ALL WOOD BLOCKING AT ROOF EDGES ARE TO BE FABRICATED FROM CONT. 2X FR-WD BOARDS. PROVIDE LARGER 2X FR-WD AS REQUIRED PER DIMENSIONED DETAILED OR AS FIELD CONDITIONS DICTATE ALL COPING TO BE SLOPED TOWARD THE INTERIOR.
4. ALL EXPOSED FLASHING, COPING (IF APPLICABLE) AND THEIR ACCESSORIES SHALL BE SPECIFIED. PAINT ALL METAL FLASHING THAT IS NOT PREFINISHED (TYP) AND VISIBLE FROM THE GROUND.
5. ALL THROUGH FLASHING SYSTEM TO ACCOMADATE 8" MININUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.
6. ANY CRACKS OR VOIDS IN RISE WALLS ABOVE COUNTER FLASHING SHALL BE REPAIRED WITH COMPATIBLE SEALANT.
7. ALL METAL FLASHING SHALL EXTEND BEYOND ROOF EDGE MIN. 8" WHERE FLASHING ABUTS VERTICAL WALL SURFACE AS DETAILED. ALL FLASHING SHALL BE INSTALLED IN SHINGLE FLASHING.
8. PROVIDE CONCRETE SPLASH BLOCKS BENEATH ALL DOWNSPOUTS.
9. TAPER WATER AWAY FROM ALL HVAC UNITS AND PARAPET WALLS.
10. PROVIDE PRE-FINISHED METAL END CLOSURE 8" BEYOND CANOPY BELOW W/ END DRAINS IN THROUGH WALL FLASHING AT THESE LOCATIONS.
11. REFER MEP DRAWINGS



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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME
HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION
2042 NORTH DOOLITTLE ROAD
EDINBURG, TX 78542

PROJECT OWNER
HIDALGO COUNTY

No.	Date	Description

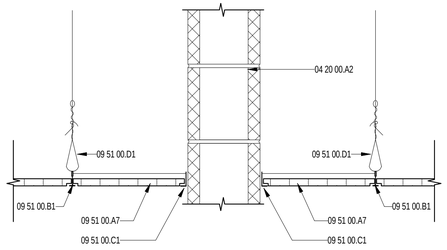
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SHEET TITLE:
ROOF DETAILS

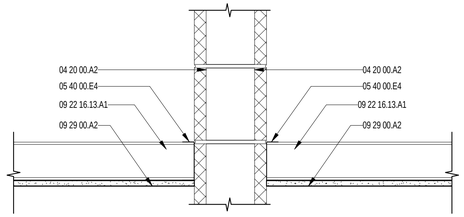
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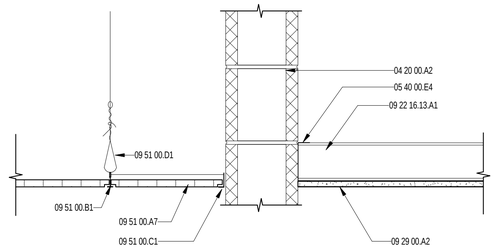
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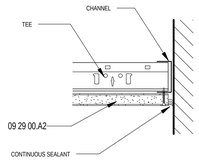
K1 RCP DETAIL
1 1/2" = 1'-0"



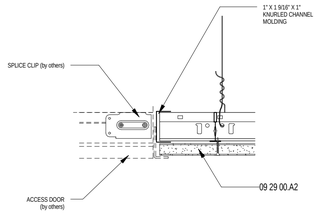
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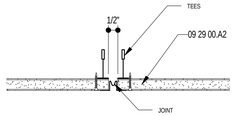
K9 RCP DETAIL
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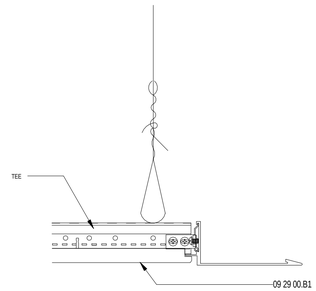
F1 RCP DETAIL
3" = 1'-0"



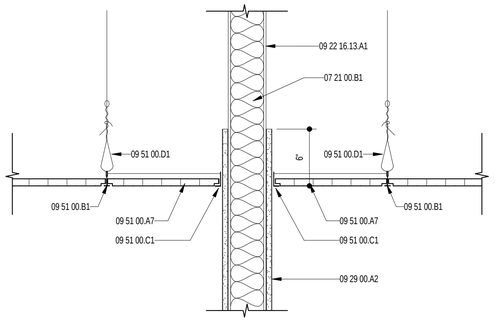
F4 RCP DETAIL
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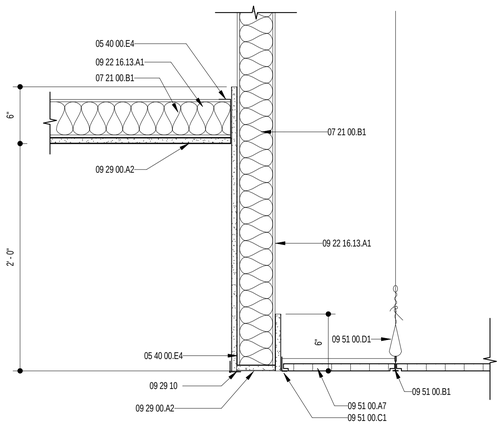
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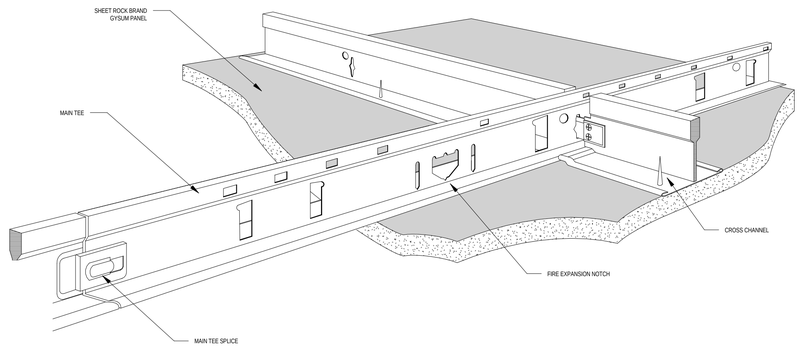
F11 RCP DETAIL
3" = 1'-0"



A1 RCP DETAIL
1 1/2" = 1'-0"



A4 RCP DETAIL
1 1/2" = 1'-0"



A8 RCP DETAIL
1 1/2" = 1'-0"

RCP GENERAL NOTES

1. ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER ENGINEERING DRAWINGS FOR LOCATION OF LIGHT FIXTURES, DIFFUSERS, ETC. SEE M.E.P. DRAWINGS FOR ADDITIONAL INFORMATION AND INSTRUCTIONS.

2. SEE ELECTRICAL DRAWINGS FOR SPECIFIC LIGHT FIXTURE TYPES, EXIT SIGNS, VISUAL ALARMS, ETC.

3. SEE MECHANICAL DRAWINGS FOR SPECIFIC MECHANICAL DIFFUSERS.

4. LIGHTING FIXTURES THAT ARE NOT THE FULL SIZE OF A CEILING PANEL SHALL BE LOCATED IN THE CENTER OF THE CEILING PANEL.

5. REFER TO SHEET AE511 FOR RCP DETAILS. PAINT ALL EXPOSED TO VIEW AREA, INCLUDING STRUCTURAL MEMBERS AND M.E.P. EQUIPMENT.

6. REFER TO INTERIOR AND EXTERIOR ELEVATIONS FOR LIGHT FIXUTRES MOUTING HEIGHT. COORDINATE WITH ELECTRICAL DRAWINGS.

7. COORDINATE ALL CEILING MOUNTED PROJECTOR LOCATIONS WITH LIGHT FIXTURES.

8. TAPE AND FLOAT ALL FIRE RATED GYPSUM BOARD. SEAL ALL PENETRATIONS WITH FIRE CAULK.

9. CEILING GRID TO BE CENTERED IN ROOMS UNLESS OTHERWISE NOTED.

10. DOWNLIGHTS TO BE CENTERED IN CEILING PANELS UNLESS OTHERWISE NOTED.

11. ALL GP. BD. CEILINGS AND SOFFITS ARE 5/8" GP.BD. UNLESS SHOWN OTHERWISE. ALL VERTICAL FACES OF SOFFITS ARE GP.BD. UNLESS SHOWN OTHERWISE.

12. ALL EXPOSED GP.BD. TO BE PAINTED UNLESS SHOWN OTHERWISE.

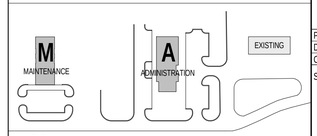
13. COORDINATE ALL MECH. DUCT WORK, PIPING, SPRINKLER LINES, AND CABLE TRAY TO AVOID CONFLICTS WITH LIGHTS AND STRUCTURE.

14. PAINT ALL EXPOSED CONDUITS, JUNCTION BOXES, ELECTRICAL ITEMS (NOT FACTORY FINISHED), SPRINKLER LINES, MECH., DUCTWORK, PIPING UNLESS ROOM FINISH SCHEDULE CALLS FOR EXPOSED CONSTRUCTION.

15.REFER TO SHEETS AE105/AE106 TO RCP FOR CEILING TYPE AND HEIGHTS.

KEYNOTE LEGEND

04 20 00.A2	CONCRETE BLOCK, 8" THICK
05 40 00.E4	4-3/16" Runner Channel
07 21 00.B1	BATT INSULATION, R-13
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
09 29 00.B1	GYPDUM CEILING BOARD AS SCHEDULED. REFER TO RCP AND SPECIFICATIONS
09 29 10	GYPSUM BOARD ACCESSORIES
09 51 00.A7	Tegular Edge (3/4 x 12 x 12)
09 51 00.B1	9/16" Tee
09 51 00.C1	9/16" Wall Angle
09 51 00.D1	Suspension Wire



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TEXAS REGISTRATION NO.
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Architect: 18160

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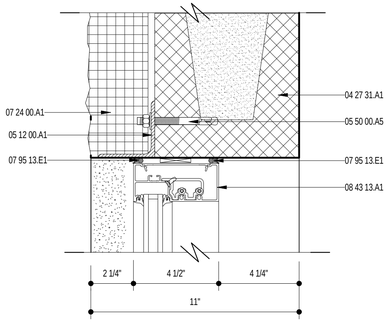
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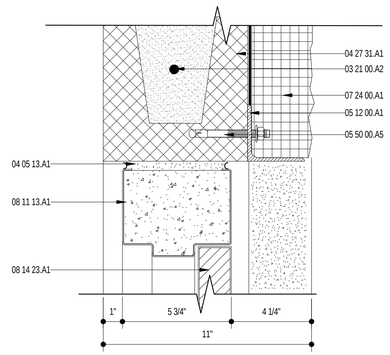
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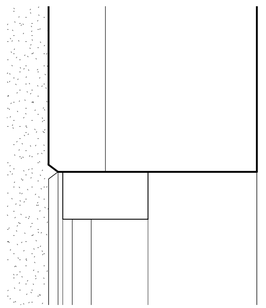
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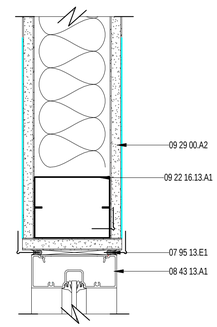
J1 EXT. ALUMINUM WINDOW HEAD
3" = 1'-0"



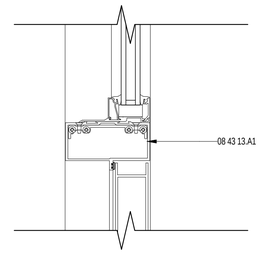
J4 EXT. H.M. DOOR HEAD
3" = 1'-0"



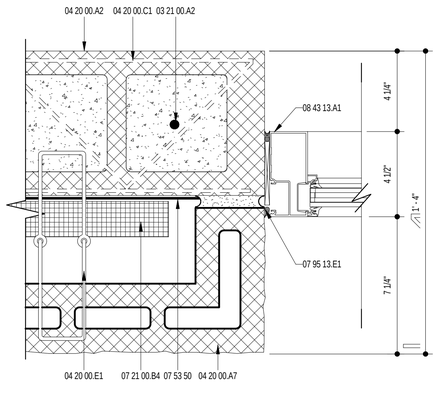
J7 EXT. STOREFRONT HEAD
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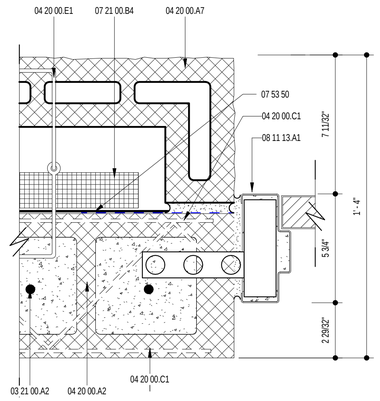
J9 INT. STOREFRONT HEAD
3" = 1'-0"



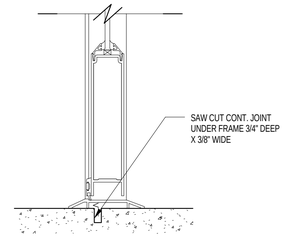
J11 ALUM. TRANSOM BAR DETAIL
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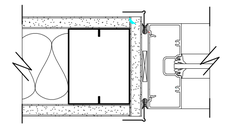
E1 EXT. ALUMINUM WINDOW JAMB
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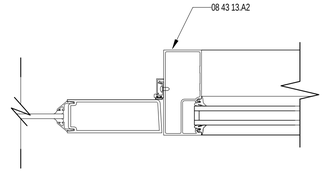
E4 EXT. H.M. DOOR JAMB
3" = 1'-0"



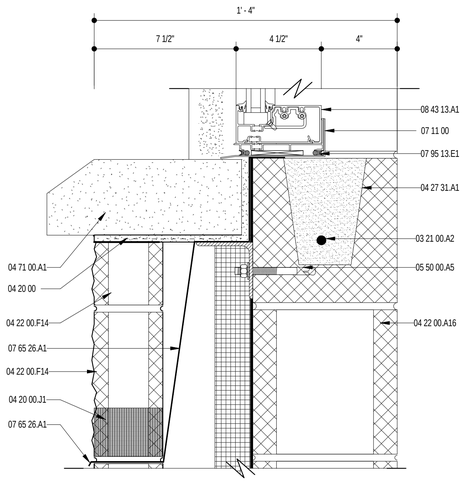
E7 EXT. ALUM. DOOR SILL
3" = 1'-0"



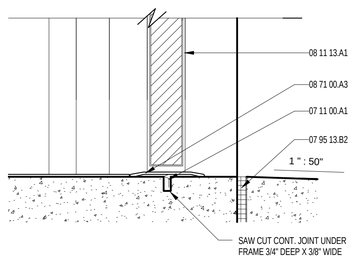
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3" = 1'-0"



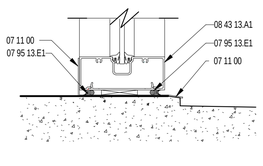
E11 ALUM. DOOR JAMB DETAIL
3" = 1'-0"



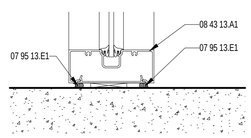
A1 EXT. ALUMINUM WINDOW SILL
3" = 1'-0"



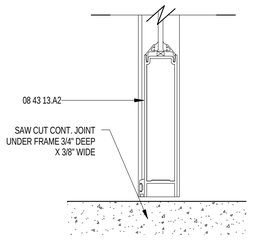
A4 EXT. H.M. DOOR SILL
3" = 1'-0"



A7 EXT.STOREFRONT SILL
3" = 1'-0"



A9 INT. STOREFRONT SILL
3" = 1'-0"



A11 ALUM. DOOR SILL DETAIL
3" = 1'-0"

DOOR AND WINDOW GENERAL NOTES

1. SET WINDOW SUBSILLS IN CONTINUOUS BEAD OF SEALANT.

2. TURN SUBSILLS AND FLASHING MEMBRANE UP AT JAMBS (6" MINIMUM) TO FORM END DAMS.

3. SPACE ANCHORS OF DOOR AND WINDOW FRAMES NO MORE THAN 16" O.C.

4. INSTALL ONE WINDOW AND STOREFRONT FOR ARCHITECT'S REVIEW AND APPROVAL PRIOR TO PROCEEDING.

5. VERIFY HEAD HEIGHTS OF OPENINGS ON THE EXTERIOR AND INTERIOR ELEVATIONS. INFORM THE ARCHITECT OF DISCREPANCIES PRIOR TO PROCEEDING.

6. ALL GLAZING NOT SCHEDULED OR NOTED OTHERWISE, SHALL BE 1/4" CLEAR GLASS.

7. ALL DOORS TO BE 1 3/4" THICK, UNLESS OTHERWISE NOTED.

8. ALL H.M. FRAMES TO HAVE A 2" FACE DIMENSION W/ 5/8" STOP. PROVIDE 3/4" STOP AS REQUIRED FOR THE RATED FRAMES.

9. REFER TO SHEET AE601 FOR DOOR AND HARDWARE SCHEDULE.

10. COORDINATE WITH MECHANICAL DOCS FOR DOOR UNDERCUTS & DOORS LOUVERS.

11. FLOOR MATERIAL CHANGES BETWEEN ROOMS TO OCCUR UNDER DOOR.

12. ALL LIGHTS IN DOORS TO HAVE TEMPERED GLAZING, UNLESS OTHERWISE NOTED.

13.ALL EXTERIOR HM DOORS TO BE INSULATED AND GALVANIZED.

14.FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATING FRAMES.

15.AT DRYWALL PARTITIONS, PROVIDE FR-WD BLKG. @ ALL WALLS BEHIND DOORS SCHEDULED TO HAVE WALLMOUNTED DOOR STOPS. (REF. HARDWARE SCHEDULE IN SPECIFICATIONS).

16. ALL ALUMINUM STOREFRONT WINDOWS AND DOOR FRAMES TO BE CLEAR ANODIZED ALUMINUM FINISH.

17. PROVIDE CLEAR ANODIZED FINISH FOR COILING GRILLS AT KITCHEN IN LIEU OF BRONZE ANODIZED ALUMINUM FINISH.

KEYNOTE LEGEND

03 21 00.A2	CONTINUOUS RE-BAR REFER TO STRUCTURAL FOR SIZE AND QUANTITY
04 05 13.A1	Mortar
04 20 00	UNIT MASONRY ASSEMBLIES
04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.A7	
04 20 00.C1	REINFORCING STEEL
04 20 00.E1	ADJUSTABLE REINFORCEMENT SYSTEM WITH ADJUSTABLE PINTLE TIE
04 20 00.J1	WEEP/CAVITY VENT
04 22 00.A16	8" X 8" X 16" CMU - 2 CORE
04 22 00.F14	4" x 8" x 16" Split Face CMU
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
04 71 00.A1	CAST STONE WATERTABLE
05 12 00.A1	CONT. STEEL ANGLE, REFER STRUCTURE
05 50 00.A5	MASONRY STUD ANCHOR BOLT, REFER TO STRUCTURAL .
07 11 00	DAMPPROOFING
07 11 00.A1	DAMPPROOFING
07 21 00.B4	
07 24 00.A1	EIFS, 3" THICK
07 53 50	FULLY ADHERED MULTI-PLY ROOF SYSTEM
07 65 26.A1	THROUGH WALL FLASHING
07 95 13.B2	1/2" Expansion Joint
07 95 13.E1	BACKER ROD W/ SEALANT
08 11 13.A1	HOLLOW METAL DOOR FRAME
08 14 23.A1	PLASTIC-LAMINATE - FACED WOOD DOOR
08 43 13.A1	TYPE A - STOREFRONT SYSTEM, 1/4" GLASS
08 43 13.A2	
08 71 00.A3	4" Saddle Threshold
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK

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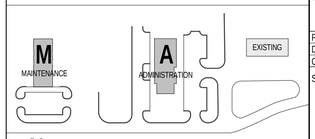
CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: CS
CHECKED BY: YIPG

SHEET TITLE: DOOR AND WINDOW DETAILS

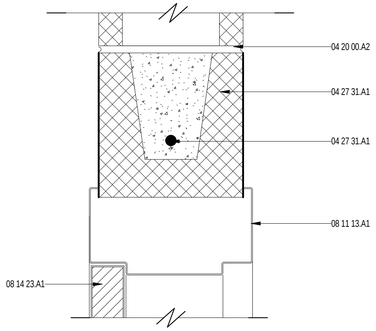


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PLAN NORTH
KEY PLAN

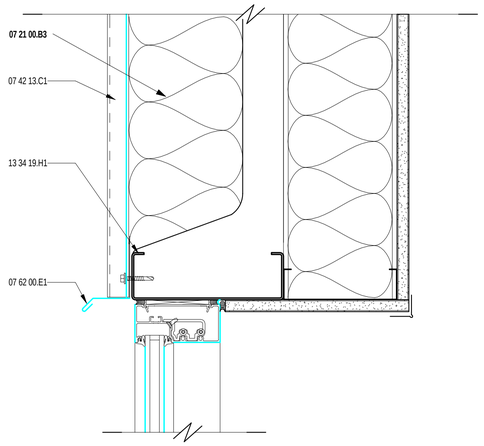
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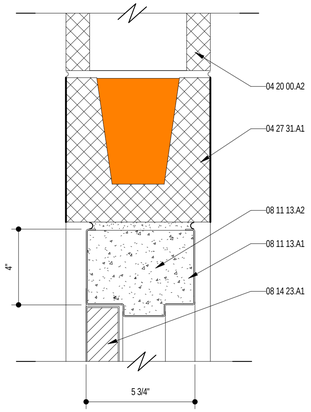
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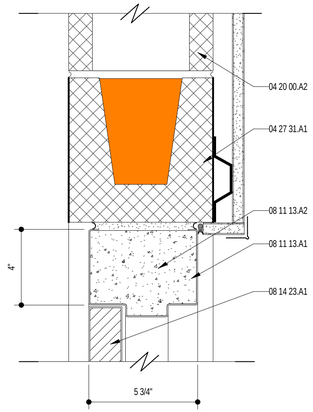
J1 INT. H.M. DOOR HEAD
3" = 1'-0"



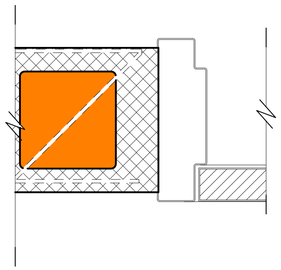
J3 WINDOW HEAD DETAIL
3" = 1'-0"



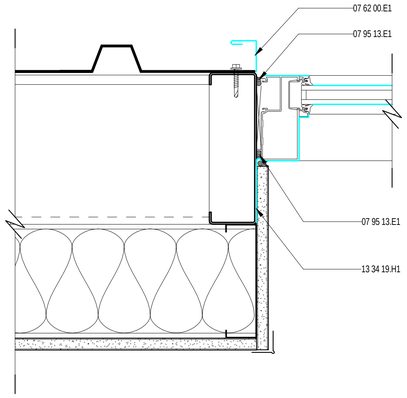
J7 HM DOOR HEAD DETAIL
3" = 1'-0"



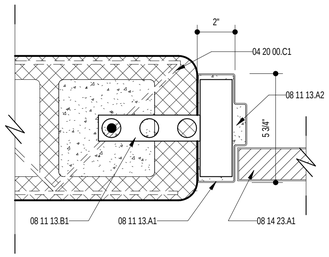
J10 INT. DOOR HEAD
3" = 1'-0"



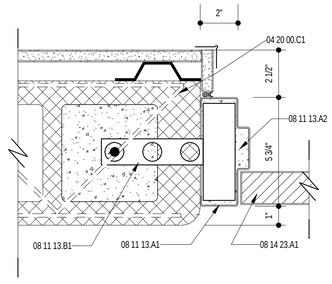
E1 INT. H.M. DOOR JAMB
3" = 1'-0"



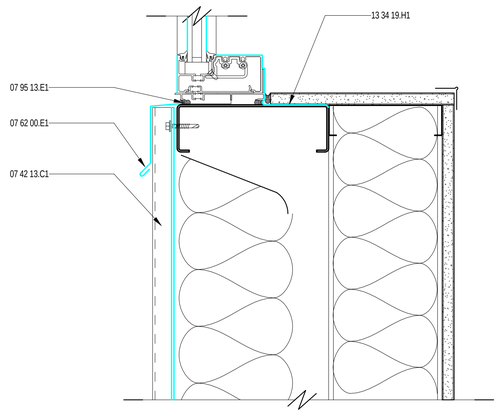
E3 EXT WINDOW JAMB DETAIL
3" = 1'-0"



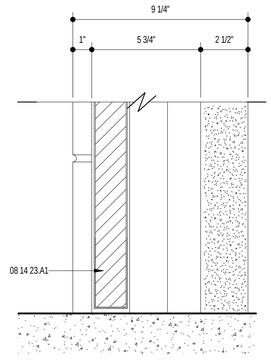
E7 HM DOOR JAMB DETAIL
3" = 1'-0"



E10 INT. DOOR SILL
3" = 1'-0"



A3 WINDOW SILL DETAIL
3" = 1'-0"



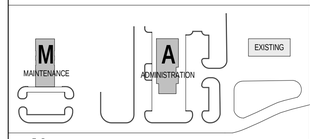
A10 INT. DOOR SILL
3" = 1'-0"

DOOR AND WINDOW GENERAL NOTES

1. SET WINDOW SUBSILLS IN CONTINUOUS BEAD OF SEALANT.
2. TURN SUBSILLS AND FLASHING MEMBRANE UP AT JAMBS (6" MINIMUM) TO FORM END DAMS.
3. SPACE ANCHORS OF DOOR AND WINDOW FRAMES NO MORE THAN 16" O.C.
4. INSTALL ONE WINDOW AND STOREFRONT FOR ARCHITECT'S REVIEW AND APPROVAL PRIOR TO PROCEEDING.
5. VERIFY HEAD HEIGHTS OF OPENINGS ON THE EXTERIOR AND INTERIOR ELEVATIONS. INFORM THE ARCHITECT OF DISCREPANCIES PRIOR TO PROCEEDING.
6. ALL GLAZING NOT SCHEDULED OR NOTED OTHERWISE, SHALL BE 1/4" CLEAR GLASS.
7. ALL DOORS TO BE 1 3/4" THICK, UNLESS OTHERWISE NOTED.
8. ALL H.M. FRAMES TO HAVE A 2" FACE DIMENSION W/ 5/8" STOP. PROVIDE 3/4" STOP AS REQUIRED FOR THE RATED FRAMES.
9. REFER TO SHEET AE601 FOR DOOR AND HARDWARE SCHEDULE.
10. COORDINATE WITH MECHANICAL DOCS FOR DOOR UNDERCUTS & DOORS LOUVERS.
11. FLOOR MATERIAL CHANGES BETWEEN ROOMS TO OCCUR UNDER DOOR.
12. ALL LIGHTS IN DOORS TO HAVE TEMPERED GLAZING, UNLESS OTHERWISE NOTED.
13. ALL EXTERIOR HM DOORS TO BE INSULATED AND GALVANIZED.
14. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATING FRAMES.
15. AT DRYWALL PARTITIONS, PROVIDE FR-WD BLKG. @ ALL WALLS BEHIND DOORS SCHEDULED TO HAVE WALLMOUNTED DOOR STOPS. (REF. HARDWARE SCHEDULE IN SPECIFICATIONS).
16. ALL ALUMINUM STOREFRONT WINDOWS AND DOOR FRAMES TO BE CLEAR ANODIZED ALUMINUM FINISH.
17. PROVIDE CLEAR ANODIZED FINISH FOR COILING GRILLS AT KITCHEN IN LIEU OF BRONZE ANODIZED ALUMINUM FINISH.

KEYNOTE LEGEND

04 20 00.A2	CONCRETE BLOCK, 8" THICK
04 20 00.C1	REINFORCING STEEL
04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
07 42 13.C1	EXTERIOR METAL PANEL
07 62 00.E1	PRE FINISHED SHEET METAL FLASHING
07 95 13.E1	BACKER ROD W/ SEALANT
08 11 13.A1	HOLLOW METAL DOOR FRAME
08 11 13.A2	GROUT-FILL HOLLOW METAL FRAME
08 11 13.B1	ANCHOR JAMB
08 14 23.A1	PLASTIC-LAMINATE - FACED WOOD DOOR
13 34 19.H1	3" VINYL FACED BATT INSULATION. REFER TO P.E.M.B. MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS



N
PLAN NORTH

KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

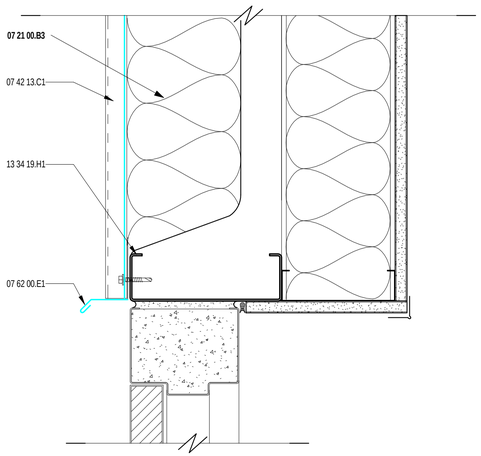
PROJECT NO.: 12014
DRAWN BY: CS
CHECKED BY: YIPG

SHEET TITLE: DOOR AND WINDOW DETAILS

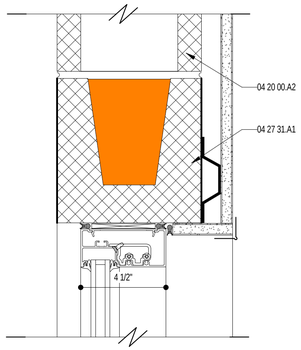
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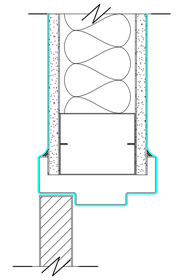
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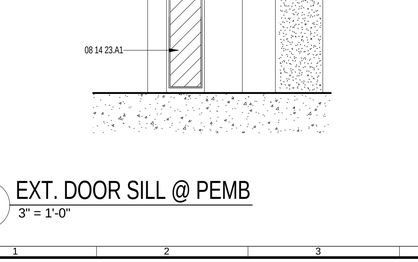
H1 EXT. DOOR HEAD @ PEMB
3" = 1'-0"



H4 INT. WINDOW HEAD @ PEMB
3" = 1'-0"



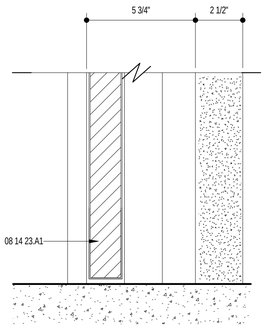
H8 INT. DOOR HEAD
3" = 1'-0"



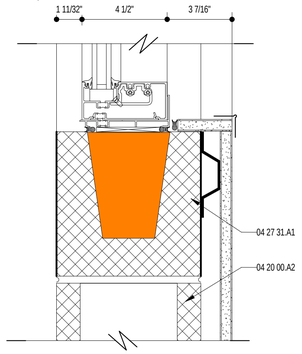
D1 EXT. DOOR JAMB @ PEMB
3" = 1'-0"

D4 INT. WINDOW HEAD @ PEMB
3" = 1'-0"

D8 INT. DOOR JAMB
3" = 1'-0"



A1 EXT. DOOR SILL @ PEMB
3" = 1'-0"



A4 INT. WINDOW HEAD @ PEMB
3" = 1'-0"

DOOR AND WINDOW GENERAL NOTES

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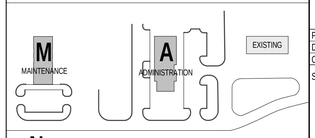
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04 27 31.A1	CONT. BOND BEAM, REFER STRUCTURE
07 42 13.C1	EXTERIOR METAL PANEL
07 62 00.E1	PRE FINISHED SHEET METAL FLASHING
07 92 13.A1	ELASTOMERIC JOINT SEALANT
07 95 13.E1	BACKER ROD W/ SEALANT
08 11 13.B1	ANCHOR JAMB
08 14 23.A1	PLASTIC-LAMINATE - FACED WOOD DOOR
09 22 16.13.A1	METAL STUDS, 4", 20GA
09 29 00.A2	GYPSUM WALLBOARD, 5/8" THICK
13 34 19.H1	3" VINYL FACED BATT INSULATION. REFER TO P.E.M.B. MANUFACTURER AND INSTALL PER ITS SPECIFICATIONS





KEY PLAN

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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: CS
CHECKED BY: YIPG

SHEET TITLE:
DOOR AND WINDOW DETAILS

AE513

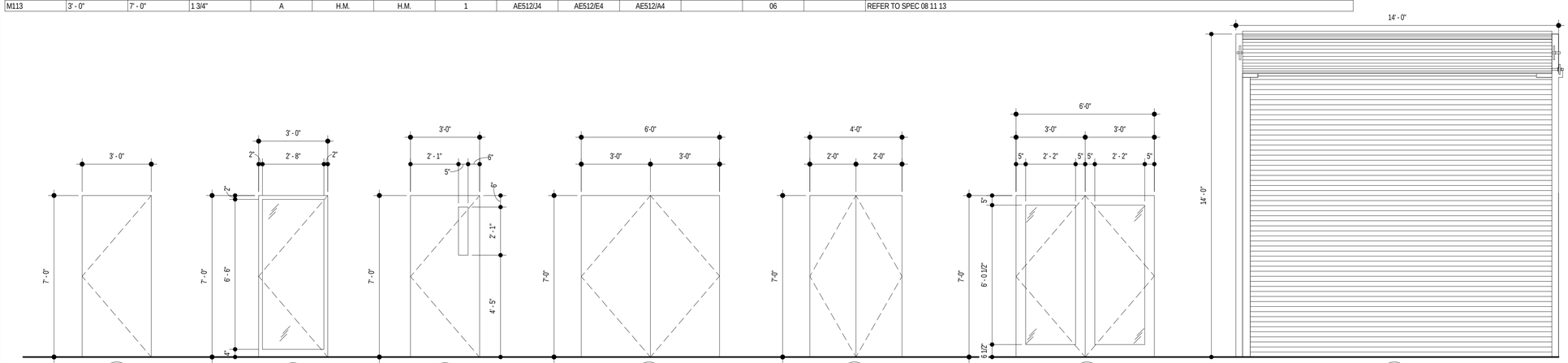
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ADMINISTRATION DOOR & FRAME SCHEDULE

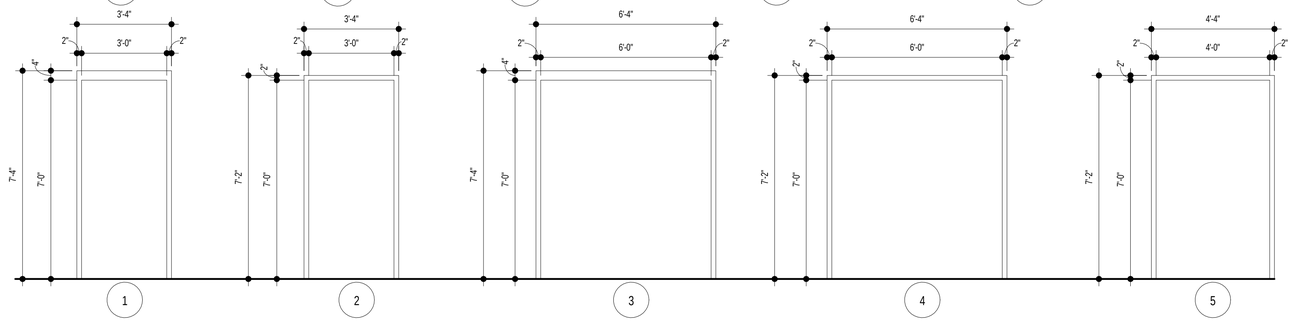
MARK	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THICKNESS	DOOR ELEVATION TYPE	DOOR MATERIAL	FRAMING MATERIAL	FRAMING ELEVATION TYPE	FRAMING HEAD DETAIL	FRAMING JAMB DETAIL	FRAMING SILL DETAIL	FIRE RATING LABEL	HARDWARE SET No.	HARDWARE KEYSIDE ROOM No.	Comments
A101	6' - 0"	7' - 0"	1 3/4"	F	GLASS	ALUM	--	AE512/J7	AE512/E7	AE512/A7		01		REFER TO SPEC 08 41 13.10
A102	6' - 4"	7' - 0"	1 3/4"	D	PLAM	H.M.	4	AE514/H8	AE514/D8	--		02		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A103	3' - 0"	7' - 0"	1 3/4"	C	PLAM	H.M.	2	AE514/H8	AE514/D8	--		15		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A103A	4' - 0"	7' - 0"	1 3/4"	E	PLAM	H.M.	5	AE514/H8	AE514/D8	--		03		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A104	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		06		REFER TO SPEC 08 11 13
A105	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		13		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A106	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	1	AE513/J7	AE513/E7	--		16		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A107	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	1	AE513/J7	AE513/E7	--		08		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A108	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	1	AE513/J7	AE513/E7	--		14		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A109	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	1	AE513/J7	AE513/E7	--		08		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A110A	3' - 0"	7' - 0"	1 3/4"	C	PLAM	H.M.	1	AE513/J1	AE513/E1	--		07		REFER TO SPEC 08 41 13.10.A1 TYPE A (FRAME AND DOOR)
A110B	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		22		REFER TO SPEC 08 11 13
A111	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		06		REFER TO SPEC 08 11 13
A112	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		05		REFER TO SPEC 08 11 13
A113	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	1	AE513/J7	AE513/E7	--		13		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A114	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		11		REFER TO SPEC 08 41 13.10
A115	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		11		REFER TO SPEC 08 41 13.10
A116	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		11		REFER TO SPEC 08 41 13.10
A117	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	2	AE514/H8	AE514/D8	--		11		REFER TO SPEC 08 41 13.10
A118A	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	2	AE514/H8	AE514/D8	--		15		REFER TO SPEC 08 41 13.10
A118B	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	2	AE514/H8	AE514/D8	--		15		REFER TO SPEC 08 41 13.10
A119A	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	2	AE514/H8	AE514/D8	--		17		REFER TO SPEC 08 41 13.10
A119B	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	2	AE514/H8	AE514/D8	--		17		REFER TO SPEC 08 41 13.10
A120	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		10		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A121	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE514/H8	AE514/D8	--		11		REFER TO SPEC 08 41 13.10
A121A	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		16		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
A122	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		11		REFER TO SPEC 08 41 13.10
A123	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		11		REFER TO SPEC 08 41 13.10
A124	3' - 0"	7' - 0"	1 3/4"	B	GLASS	ALUM	--	AE512/J9-J11	AE512/E11-E1	AE512/A11		12		REFER TO SPEC 08 41 13.10

MAINTENANCE DOOR & FRAME SCHEDULE

MARK	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THICKNESS	DOOR ELEVATION TYPE	DOOR MATERIAL	FRAMING MATERIAL	FRAMING ELEVATION TYPE	FRAMING HEAD DETAIL	FRAMING JAMB DETAIL	FRAMING SILL DETAIL	FIRE RATING LABEL	HARDWARE SET No.	HARDWARE KEYSIDE ROOM No.	Comments
M101A	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		04		REFER TO SPEC 08 11 13
M101B	3' - 0"	7' - 0"	1 3/4"	C	H.M.	H.M.	1	AE513/J10	AE513/E10	AE513/A10		19		REFER TO SPEC 08 11 13
M102	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		18		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
M103	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		18		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
M104	3' - 0"	7' - 0"	1 3/4"	C	PLAM	H.M.	2	AE514/H8	AE514/D8	--		17		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
M105A	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M105B	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M106A	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M106B	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M107A	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M107B	14' - 0"	14' - 0"	1 3/4"	G	ALUM	H.M.	--	--	--	--		21		REFER TO SPEC 13.34.19
M108	6' - 0"	10' - 0"	1 1/2"	CHAINLINK	ALUM	ALUM	--	--	--	--		21		
M109A	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		23		REFER TO SPEC 08 11 13
M109B	3' - 0"	7' - 0"	1 3/4"	C	H.M.	H.M.	1	AE513/J7	AE513/E7	--		19		REFER TO SPEC 08 11 13
M109C	3' - 0"	7' - 0"	1 3/4"	C	H.M.	H.M.	1	AE513/J7	AE513/E7	AE512/A4		20		REFER TO SPEC 08 11 13
M110	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		09		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
M111	3' - 0"	7' - 0"	1 3/4"	A	PLAM	H.M.	2	AE514/H8	AE514/D8	--		09		REFER TO SPEC 08 11 13.10 (FRAME) AND 08 14 16 (DOOR)
M112	6' - 0"	10' - 0"	1 1/2"	CHAINLINK	ALUM	ALUM	--	--	--	--		21		
M113	3' - 0"	7' - 0"	1 3/4"	A	H.M.	H.M.	1	AE512/J4	AE512/E4	AE512/A4		06		REFER TO SPEC 08 11 13



DOOR TYPES



FRAME TYPES

DOOR AND WINDOW GENERAL NOTES

1. SET WINDOW SUBSILLS IN CONTINUOUS BEAD OF SEALANT.

2. TURN SUBSILLS AND FLASHING MEMBRANE UP AT JAMBS (6" MINIMUM) TO FORM END DAMS.

3. SPACE ANCHORS OF DOOR AND WINDOW FRAMES NO MORE THAN 16" O.C.

4. INSTALL ONE WINDOW AND STOREFRONT FOR ARCHITECT'S REVIEW AND APPROVAL PRIOR TO PROCEEDING.

5. VERIFY HEAD HEIGHTS OF OPENINGS ON THE EXTERIOR AND INTERIOR ELEVATIONS. INFORM THE ARCHITECT OF DISCREPANCIES PRIOR TO PROCEEDING.

6. ALL GLAZING NOT SCHEDULED OR NOTED OTHERWISE, SHALL BE 1/4" CLEAR GLASS.

7. ALL DOORS TO BE 1 3/4" THICK, UNLESS OTHERWISE NOTED.

8. ALL H.M. FRAMES TO HAVE A 2" FACE DIMENSION W/ 5/8" STOP. PROVIDE 3/4" STOP AS REQUIRED FOR THE RATED FRAMES.

9. REFER TO SHEET AE601 FOR DOOR AND HARDWARE SCHEDULE.

10. COORDINATE WITH MECHANICAL DOCS FOR DOOR UNDERCUTS & DOORS LOUVERS.

11. FLOOR MATERIAL CHANGES BETWEEN ROOMS TO OCCUR UNDER DOOR.

12. ALL LIGHTS IN DOORS TO HAVE TEMPERED GLAZING, UNLESS OTHERWISE NOTED.

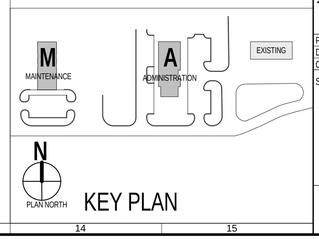
13.ALL EXTERIOR HM DOORS TO BE INSULATED AND GALVANIZED.

14.FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATING FRAMES.

15.AT DRYWALL PARTITIONS, PROVIDE FR-WD BLKG. @ ALL WALLS BEHIND DOORS SCHEDULED TO HAVE WALLMOUNTED DOOR STOPS. (REF. HARDWARE SCHEDULE IN SPECIFICATIONS).

16. ALL ALUMINUM STOREFRONT WINDOWS AND DOOR FRAMES TO BE CLEAR ANODIZED ALUMINUM FINISH.

17. PROVIDE CLEAR ANODIZED FINISH FOR COILING GRILLS AT KITCHEN IN LIEU OF BRONZE ANODIZED ALUMINUM FINISH.



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ELI R.OCHOA, P.E., AIA
TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 MAINTENANCE & ADMINISTRATION BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

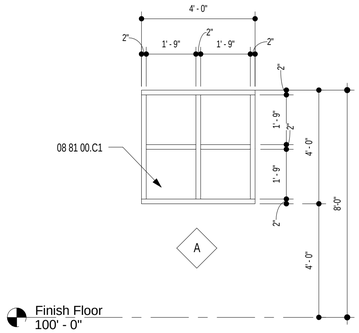
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DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE: DOOR & FRAME SCHEDULE - A & M

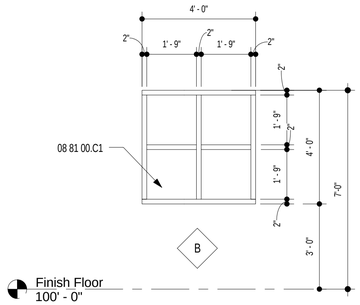
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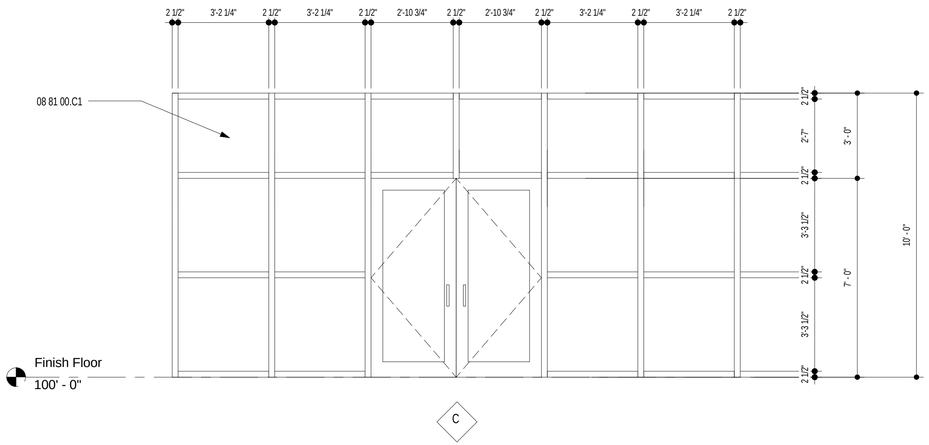
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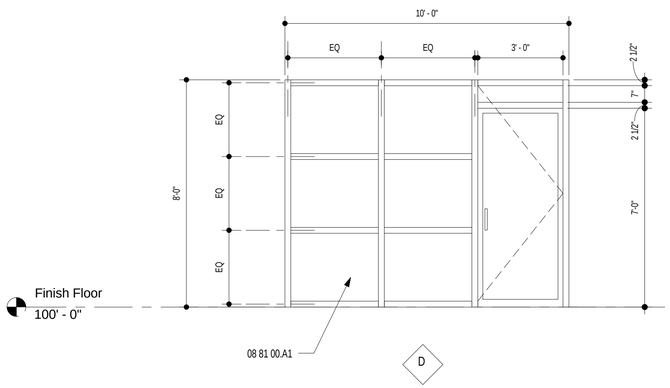
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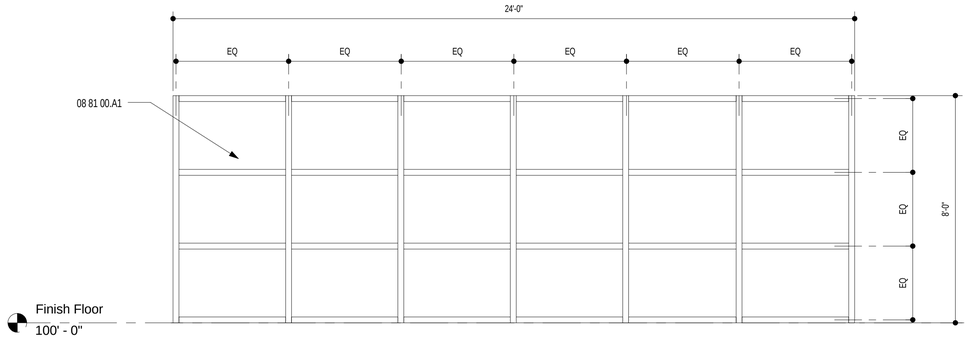


FRAME: ALUMINUM
TYPE: RELIANCE
GLASS: 1" INSULATED
BLINDS: YES/NO









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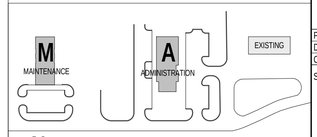
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REFERENCE KEYNOTES

08 81 00.A1 - TYPE A - UNCOATED CLEAR FLOAT GLASS, 1/4" THICK
08 81 00.B1 - TYPE B - UNCOATED INSULATION GLASS, 1" THICK
08 81 00.C1 - TYPE C - LOW-E- INSULATING GLASS, 1" THICK



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TEXAS REGISTRATION NO.
Engineer: 60251
Architect: 18160

CONSULTANTS

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 12014
DRAWN BY: ES
CHECKED BY: YIPG

SHEET TITLE:
WINDOW TYPES

AE602

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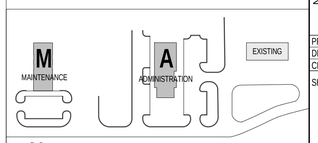
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ROOM FINISH SCHEDULE - ADMINISTRATION BUILDING

ROOM NUMBER	ROOM NAME	FLOOR		BASE	NORTH		EAST		SOUTH		WEST		CEILING MATERIAL	CEILING HEIGHT	NOTES
		MATERIAL	FINISH		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH			
A101	LOBBY	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	G.B.C.	12' - 0"	
A102	COORIDOR	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.B.C.	10' - 0"	
A103	KITCHEN	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A103A	PANTRY	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A104	TRAINING	CONCRETE	SC	RB	G.W.B.	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	A.C.T.	12' - 0"	
A105	STORAGE	CONCRETE	SC	RB	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A106	MDF	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A107	MEN'S RR	CONCRETE	TILE	RB	CMU	TILE	CMU	TILE	CMU	TILE	CMU	TILE	G.B.C.	10' - 0"	
A108	JAN.	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	G.B.C.	10' - 0"	
A109	WOMEN'S RR	CONCRETE	TILE	RB	CMU	TILE	CMU	TILE	CMU	TILE	CMU	TILE	G.B.C.	10' - 0"	
A110	COORIDOR	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A111	ELECTRICAL	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	O.T.S.		
A112	FIRE RISER	CONCRETE	SC	RB	G.W.B.	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	O.T.S.		
A113	STOR.	CONCRETE	SC	RB	G.W.B.	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A114	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A115	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A116	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A117	OFFICE	CONCRETE	VCT	RB	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	A.C.T.	10' - 0"	
A118	MEETING ROOM	CONCRETE	VCT	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	12' - 0"	
A119	COMMISSIONER	CONCRETE	VCT	RB	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A120	RR	CONCRETE	TILE	RB	CMU	TILE	G.W.B.	TILE	G.W.B.	TILE	G.W.B.	TILE	G.B.C.	10' - 0"	
A121	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A121A	STOR.	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A122	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A123	OFFICE	CONCRETE	VCT	RB	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	
A124	FIN. ROOM	CONCRETE	VCT	RB	G.W.B.	PAINT	CMU	PAINT	CMU	PAINT	G.W.B.	PAINT	A.C.T.	10' - 0"	

ROOM FINISH SCHEDULE - MAINTENANCE BUILDING

ROOM NUMBER	ROOM NAME	FLOOR		BASE	NORTH		EAST		SOUTH		WEST		CEILING MATERIAL	CEILING HEIGHT	NOTES
		MATERIAL	FINISH		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH			
M101	DISPATCH	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	A.C.T. 24" X 24"	10' - 0"	
M102	JANITOR	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	O.T.S.		
M103	AC	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	G.W.B.	PAINT	O.T.S.		
M104	COMM STORAGE	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	G.W.B.	PAINT	G.B.C.	8' - 0"	
M105	SHOP BAY 1	CONCRETE	SC	RB	CMU	PAINT	MP	--	--	--	MP	--	O.T.S.		
M106	SHOP BAY 2	CONCRETE	SC	RB	--	--	MP	--	--	--	MP	--	O.T.S.		
M107	SHOP BAY 3	CONCRETE	SC	RB	--	--	MP	--	--	--	MP	--	O.T.S.		
M108	PARTS STORAGE	CONCRETE	SC	RB	--	--	MP	--	MP	PAINT	CMU	PAINT	O.T.S.		
M109	OFFICE	CONCRETE	SC	RB	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	A.C.T. 24" X 24"	10' - 0"	
M110	RR	CONCRETE	SC	RB	G.W.B.	FRP	G.W.B.	FRP	CMU	FRP	G.W.B.	FRP	G.B.C.	10' - 0"	
M111	RR	CONCRETE	SC	RB	G.W.B.	FRP	G.W.B.	FRP	G.W.B.	FRP	G.W.B.	FRP	G.B.C.	10' - 0"	
M112	LOCKERS	CONCRETE	SC	RB	G.W.B.	PAINT	G.W.B.	PAINT	CMU	PAINT	G.W.B.	P	A.C.T. 24" X 24"	10' - 0"	
M113	EQUIPMENT PAD	CONCRETE	RC	--	--	--	MP	--	MP	--	--	--	O.T.S.		



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No.	Description	Date

PROJECT NO.: 12014
DRAWN BY: YIPG
CHECKED BY: YIPG

SHEET TITLE: ROOM FINISH SCHEDULE

AF601

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ELECTRICAL GENERAL LEGEND

ALL SYMBOLS SHOWN MAY NOT APPEAR IN ALL DRAWINGS.
SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE.

SYMBOL	DESCRIPTION	MNTG. HT. UNO (SEE NOTE 1)
LIGHTING		
	2'x4' FLUORESCENT LIGHT FIXTURE	SEE FIX. SCH.
	2'x4' FLUORESCENT LIGHT FIXTURE WITH EMERGENCY BATTERY	SEE FIX. SCH.
	2'x2' FLUORESCENT LIGHT FIXTURE	SEE FIX. SCH.
	2'x2' FLUORESCENT LIGHT FIXTURE WITH EMERGENCY BATTERY	SEE FIX. SCH.
	FLUORESCENT STRIP LIGHT	SEE FIX. SCH.
	FLUORESCENT STRIP LIGHT WITH EMERGENCY BATTERY	SEE FIX. SCH.
	1'X4' FLUORESCENT LIGHT FIXTURE	SEE FIX. SCH.
	1'X4' FLUORESCENT LIGHT FIXTURE WITH EMERGENCY BATTERY	SEE FIX. SCH.
	TRACK LIGHT WITH HEADS	SEE FIX. SCH.
	INCANDESCENT, FLUORESCENT, OR HID FIXTURE CLG. OR WALL MTD.	SEE FIX. SCH.
	INCANDESCENT, FLUORESCENT, OR HID FIXTURE WITH EMERGENCY BATTERY CLG. OR WALL MTD.	SEE FIX. SCH.
	EMERGENCY FIXTURE	SEE FIX. SCH.
	POLE MOUNTED FIXTURE	SEE FIX. SCH.
	EXIT LIGHT, CEILING OR WALL MOUNTED – SHADING INDICATING SINGLE OR DOUBLE FACE; DIRECTIONAL ARROWS AS INDICATED	9" BFC
SECURITY SYSTEM		
DM	DOOR MONITOR	–
	CAMERA	–
CR	CARD READER	–
MD	MOTION DETECTOR	–
D	DOOR CONTACT	–
K	SECURITY KEYPAD	–
ERP	ENTRANCE ROOM PAGER	–
P	PANIC BUTTON	–
DR	DOOR RELEASE	–
ES	ELECTRIC STRIKE	–

SYMBOL	DESCRIPTION	MNTG. HT. UNO (SEE NOTE 1)
POWER		
	SINGLE RECEPTACLE – 20A/125V/1P/3W/G NEMA 5–20R	15" AFF
	DUPLEX RECEPTACLE – 20A/125V/1P/3W/G NEMA 5–20R	15" AFF
	220 RECEPTACLE – 20A/125V/1P/3W/G NEMA 5–20R	15" AFF
WP	DUPLEX RCPT. GFI/WATER PROOF – 20A/125V/1P/3W/G NEMA 5–20R	15" AFF
	QUADRAPLEX RECEPTACLE (TWO DUPLEX RCPTS. UNDER ONE COVERPLATE)	15" AFF
	ISOLATED GROUND QUADRAPLEX RECEPTACLE (TWO DUPLEX RCPTS. UNDER ONE COVERPLATE)	15" AFF
	ISOLATED GROUND DUPLEX RECEPTACLE – 20A/125V NEMA 5–20R	15" AFF
E	DUPLEX RECEPTACLE ON EMERGENCY CIRCUIT	15" AFF
	FLOOR MOUNTED DUPLEX RECEPTACLE – FLUSH MOUNTED UNO	–
IG	ISOLATED GROUND FLOOR MOUNTED DUPLEX RECEPTACLE – FLUSH MOUNTED UNO	–
	DUPLEX RCPT. SPLIT–WIRED – 20A/125V/1P/3W/G NEMA 5–20R	15" AFF
	SPECIAL PURPOSE RECEPTACLE (NEMA NO. OR RATING AS INDICATED)	15" AFF
J J	JUNCTION BOX – SIZE & MOUNTING AS REQUIRED	15" AFF
	MULTIOUTLET ASSEMBLY – LENGTH AND OUTLET SPACING AS INDICATED	–
30/–/3	DISCONNECT SWITCH – 30/–/3 INDICATES 30A, 3–POLE, NONFUSED; 30/30/3 INDICATES 30A, 3–POLE, 30A FUSE	AS REQD.
CB 30/3	CIRCUIT BREAKER DISCONNECT SWITCH – THERMAL MAGNETIC CB IN NEMA 1 ENCL; AMPS/POLES AS INDICATED	AS REQD.
30/30/3	DISCONNECT SWITCH – 30/30/3 INDICATES 30A, 3–POLE, 30A FUSE	AS REQD.
2	MOTOR STARTER FVNR UNO; NUMBER INDICATES NEMA SIZE	AS REQD.
CB	COMBINATION MOTOR CONTROLLER/DISCONNECT SWITCH	AS REQD.
	PANELBOARD	–
	TRANSFORMER	–
	MOTOR	–
~	SINGLE LINE CONTINUATION	–
	CIRCUIT HOME RUN TO PANELBOARD (2 #12, 1 #12G, 3/4"C. 20A/1P CB UNO)	–
X,X,X	THREE SINGLE POLE DEVICE CIRCUIT NUMBERS	–
X/X/X	MULTI–POLE DEVICE CIRCUIT NUMBERS	–
	METER	AS REQD.
GAP	GENERATOR ANNUNCIATING PANEL	AS REQD.
EPO	EMERGENCY POWER OFF BUTTON WITH STOPPER II NUANCE COVER	48" AFF

SYMBOL	DESCRIPTION	MNTG. HT. UNO (SEE NOTE 1)
FIRE ALARM		
DH	DOOR HOLDER OR DOOR RELEASE	–
F	FIRE ALARM PULL STATION	48" AFF
F	FIRE ALARM AUDIBLE/VISUAL SIGNAL	80" AFF
F	FIRE ALARM AUDIBLE SIGNAL	80" AFF
F	FIRE ALARM VISUAL SIGNAL	80" AFF
FS	FIRE ALARM SPRINKLER FLOW SWITCH	–
TS	FIRE ALARM SPRINKLER TAMPER SWITCH	–
S	FIRE ALARM SMOKE DETECTOR CEILING OR WALL MOUNTED	80" AFF
H	HEAT DETECTOR CEILING OR WALL MOUNTED	–
D	DUCT SMOKE DETECTOR	–
FACP	FIRE ALARM CONTROL PANEL	–
FAAP	FIRE ALARM ANNUNCIATOR PANEL	–
ARC	AREA OF RESCUE CALL	–
ARANN	AREA OF RESCUE ANNUNCIATOR	–
FSP	FIRE SUPRESSION PANEL	
COMMUNICATION		
	TELEPHONE/DATA OUTLET. WALL MOUNTED – STUB 3/4" C. ABOVE ACCESSIBLE CEILING	15" AFF
	TELEPHONE OUTLET. WALL MOUNTED – STUB 3/4" C. ABOVE ACCESSIBLE CEILING	15" AFF
	DATA OUTLET. WALL MOUNTED – STUB 3/4" C. ABOVE ACCESSIBLE CEILING	15" AFF
	FLOOR MOUNTED TELEPHONE/DATA OUTLET – FLUSH MOUNTED UNO	–
	FLOOR MOUNTED TELEPHONE OUTLET – FLUSH MOUNTED UNO	–
	FLOOR MOUNTED DATA OUTLET – FLUSH MOUNTED UNO	–
W	TELEPHONE OUTLET. WALL MOUNTED – STUB 3/4" C. ABOVE ACCESSIBLE CEILING	48" AFF
SC	SOUND CONSOLE (RACK)	–
S S	P.A. SPEAKER, CEILING OR WALL MOUNTED	9" BFC, UNO
M M	MICROPHONE OUTLET	–
DBL	CLOCK – SINGLE OR DOUBLE FACE	–
W	WIRELESS ACCESS POINT	–
R	SPRINKLER SYSTEM REGULATOR RELAY	–
TV TV	TELEVISION OUTLET, CLG. OR WALL MTD – FURNISH AND INSTALL 3/4"CONDUIT STUB ABOVE ACCESSIBLE CLG., REFER TO SPECIFICATION 16702 (MASTER ANTENNA TELEVISION SYSTEM) FOR CABLING AND EQUIPMENT REQUIREMENTS	–
	PUSHBUTTON FOR INTERCOM CALL IN	48" AFF
	BUZZER/BELL	–
	TELEPHONE BOARD	–
	CABLE TRAY	–
	J–HOOKS – AS NOTED ON PLANS	–

GENERAL ABBREVIATIONS

ABS	ABOVE BACK SPLASH	EX	EXISTING	MTD	MOUNT OR MOUNTED	NL	NIGHT LIGHT	SW	SWITCH
AFF	ABOVE FINISHED FLOOR	F	FUSE	NC (N.C.)	NORMALLY CLOSED	NO (N.O.)	NORMALLY OPEN	UF	UNDERFLOOR
BFC	BELOW FINISHED CEILING	G	GROUND (EQUIPMENT)	NF	NONFUSED	RCPT(S)	RECEPTACLE(S)	UG	UNDERGROUND
C	CONDUIT	GFI	GROUND FAULT INTERRUPTER	NIC	NOT IN CONTRACT	PNL	PANEL	WG	WIRE GUARD
CB	CIRCUIT BREAKER	IC	INTERRUPTING CAPACITY	TYP	TYPICAL	SO (S.O.)	SPACE ONLY	WP	WEATHERPROOF
CLG	CEILING	IG	ISOLATED GROUND	EP	ELECTRICAL PRIMARY	SP	SPARE	XFMR	TRANSFORMER
EC	EMPTY CONDUIT					ST (S.T.)	SHUNT TRIP	UNO	UNLESS NOTED OTHERWISE

NOTES:
1. 48" AFF INDICATES TO TOP OF DEVICE;
   15" AFF INDICATES TO BOTTOM OF DEVICE;
   ALL OTHER MOUNTING HEIGHTS REFER TO CENTERLINE OF DEVICE.

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX. 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: ES./M.
CHECKED BY: RAL/M.

SHEET TITLE:
ELECTRICAL GENERAL LEGEND

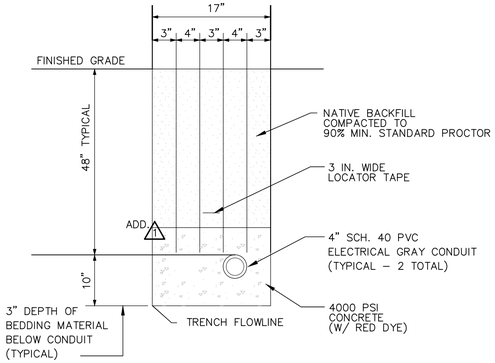
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ELECTRICAL DUCT BANK & MINIMAL CRITERIA NOTES:

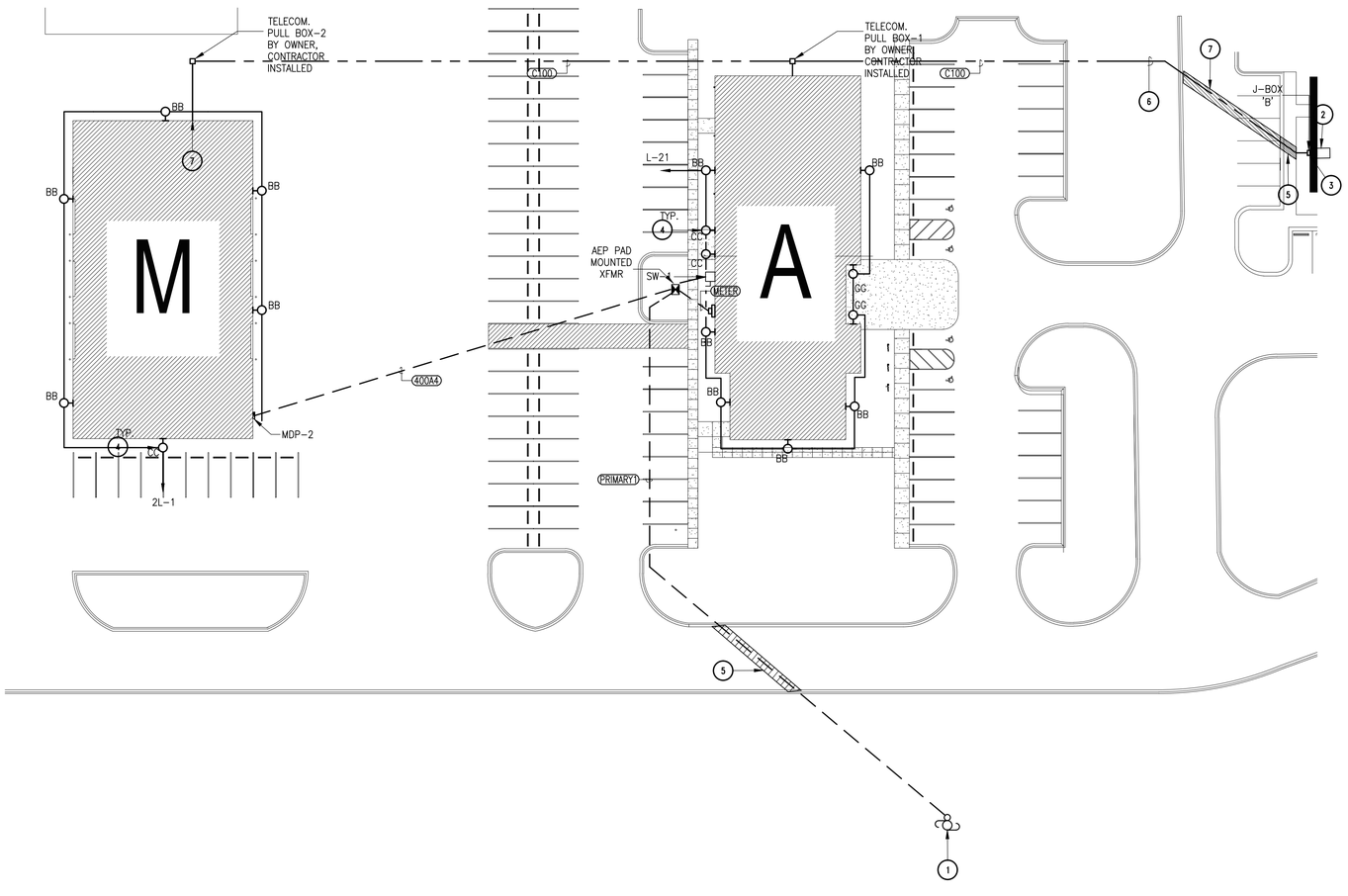
1. THE ELECTRICAL DUCT BANK IS SHOWN FOR ILLUSTRATION PURPOSES ONLY AND IS ONLY SUGGESTED. THE ACTUAL ALIGNMENT & IMPROVEMENTS SHALL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR DESIGN & INSTALLATION COMPLETE IN PLACE.
2. ALL CONDUITS SHALL BE PLACED PRIOR TO COMPACTION OF SUBGRADE.
3. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL CONDUITS REQUIRED FOR PUBLIC AND PRIVATE UTILITIES.
4. ALL CONDUITS TO BE INSTALLED WITH PULL STRING AS REQUIRED.
5. MANHOLES, JUNCTION BOXES, ABOVE GROUND PEDESTALS, AND DEFLECTIONS SHALL BE PROVIDED AS NEEDED.
6. CABLE TENSION PULLING CALCULATIONS TO CONFIRM PULL BOX QTY'S. (PROVIDED BY CONTRACTOR)
7. NO MORE THAN (3) 90^ BENDS BETWEEN BOXES. (HORIZONTAL & VERTICAL CUMULATIVE)
8. NO MORE THAN 400 FT. BETWEEN BOXES.
9. MIN. 48" SWEEPS FOR 4" CONDUIT.



02 TYPICAL CONDUIT EARTHERN SECTION
SCALE: NTS

TELECOMMUNICATION SCHEDULE				
MARK	CONDUIT	FROM	TO	REMARKS
C100	QTY(2) – 4INCH W/ QTY. (4) NYLON PULL STRINGS	NETWORK RM. IN PCT. 4 EXISTING BUILDING	J–BOX 'B'	
C100	QTY(2) – 4INCH W/ QTY. (4) NYLON PULL STRINGS	J–BOX 'B'	TELECOM PULL BOX '1'	
C100	QTY(2) – 4INCH W/ QTY. (4) NYLON PULL STRINGS	TELECOM. PULL BOX '1'	IDF ROOM	
C100	QTY(2) – 4INCH W/ QTY. (4) NYLON PULL STRINGS	TELECOM PULL BOX '2'	ROOM 129	

03 TELECOMMUNICATION SCHEDULE
SCALE: NTS



PLAN NORTH

01 ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

GENERAL NOTES:

A. ELECTRICAL CONTRACTOR SHALL CONTACT UTILITY COMPANIES SERVICES REPRESENTATIVES AND COORDINATE SERVICE INSTALLATION FOR POWER, TELEPHONE AND CABLE PRIOR TO COMMENCING WORK.

B. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER ALL FEES AND CONSTRUCTION COSTS CHARGED BY UTILITY COMPANIES I.E. POWER, CABLE FOR MAIN LINE EXTENSIONS AND NEW SERVICE INSTALLATION REQUIREMENTS.

C. ELECTRICAL CONTRACTOR SHALL COORDINATE SERVICE ENTRANCE REQUIREMENTS FOR TELEPHONE WITH LOCAL TELEPHONE SERVICE COMPANY PRIOR TO COMMENCING WORK. CONTACT TELEPHONE COMPANY TO VERIFY THAT EXISTING SERVICE CAN SUPPORT NEW OFFICE AND MAINTENANCE BLG. CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO EXTEND TELEPHONE SERVICE TO NEW BUILDING.

D. ELECTRICAL CONTRACTOR SHALL PROVIDE FOUNDATIONS FOR ALL LIGHT POLES SHOWN ON DRAWINGS. REEFER TO DETAIL SHEET FOR ELECTRICAL ROUGH–IN REQUIREMENTS. REFER TO STRUCTURAL PLANS FOR FOUNDATION REQUIREMENT.

E. ELECTRICAL CONTRACTOR SHALL INSTALL ALL UNDERGROUND CONDUIT, CONDUCTORS, AND CABLE AS SPECIFIED IN PROJECT MANUAL. RE: SECTION 260519, 26533 AND OTHER RELATED SECTIONS OF DIVISION 16.

F. FURNISH AND INSTALL ALL CAMERAS AT 14–FEET ABOVE FINISH GRADE.

KEY NOTES:

1. APPROXIMATE LOCATION OF NEW POWER RISER POLE. CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO EXPAND POWER FROM RISER POLE TO PAD MOUNTED TRANSFORMER.
2. APPROXIMATE LOCATION OF EXISTING MDF ROOM "NETWORK" AT EXISTING PRECINCT 4 OFFICES. CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO FURNISH AND INSTALL CONDUIT TO MDF ROOM.
3. FURNISH AND INSTALL HOFFMAN HINGED COVER TYPE 3R MEDIUM JUNCTION BOX 20"x20"x8" CATALOG NO. AZOR208HCR. COORDINATE FINAL PLACEMENT TO AVOID DAMAGING EXISTING UTILITIES.
4. MOUNT EGRESS LIGHT FIXTURE "CC" 12–INCHES ABOVE TOP OF EXIT DOOR. FURNISH AND INSTALL FIXTURE ON UNSWITCHED CIRCUIT.
5. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO BORE UNDER STREET IN ORDER TO INSTALL CONDUITS AS NOTED.
6. EFER TO 02/ES100 FOR DUCTBANK DETAIL. TELEPHONE SERVICE FOR NEW BUILDINGS WILL BE EXTENDED FROM EXISTING BUILDING USING 25 PAIR CAT 6A CABLE. CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO EXTEND THE TELEPHONE SERVICE.
7. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO ROUTE THE TWO 4–INCH CONDUITS TO THE WEST WALL OF COMMUNICATION'S ROOM 129.

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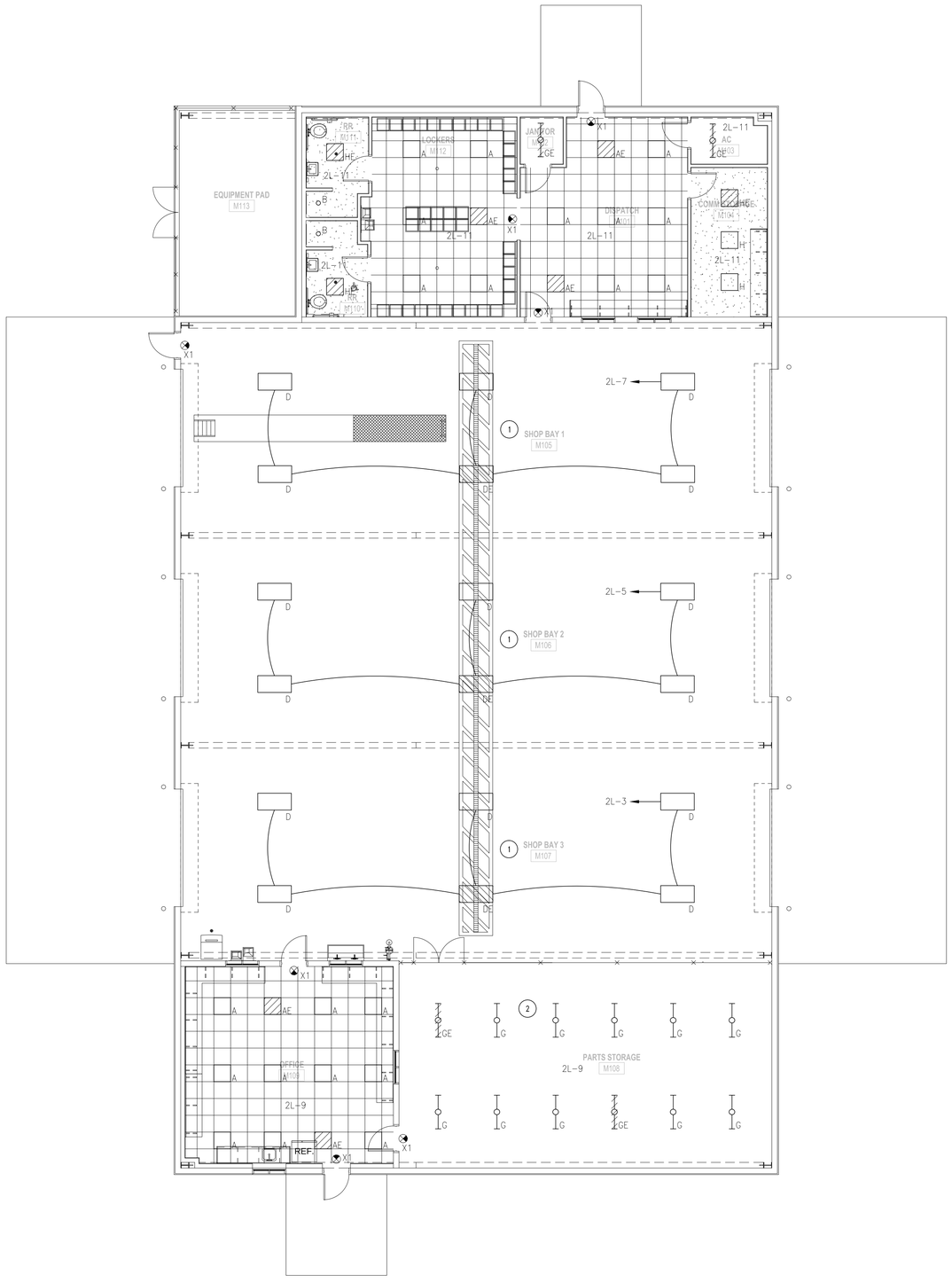
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: G.B.
CHECKED BY: J.A.N.
SHEET TITLE: ELECTRICAL SITE PLAN

ES100

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01 ELECTRICAL LIGHTING PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN (RCP) FOR EXACT LOCATION OF LIGHT FIXTURES. FURNISH FIXTURES WITH TRIM COMPATIBLE WITH THE TYPE OF CEILING AS INDICATED ON THE RCP.

B. CONNECT EXIT/EMERCENCY LIGHTS AND EMERGENCY BALLASTS IN EMERGENCY LIGHTS IN EACH SPACE TO UNSWITCHED HOT LEG OF LOCAL LIGHTING CIRCUIT. REFER TO DETAIL SHEETS FOR REQUIREMENTS.

C. COORDINATE PLACEMENT OF FIXTURES WITH ACTUAL INSTALLATION OF MECHANICAL EQUIPMENT AND DUCTWORK.

D. WHERE AN nPODM 2P 2 CHANNEL ON/OFF DIGITAL SWITCH IS SHOWN, ONE TOGGLE BUTTON THE OUTER LAMPS IN ALL THE FIXTURES IN THE SPACE AND THE OTHER BUTTON CONTROLS THE INNER LAMPS IN ALL THE FIXTURES IN THE SPACE UNO.

E. SWITCH LEGS ARE NOT SHOWN WHERE SWITCHING SCHEME IS OBVIOUS.

F. FIXTURES SHALL BE CIRCUITED TO CIRCUIT INDICATED IN SPACE, UNO.

G. EMERGENCY LIGHTING CIRCUIT WIRING SHALL BE INSTALLED IN FULL COMPLIANCE WITH 2011 NATIONAL ELECTRICAL CODE – ARTICLE 700.

H. COORDINATE WITH AHJ CONTROL SENSITIVITY REQUIRED FOR ALL ELECTRICAL AND MECHANICAL ROOMS.

I. FURNISH AND INSTALL ALL EXTERIOR EMERGENCY REMOTE BALLAST AT THE CORRIDORS, ACCESSIBLE FROM CEILING GRID TILE. PROVIDE LABEL AT CEILING GRID IDENTIFYING LOCATION.

J. REFER TO LIGHTING CONTROL PLAN FOR CONTROL REQUIREMENTS.

K. REFER TO ARCHITECTURAL SCHEDULES FOR ROOM CEILING HEIGHTS. LIGHT FIXTURES SHOWN IN THIS SHEET ARE TO BE MOUNTED AT THE SAME CEILING HEIGHT AS LISTED IN THE ARCHITECTURAL ROOM FINISH SCHEDULES U.N.O.

L. NOT ALL KEY NOTES SCHEDULED SHOWN MAY APPLY TO THIS SHEET.

M. FURNISH AND INSTALL ALL WALL MOUNTED EXIT LIGHT AT 12" ABOVE DOOR MULLIONS.

KEY NOTES:

1. FURNISH AND INSTALL LIGHT FIXTURES AT 18'-A.F.F.

2. FURNISH AND INSTALL LIGHT FIXTURES AT 10'-A.F.F.

M MAINTENANCE
A ADMINISTRATION
EXISTING

N PLAN NORTH

KEY PLAN

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

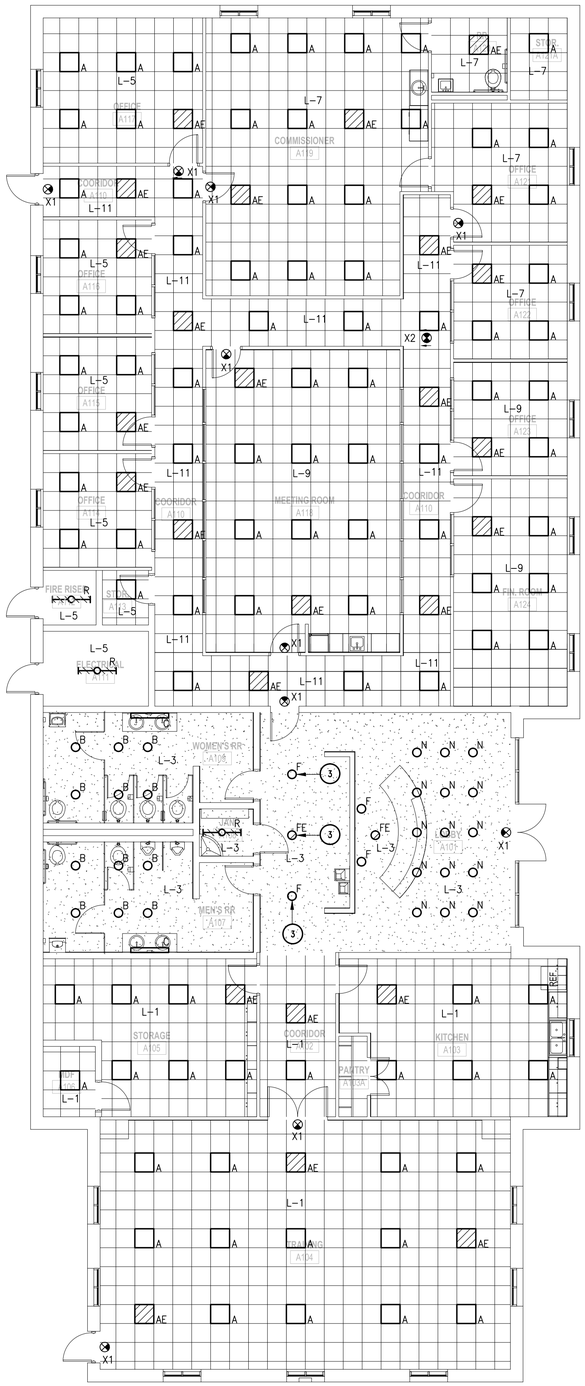
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE: ELECTRICAL LIGHTING PLAN - MAINTENANCE BUILDING - BASE

EL101

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01 ELECTRICAL LIGHTING PLAN
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN (RCP) FOR EXACT LOCATION OF LIGHT FIXTURES. FURNISH FIXTURES WITH TRIM COMPATIBLE WITH THE TYPE OF CEILING AS INDICATED ON THE RCP.

B. CONNECT EXIT/EMERCENCY LIGHTS AND EMERGENCY BALLASTS IN EMERGENCY LIGHTS IN EACH SPACE TO UNSWITCHED HOT LEG OF LOCAL LIGHTING CIRCUIT. REFER TO DETAIL SHEETS FOR REQUIREMENTS.

C. COORDINATE PLACEMENT OF FIXTURES WITH ACTUAL INSTALLATION OF MECHANICAL EQUIPMENT AND DUCTWORK.

D. WHERE AN nPODM 2P 2 CHANNEL ON/OFF DIGITAL SWITCH IS SHOWN, ONE TOGGLE BUTTON THE OUTER LAMPS IN ALL THE FIXTURES IN THE SPACE AND THE OTHER BUTTON CONTROLS THE INNER LAMPS IN ALL THE FIXTURES IN THE SPACE UNO.

E. SWITCH LEGS ARE NOT SHOWN WHERE SWITCHING SCHEME IS OBVIOUS.

F. FIXTURES SHALL BE CIRCUITED TO CIRCUIT INDICATED IN SPACE, UNO.

G. EMERGENCY LIGHTING CIRCUIT WIRING SHALL BE INSTALLED IN FULL COMPLIANCE WITH 2011 NATIONAL ELECTRICAL CODE – ARTICLE 700.

H. COORDINATE WITH AHJ CONTROL SENSITIVITY REQUIRED FOR ALL ELECTRICAL AND MECHANICAL ROOMS.

I. FURNISH AND INSTALL ALL EXTERIOR EMERGENCY REMOTE BALLAST AT THE CORRIDORS, ACCESSIBLE FROM CEILING GRID TILE. PROVIDE LABEL AT CEILING GRID IDENTIFYING LOCATION.

J. REFER TO LIGHTING CONTROL PLAN FOR CONTROL REQUIREMENTS.

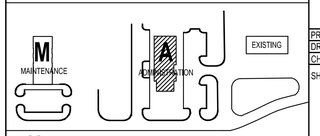
K. REFER TO ARCHITECTURAL SCHEDULES FOR ROOM CEILING HEIGHTS. LIGHT FIXTURES SHOWN IN THIS SHEET ARE TO BE MOUNTED AT THE SAME CEILING HEIGHT AS LISTED IN THE ARCHITECTURAL ROOM FINISH SCHEDULES U.N.O.

L. NOT ALL KEY NOTES SCHEDULED SHOWN MAY APPLY TO THIS SHEET.

M. FURNISH AND INSTALL ALL WALL MOUNTED EXIT LIGHT AT 12" ABOVE DOOR MULLIONS.

KEY NOTES:

1. FURNISH AND INSTALL FIXTURE 7–FEET ABOVE FINISHED FLOOR.
2. FURNISH AND INSTALL SPOT LIGHT FIXTURE 'N' MOUNTED TO STRUCTURE AND CENTERED TO THE COUNTY OF HIDALGO TEXAS LOGO ON THE FINISHED FLOOR. REFER TO EXACT LOCATION OF LOGO WITH ARCHITECTURAL DRAWINGS.
3. FURNISH AND INSTALL FIXTURE AT 12'–1" AFF.





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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

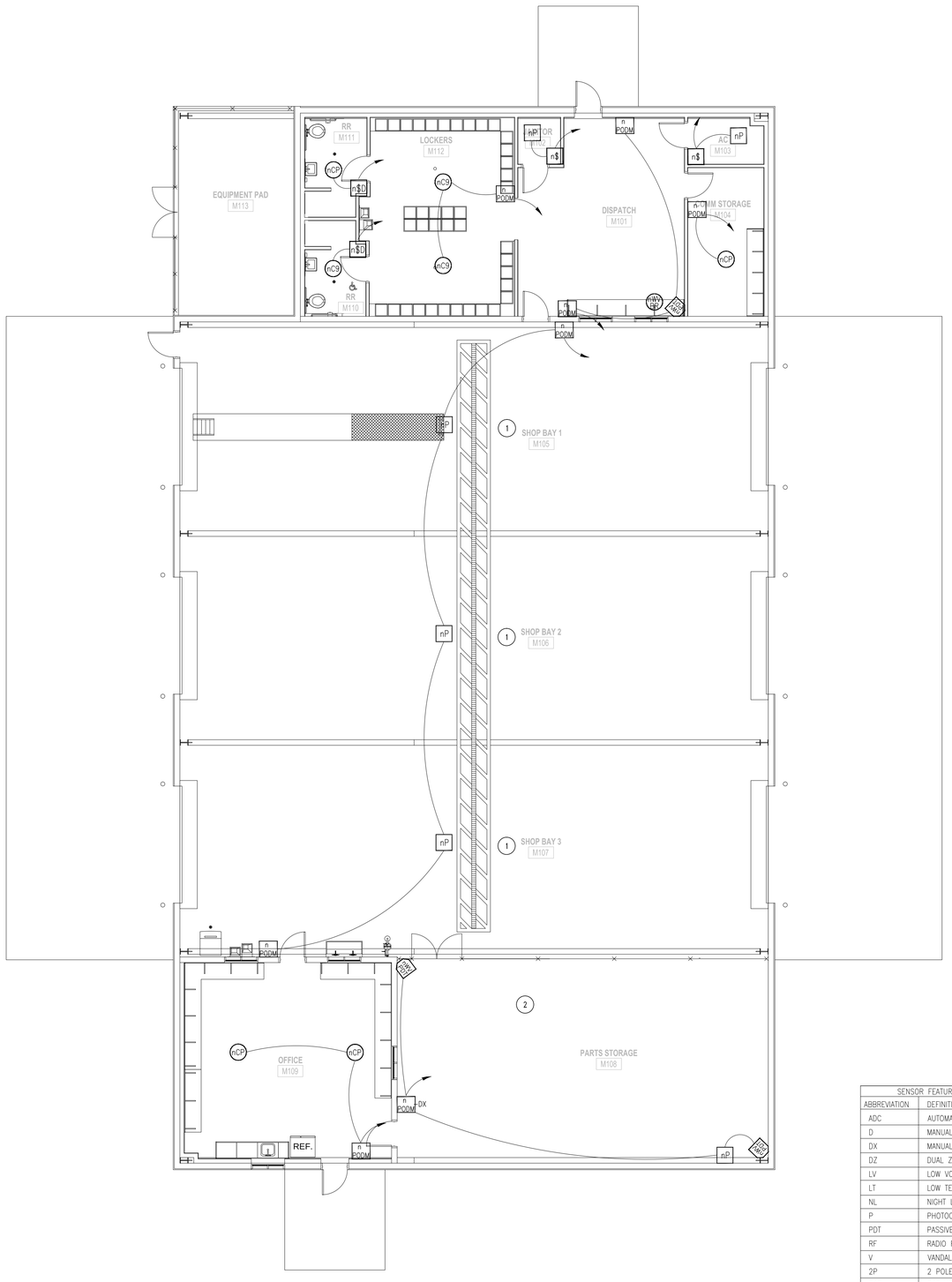
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.M.

SHEET TITLE: ELECTRICAL LIGHTING PLAN - ADMINISTRATION BUILDING - ALTERNATE #1

EL102

10/28/2011 10:19:18 AM



01 ELECTRICAL LIGHTING CONTROLS

SCALE: 1/8" = 1'-0"

SENSOR LEGEND

SYMBOL	DESCRIPTION
	BRIDGE PORT CONNECTION POINTS
nP4	nPANEL 4 nLight Enabled Relay Panel–4 Manual Dimming outputs
nBR PS +50	nBRG 8 KIT Bridge–8 Port with 150 mA power supply
nG PS +50	nGWY KIT Gateway w/ SensorView Software with 150 mA power supply
n PODM	nPODM [COLOR] 1 Channel On/Off Toggle
n PODM –2P	nPODM 2P [COLOR] 2 Channel On/Off Toggle
n PODM –4P	nPODM 4P [COLOR] 4 Channel On/Off Toggle
n PODM 4S	nPODM 4S [COLOR] 4 Button On/Off Toggle or Quad Scene Controller
n$	nWSD [COLOR] Wall Switch Decorator Sensor – Passive Infrared (PIR)
nD$	nWSD PDT [COLOR] Wall Switch Decorator Sensor–Dual Technology (PDT)
nCM 6	nCM 6 High Bay 360° Sensor–Ceiling Mount, Low Voltage, Passive Infrared (PIR)
nCM 9	nCM 9 Standard Range 360° Sensor–Ceiling Mount, Low Voltage, Passive Infrared (PIR)
nCM 10	nCM 10 Extended Range 360° Sensor–Ceiling Mount, Low Voltage, Passive Infrared (PIR)
nCP	nCM PDT 9 Standard Range 360° Sensor, Ceiling Mount, Low Voltage, Dual Technology (PDT)
nWV PDT	nWV PDT 16 Wide View Sensor–Corner Mount, Low Voltage, Dual Technology (PDT)
nP	nPP16 Power Pack: 120/277 VAC
nSP	nSP16 Slave Relay Pack: 120/277/347 VAC
nSP 5 2P	nSP5 2P Slave Pack: 2 POLE: 5A @ 120/277/347 VAC EACH POLE
nPOD GFX	nPOD GFX GRAFIX WALLPOD, REQUIRED POWER SUPPLY PS 150 INCLUDED
n PODM –2P DX	nPODM 2P DX [COLOR] 2 CHANNEL ON/OFF TOGGLE WITH DIMMING
n$ –LV	nWSD LV [COLOR] Wall Switch Decorator Sensor–Passive Infrared (PIR), Low Voltage
n PODM –DX	nPODM DX [COLOR] 1 Channel On/Off Toggle With Dimming
nIO PC KIT	nIO PC KIT nIO NLI & Outdoor PC Kit

SENSOR FEATURE OPTIONS	
ABBREVIATION	DEFINITION
ADC	AUTOMATIC DIMMING CONTROL
D	MANUAL DIMMING
DX	MANUAL DIMMING CONTROL
DZ	DUAL ZONE
LV	LOW VOLTAGE
LT	LOW TEMP
NL	NIGHT LIGHT
P	PHOTOCELL
PDT	PASSIVE DUAL TECHNOLOGY
RF	RADIO FREQUENCY
V	VANDAL RESISTANT
2P	2 POLE
347	347 VOLT
4	4 PORT
8	8 PORT
480	480 VOLT

WALL SWITCH/POD COLOR OPTIONS	
ABBREVIATION	DEFINITION
IV	IVORY
GY	GREY
WH	WHITE
AL	ALMOND
SENSOR ACCESSORIES	
NAME	DEFINITION
WV BR	WIDE VIEW CEILING MOUNTING BRACKET
FB1	DEEP FIXTURE BRACKET
FB2	DEEP FIXTURE BRACKET WITH HARDWARE

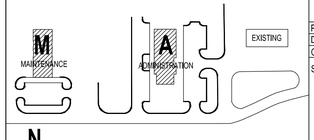
GENERAL NOTES:

1. ONE RELAY IS NEEDED PER CIRCUIT TO BE CONTROLLED AND CAN RESIDE WITHIN SENSORS, WALLPODS, OR RELAY PACKS. POWER PACK PLACEMENT ON DRAWINGS IS FOR COUNTING ONLY; PLEASE RECHECK COUNTS TO VERIFY THE NUMBER OF RELAYS NEEDED TO SWITCH ALL DESIRED LOADS.
2. BRIDGES AND SENSORS ON DRAWINGS WERE PLACED WITH INFORMATION PROVIDED AT TIME OF DESIGN. ADDITIONAL BRIDGES AND/OR SENSORS MAY BE REQUIRED DEPENDING ON BUILDING CHANGES, FINAL PARTITION HEIGHT/PLACEMENT, FURNITURE PLACEMENT, EQUIPMENT HEIGHT/PLACEMENT AND SHELVING HEIGHT/PLACEMENT.
3. 3.THE LAYOUT OF THE NETWORK BACKBONE (BRIDGES AND GATEWAYS) HAS BEEN PLACED IN A SEPARATE TREE DIAGRAM AND NOT ON THE ACTUAL LAYOUT.
4. ALL DEVICES HAVE RJ–45 FEMALE PORTS. MAKING CAT–5(E) CABLES WITH T568B MALE TERMINATIONS IS REQUIRED. IT IS IMPERATIVE THAT ALL CAT–5 CABLES BE TESTED WITH A LAN CABLE TESTER TO VERIFY PROPER TERMINATIONS.
5. COMPUTER FOR HOSTING SENSORVIEW SOFTWARE PROVIDED BY OWNER.
6. SENSORS IN ELECTRICAL/MECHANICAL LOCATIONS NEED TO BE VERIFIED WITH AUTHORITY HAVING JURISDICTION (NEC 110.26.D).
7. "ILLUMINATION. ILLUMINATION SHALL BE PROVIDED FOR ALL WORKING SPACE ABOUT SERVICE EQUIPMENT, SWITCHBOARDS, PANEL BOARDS, OR MOTOR CONTROL CENTERS INSTALLED INDOORS. ADDITIONAL LIGHT OUTLETS SHALL NOT BE REQUIRED WHERE THE WORK SPACE IS ILLUMINATED BY AN ADJACENT LIGHT SOURCE OR A PERMITTED BY 201 7D(A)(1). EXCEPTION NO. 1, FOR SWITCHED RECEPTACLES. IN ELECTRICAL EQUIPMENT ROOMS THE ILLUMINATION SHALL NOT BE CONTROLLED BY AUTOMATIC MEANS ONLY."

KEY NOTES:

COMMON TERMINOLOGY

1. ZONE: A GROUP OF DEVICES IN A ROOM OR AREA THAT ARE DAISY–CHAINED WIRED TOGETHER WITH CAT–5(E) CABLING AND FUNCTION TOGETHER TO CONTROL THAT PARTICULAR SPACE'S LIGHTING. DEVICES CAN BE WIRED IN ANY ORDER. POWER FOR DEVICES AND COMMUNICATION MAY BE SUPPLIED LOCALLY FROM POWER/RELAY PACKS (NPP–16) AND/OR POWER SUPPLIES (NPS–150).
2. BACKBONE: THE COMMUNICATION NETWORK CONSISTING OF BRIDGES (NBRG–*), TRANSCEIVERS (NTXVR–250), AND A SINGLE GATEWAY (NGWY) WHICH INTERCONNECTS NLIGHT ZONES TO THE SENSORVIEW SOFTWARE (REQUIRED FOR REMOTE PROGRAMMING/STATUS). BRIDGE AND TRANSCEIVER DEVICES ALSO SUPPLY POWER FOR ZONES WITHOUT LOCAL POWER/RELAY PACKS OR POWER SUPPLIES.
3. BRIDGE (NBRG–*): A DEVICE USED TO HUB SEVERAL ZONES TOGETHER. BRIDGES INTERCONNECT USING WITH EITHER CAT–5(E) (NTXVR–250), OR A GATEWAY (NGWY) TO FORM A NETWORK BACKBONE. BRIDGES ALSO SUPPLY POWER TO DOWNSTREAM ZONES THAT DO NOT GENERATE LOCAL POWER.
4. GATEWAY (NGWY): THE DEVICE IN AN NLIGHT NETWORK THAT CONNECTS TO THE BUILDING'S ETHERNET (AND EVENTUALLY THE COMPUTER RUNNING THE SENSORVIEW SOFTWARE). ONE GATEWAY IS NEEDED PER 400 DEVICES. REQUIRES AN ETHERNET DROP.
5. WALLPOD: A TERM FOR ANY NLIGHT TOGGLE SWITCH, DIMMER SWITCH, OR SCENE CONTROLLER.





KEY PLAN

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

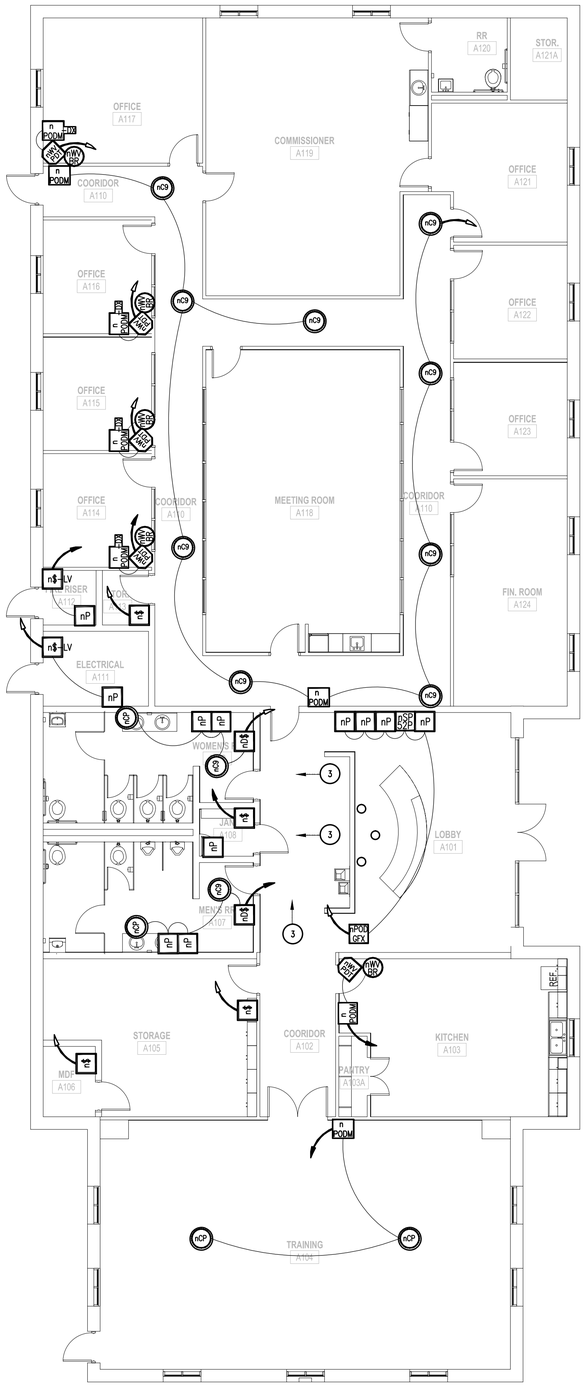
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.A.M.

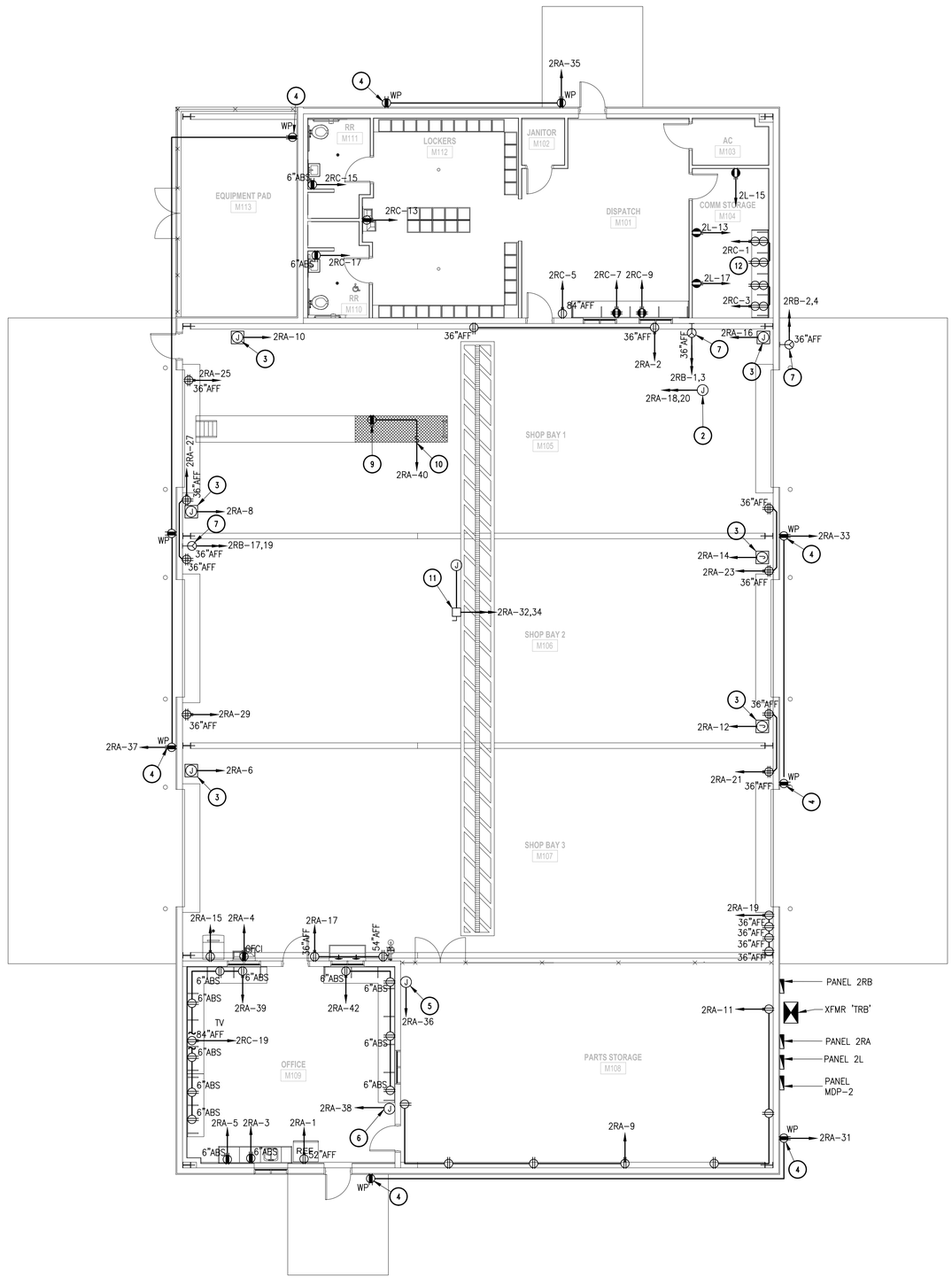
SHEET TITLE: ELECTRICAL LIGHTING CONTROLS PLAN - MAINTENANCE BUILDING - BASE

EL103

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COORIDOR
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A118
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FIN. ROOM
A124
RISER
A112
ELECTRICAL
A111
WOMEN'S
A108
JAN.
A109
MEN'S RR
A107
LOBBY
A101
STORAGE
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01 ELECTRICAL POWER PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. MOUNTING HEIGHT OF DEVICES AS PER PROJECT SPECIFICATIONS UNLESS NOTED OTHERWISE.

B. COORDINATE ROUGH-IN LOCATION OF ALL DEVICES WITH ARCHITECTURAL ELEVATIONS DETAILS, AND PLANS.

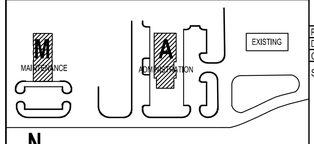
C. REFER TO ARCHITECTURAL MILLWORK AND ELEVATION PLANS FOR EXACT LOCATION AND MOUNTING HEIGHT OF ALL WIRING DEVICES.

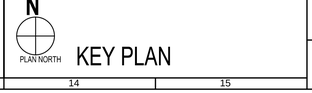
D. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING/ABSORBING FIRE STOP MATERIAL.

E. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

KEY NOTES:

1. NOT USED.
2. FURNISH AND INSTALL J-BOX FOR CAR-LIFT COMPRESSOR MOTOR. COORDINATE EXACT PLACEMENT OF CAR LIFT WITH OWNER PRIOR TO COMMENCING WORK.
3. FURNISH AND INSTALL HEAVY DUTY RETRACTABLE DROP CORD REEL WITH STRAIN RELIEF AND BALL STOP TYPE WOODHEAD# 9258SN. FURNISH WITH 20 AMP, 120V NEMA 5-20R TWIST LOCK RECEPTACLE. CORD REEL SHALL BE SECURELY MOUNTED TO STRUCTURE. ROUTE 2#12, 1#12G, 1/2"C.
4. FURNISH AND INSTALL WEATHER PROOF RECEPTACLE WITH COMMERCIAL GRADE WHILE IN USE COVER.
5. POWER FOR FIRE ALARM CONTROL PANEL.
6. POWER FOR FIRE ALARM ANNUNCIATING PANEL.
7. FURNISH AND INSTALL 220V, 50A, 2-POLE NEMA 50R RECEPTACLE FOR WELDING EQUIPMENT.
8. NOT USED.
9. FURNISH AND INSTALL GFCI RECEPTACLE FOR WORKING LIGHT AT 12-INCHES BELOW GRADE.
10. FURNISH AND INSTALL GFCI RECEPTACLE TOGGLE SWITCH 12-INCHES BELOW GRADE.
11. FURNISH AND INTALL DISCONNECT SWITCH FOR POWER TO HOIST MONORAIL, FLOOR SUPPORTED, EXTEND POWER TO MOTORS AND CONTROLS AS REQUIRED. COORINATE EXACT LOCATION WITH ARCHITECT PRIOR TO COMMENCING WORK.
12. FURNISH AND INSTALL TWO ROWS OF DUPLEX RECEPTACLES FOR RADIO CHARGING STATIONS. ONE ROW AT 6" ABOVE COUNTER TOP. THE SECOND ROW AT 12" ABOVE COUNTER TOP. ALL RECEPTACLES ABOVE COUNTER SHALL BE HORIZONTALLY MOUNTED





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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

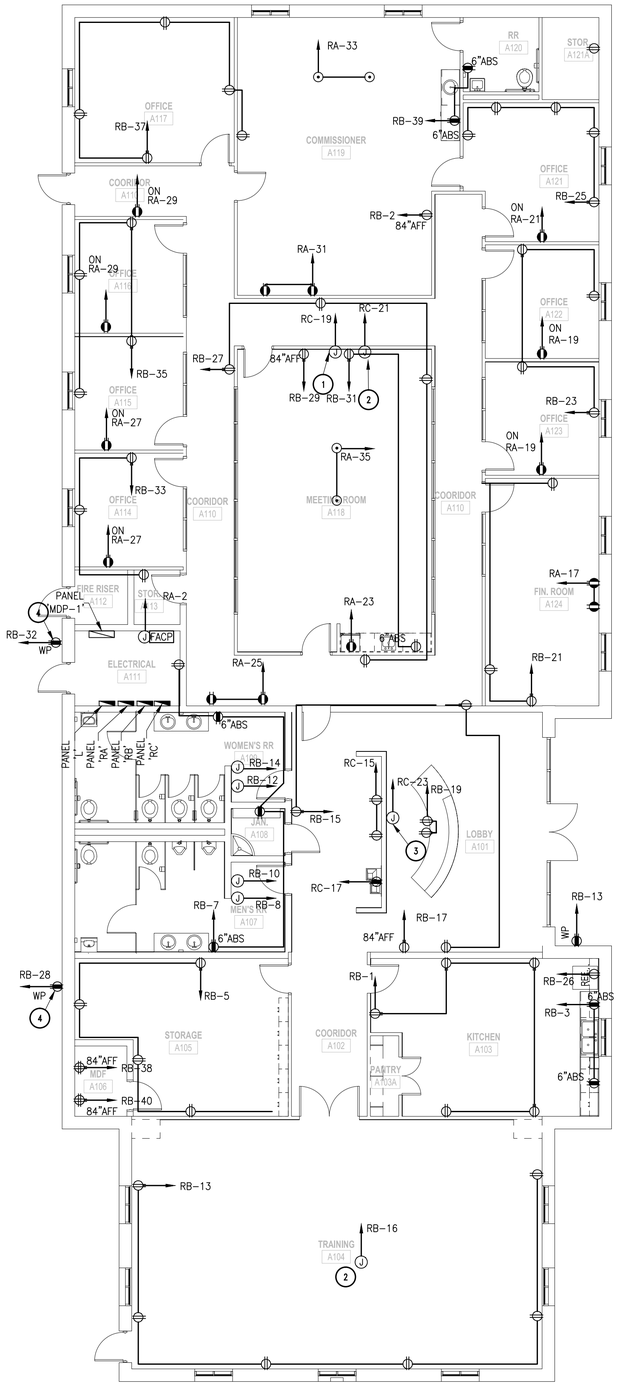
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.A.M.

SHEET TITLE: ELECTRICAL POWER PLAN - MAINTENANCE BUILDING

EP105

10/28/2011 10:19:18 AM



01 ELECTRICAL POWER PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. MOUNTING HEIGHT OF DEVICES AS PER PROJECT SPECIFICATIONS UNLESS NOTED OTHERWISE.

B. COORDINATE ROUGH-IN LOCATION OF ALL DEVICES WITH ARCHITECTURAL ELEVATIONS DETAILS, AND PLANS.

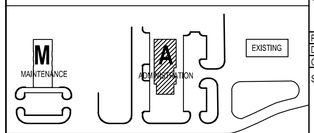
C. REFER TO ARCHITECTURAL MILLWORK AND ELEVATION PLANS FOR EXACT LOCATION AND MOUNTING HEIGHT OF ALL WIRING DEVICES.

D. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING/ABSORBING FIRE STOP MATERIAL.

E. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

KEY NOTES:

1. FURNISH AND INSTALL TWO ROWS OF DUPLEX RECEPTACLES FOR RADIO CHARGING STATIONS. ONE ROW AT 6" ABOVE COUNTER TOP. THE SECOND ROW AT 12" ABOVE COUNTER TOP. ALL RECEPTACLES ABOVE COUNTER SHALL BE HORIZONTALLY MOUNTED.
2. FURNISH AND INSTALL CEILING, RECESSED MOUNTED DUPLEX RECEPTACLE FOR POWER TO PROJECTOR.
3. COORDINATE WIITH LOCATION OF PODIUM PRIOR TO ROUCH-IN.
4. FURNISH AND INSTALL WEATHER PROOF RECEPTACLE WITH COMMERCIAL GRADE WHILE IN USE COVER.
5. POWER FOR TELEVISION.



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PROJECT OWNER: HIDALGO COUNTY

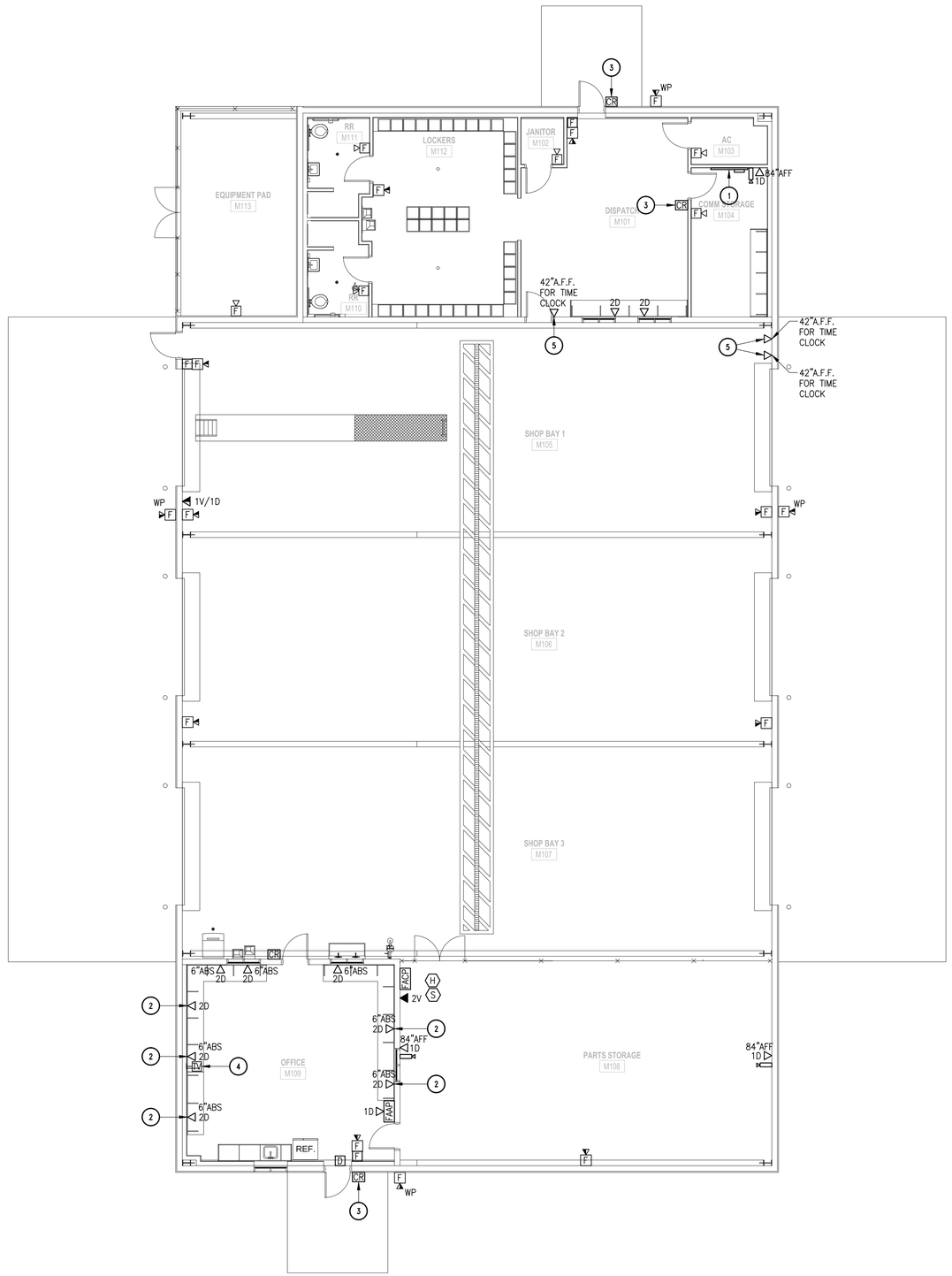
No.	Date	Description

PROJECT NO.:	28493
DRAWN BY:	S.M.
CHECKED BY:	M.A.M.

SHEET TITLE: ELECTRICAL POWER PLAN - ADMINISTRATION BUILDING

EP106

10/28/2011 10:19:18 AM



01 ELECTRICAL SPECIAL SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK. ALL INSTALLATIONS SHALL COMPLY WITH ADA REQUIREMENTS.

B. ELECTRICAL CONTRACTOR SHALL VERIFY ALL REQUIREMENTS BEFORE ANY ROUGH-IN IN ORDER TO COORDINATE MANUFACTURER'S DRAWINGS FOR EQUIPMENT LOCATION AND INSTALLATION ACCESSORIES.

C. FURNISH DUCT SMOKE DETECTOR FOR RETURN DUCT. COORDINATE EXACT LOCATION IN ACCORDANCE MECHANICAL DRAWINGS.

D. ALL CABLES ABOVE CEILING SHALL BE PLENUM RATED.

E. SEAL PENETRATION WITH FIRE PROOF SEALANT UL LISTED FOR FIRE WALLS. BOTH ENDS SHALL BE CHAMFERED FOR A NON SHARP EDGES. IF NECESSARY ROUTE CONDUIT ABOVE OTHER ROOMS TO GET TO J-HOOK LOCATION.

F. ALL DATA-CONDUITS SHALL STUB-UP, RECESSED TO THE CORRIDOR WALL.

G. FURNISH AND INSTALL 4-INCH J-HOOKS WITH DIMENSION OF 7.5"H X 2"W X 5"D. J-HOOKS SHALL BE PAINTED AS FOLLOWS, (DATA: BLUE), (LIGHTING CONTROLS: BLUE), (FIRE ALARM: RED), (DDC: GREEN) AND (SPARE: BLUE). FURNISH AND INSTALL 4-INCH J-HOOKS AT 4-FEET SPACING. REFER TO DETAIL PLANS FOR MOUNTING CONFIGURATION. COORDINATE FINAL LOCATION OF J-HOOKS WITH ARCHITECT/OWER REPRESENTATIVE PRIOR TO COMMENCING WORK.

H. CONDUITS SHALL BE REAMED AND COMPLETED WITH CONNECTORS AND INSULATED BUSHINGS AT BOTH ENDS.

I. BETWEEN ANY TWO PULL POINTS THERE SHALL BE NO CONDUIT WITH GREATER THAN 180 DEGREES OF BENDS OR EQUIVALENT.

J. WHERE CONDUIT LENGTH EXCEEDS 100FT AND/OR TWO 90 DEGREE BENDS OR EQUIVALENT PROVIDE PULL BOXES AS REQUIRED.

K. ALL ZONE CONDUITS (HOME RUN) FOR LOW VOLTAGE COMMUNICATIONS CABLING SHALL BE MARKED AT THEIR TERMINUS WITH A TAG THAT IDENTIFIES "FIRE ALARM, DATA, INTERCOM, ETC" (ROOM NAME AND NUMBER) WHERE THE OTHER END OF THE CONDUIT TERMINATES.

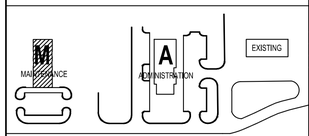
L. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

M. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO EXTEND DATA AND POWER FROM THE WALL OR FLOOR OUTLETS TO OUTLETS LOCATED IN FURNITURE OR MILLWORK.

N. FURNISH AND INSTALL ALL CAMERAS AT 14-FEET ABOVE FINISH GRADE. ALL CONDUITS SHALL TERMINATE FROM CAMERAS ALL THE WAY TO SURVEILLANCE EQUIPMENT RACK LOCATED IN THE NOC ROOM. FURNISH AND INSTALL 1-INCH CONDUIT WITH PULL STRING FROM CAMERA TO 12-INCHES ABOVE RACK. COORDINATE FINAL LOCATION OF RACK WITH ARCHITECT.

KEY NOTES:

1. FURNISH AND INSTALL 3/4" X 48"X 96" PLY-BOARD. PAINT WITH FIRE RETARDANT PAINT. PAINT TO MATCH WALL PAINT.
2. FURNISH AND INSTALL 2-INCH CONDUIT FOR DATA.
3. FURNISH AND INSTALL 1-INCH CONDUIT ROUGH-IN FOR CARD READER.
4. FURNISH AND INSTALL 1-1/2" CONDUIT FOR TELEVISION.
5. FURNISH AND INSTALL 2-INCH CONDUIT FOR TIME CLOCK DATA DROPS.



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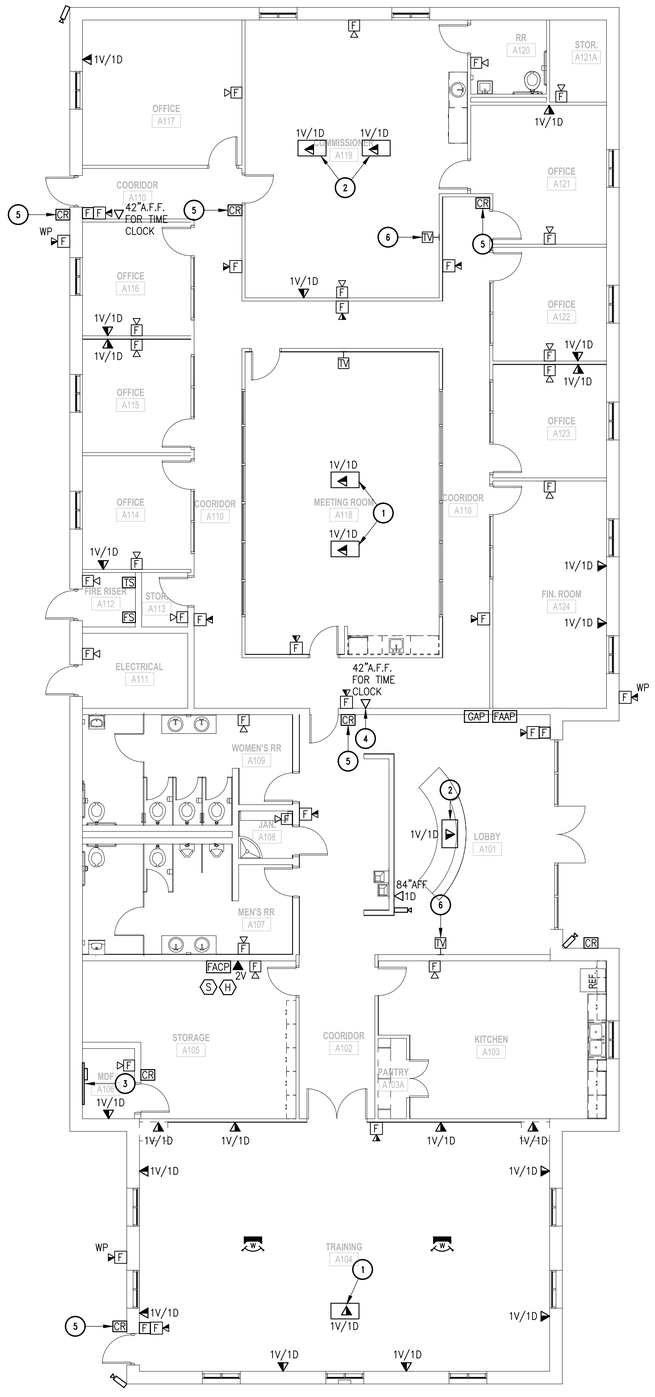
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: G.B.
CHECKED BY: J.A.N.

SHEET TITLE: ELECTRICAL SPECIAL SYSTEMS PLAN - MAINTENANCE BUILDING

EP107

10/28/2011 10:19:18 AM



01 ELECTRICAL SPECIAL SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK. ALL INSTALLATIONS SHALL COMPLY WITH ADA REQUIREMENTS.

B. ELECTRICAL CONTRACTOR SHALL VERIFY ALL REQUIREMENTS BEFORE ANY ROUGH-IN IN ORDER TO COORDINATE MANUFACTURER'S DRAWINGS FOR EQUIPMENT LOCATION AND INSTALLATION ACCESSORIES.

C. FURNISH DUCT SMOKE DETECTOR FOR RETURN DUCT. COORDINATE EXACT LOCATION IN ACCORDANCE MECHANICAL DRAWINGS.

D. ALL CABLES ABOVE CEILING SHALL BE PLENUM RATED.

E. SEAL PENETRATION WITH FIRE PROOF SEALANT UL LISTED FOR FIRE WALLS. BOTH ENDS SHALL BE CHAMFERED FOR A NON SHARP EDGES. IF NECESSARY ROUTE CONDUIT ABOVE OTHER ROOMS TO GET TO J-HOOK LOCATION.

F. ALL DATA-CONDUITS SHALL STUB-UP, RECESSED TO THE CORRIDOR WALL.

G. FURNISH AND INSTALL 4-INCH J-HOOKS WITH DIMENSION OF 7.5"H X 2"W X 5"D. J-HOOKS SHALL BE PAINTED AS FOLLOWS, (DATA: BLUE), (LIGHTING CONTROLS: BLUE), (FIRE ALARM: RED), (DDC: GREEN) AND (SPARE: BLUE). FURNISH AND INSTALL 4-INCH J-HOOKS AT 4-FEET SPACING. REFER TO DETAIL PLANS FOR MOUNTING CONFIGURATION. COORDINATE FINAL LOCATION OF J-HOOKS WITH ARCHITECT/OWER REPRESENTATIVE PRIOR TO COMMENCING WORK.

H. CONDUITS SHALL BE REAMED AND COMPLETED WITH CONNECTORS AND INSULATED BUSHINGS AT BOTH ENDS.

I. BETWEEN ANY TWO PULL POINTS THERE SHALL BE NO CONDUIT WITH GREATER THAN 180 DEGREES OF BENDS OR EQUIVALENT.

J. WHERE CONDUIT LENGTH EXCEEDS 100FT AND/OR TWO 90 DEGREE BENDS OR EQUIVALENT PROVIDE PULL BOXES AS REQUIRED.

K. ALL ZONE CONDUITS (HOME RUN) FOR LOW VOLTAGE COMMUNICATIONS CABLING SHALL BE MARKED AT THEIR TERMINUS WITH A TAG THAT IDENTIFIES "FIRE ALARM, DATA, INTERCOM, ETC" (ROOM NAME AND NUMBER) WHERE THE OTHER END OF THE CONDUIT TERMINATES.

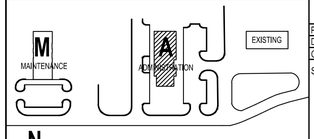
L. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

M. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER MATERIAL AND LABOR REQUIRED TO EXTEND DATA AND POWER FROM THE WALL OR FLOOR OUTLETS TO OUTLETS LOCATED IN FURNITURE OR MILLWORK.

N. FURNISH AND INSTALL ALL CAMERAS AT 14-FEET ABOVE FINISH GRADE. ALL CONDUITS SHALL TERMINATE FROM CAMERAS ALL THE WAY TO SURVEILLANCE EQUIPMENT RACK LOCATED IN THE NOC ROOM. FURNISH AND INSTALL 1-INCH CONDUIT WITH PULL STRING FROM CAMERA TO 12-INCHES ABOVE RACK. COORDINATE FINAL LOCATION OF RACK WITH ARCHITECT.

KEY NOTES:

1. FURNISH AND INSTALL FLOOR BOX WALKERLEGRAND RFB4 SERIES WITH QTY. (2) DUPLEX INTERNAL BRACKET RFB-DR, QTY. (2) COMMUNICATION BRACKETS DB-2-2RT, FURNISH AND INSTALL WITH 1-INCH CONDUIT, PULL STRING FROM FLOOR BOX TO CEILING MOUNTED PROJECTOR. ROUTE 1-INCH CONDUIT FROM PROJECTOR TO QTY (2) 4-INCH SQUARE OUTLET BOX. FINAL LOCATION OF 4-INCH SQUARE OUTLET BOX BY OWNER. CONTRACTOR TO VERIFY LOCATION PRIOR TO COMMENCING ROUGH-IN.
2. FURNISH AND INSTALL FLOOR BOX WALKERLEGRAND RFB4 SERIES WITH QTY. (2) DUPLEX INTERNAL BRACKET RFB-DR, QTY. (2) COMMUNICATION BRACKETS DB-2-2RT.
3. FURNISH AND INSTALL 3/4" X 48"X 96" PLY-BOARD. PAINT WITH FIRE RETARDANT PAINT. PAINT TO MATCH WALL PAINT.
4. FURNISH AND INSTALL 2-INCH CONDUIT FOR TIME CLOCK DATA DROP.
5. FURNISH AND INSTALL 1-INCH CONDUIT ROUGH-IN FOR CARD READER.
6. FURNISH AND INSTALL 1-1/2" CONDUIT FOR TELEVISION.



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PROJECT OWNER: HIDALGO COUNTY

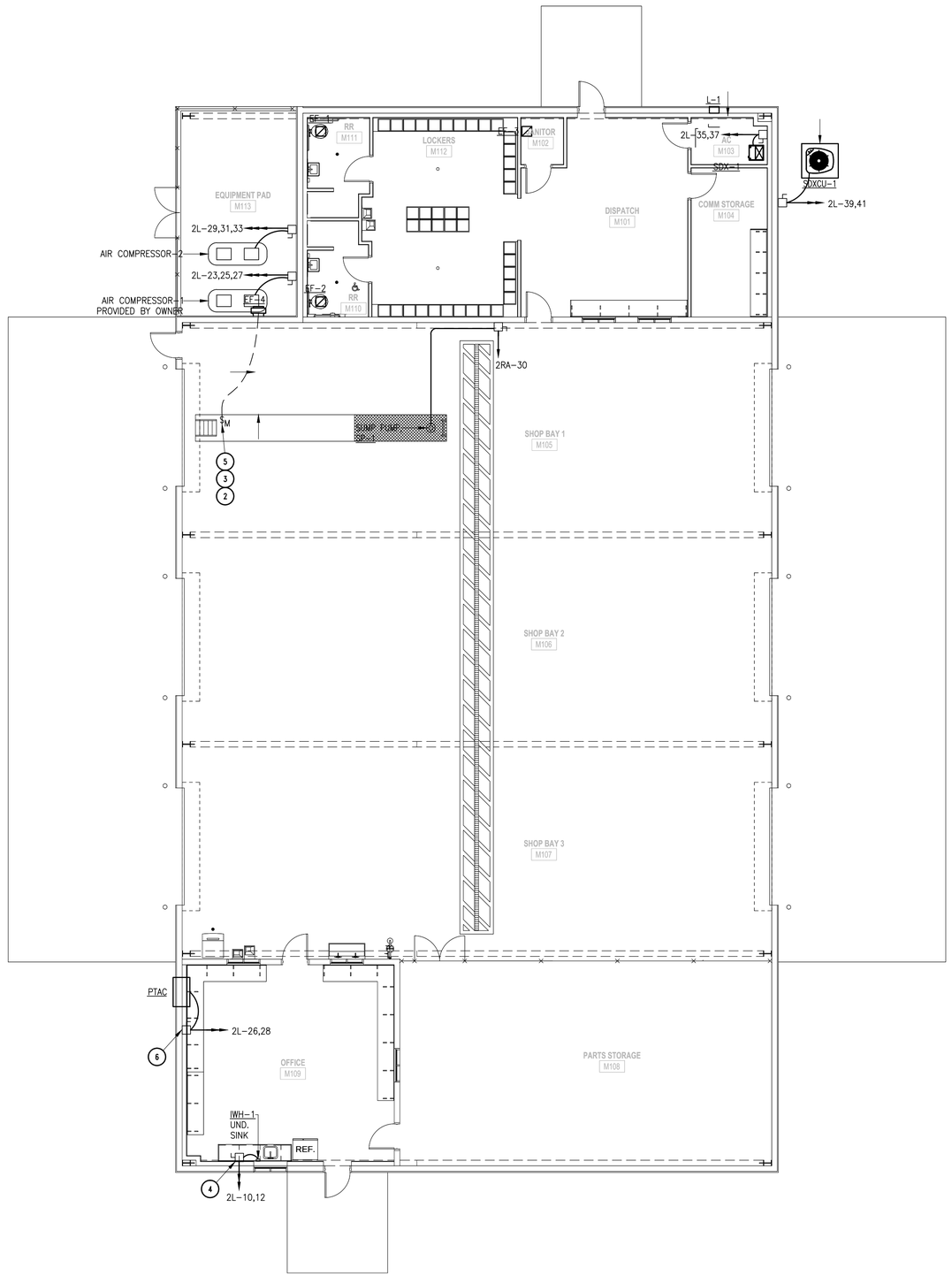
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: G.B.
CHECKED BY: J.A.N.

SHEET TITLE: ELECTRICAL SPECIAL SYSTEMS PLAN - ADMINISTRATION BUILDING

EP108

10/28/2011 10:19:18 AM



01 MECHANICAL EQUIPMENT PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.

B. CONTRACTOR SHALL VERIFY ALL REQUIREMENTS BEFORE ANY ROUGH-IN IN ORDER TO COORDINATE MANUFACTURER'S DRAWINGS FOR EQUIPMENT LOCATION AND INSTALLATION ACCESSORIES.

C. COORDINATE RUNS FOR CONDUIT UP IN JOIST AND FOR SUSPENDING REQUIREMENTS IN ACCORDANCE STRUCTURAL PLANS.

D. REFER TO DIVISION 25 FOR ALL MECHANICAL EQUIPMENT EXACT LOCATION. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH MECHANICAL DRAWINGS TO MEET ELECTRICAL AND MECHANICAL REQUIRED CLEARANCE BY THE LATEST CODE. SOME EQUIPMENT LOCATED ON ROOF.

E. COORDINATE ALL ROOF PENETRATIONS WITH CONTRACTOR AND ALL OTHER TRADES. SEAL ALL ROOF PENETRATIONS AS RECOMMENDED BY THE WARRANTY SYSTEM. VERIFY WITH CONTRACTOR.

F. ELECTRICAL CONTRACTOR SHALL PROVIDE J-BOX AND ONE INCH CONDUIT (1"C) FOR H.V.A.C. CONTROLS AND THERMOSTATS. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.

G. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS, RELAYS, CONTACTORS AND THE REQUIRED ELECTRICAL ACCESSORIES FOR AN OPERABLE MECHANICAL SYSTEM.

H. ALL ELECTRICAL CONDUIT AND WIRING SHALL BE CONCEALED. IF NOT POSSIBLE PROVIDE SURFACE MOUNT STEEL RACEWAY. STEEL RACEWAY SHALL BE WIREMOLD #V2100 SERIES. PROVIDE ALL RELATED #V2100 SERIES ACCESSORIES FOR AN OPERABLE SYSTEM.

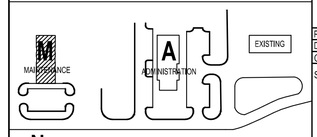
I. ALL EXHAUST FANS (EF-__) LOCATED ON ROOF. PROVIDE ALL CONDUIT, WIRING, RACEWAY, AND BOXES FOR AN OPERABLE SYSTEM. COORDINATE WITH DIVISION 15 FOR EXACT LOCATION.

J. ALL CABLES ABOVE CEILING SHALL BE PLENUM RATED.

K. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

KEY NOTES:

1. NOT USED.
2. FURNISH AND INSTALL 1/2"C WITH CONTROL CABLING AS REQUIRED FOR EXHAUST FAN (ROUTED UNDER THE CONCRETE SLAB).
3. LOCATE EXHAUST FAN SWITCH NEAR PIT ACCESS LADDER.
4. FURNISH AND INSTALL SAFETY DISCONNECT SWITCH ACCESSIBLE ABOVE CEILING GRID. MAKE NOTE ON WATER HEATER OF THE LOCATION OF THE DISCONNECT SWITCH AT THE WATER HEATER. "DISCONNECT SWITCH IS LOCATED ABOVE CEILING". PROVIDE ACCESS PANEL AS REQUIRED.
5. FURNISH AND INSTALL HORSEPOWER RATED SWITCH. LABEL SWITCH TO IDENTIFY THE FAN IT IS CONTROLLING.
6. FURNISH AND INSTALL DISCONNECT SWITCH ADJACENT TO UNIT.



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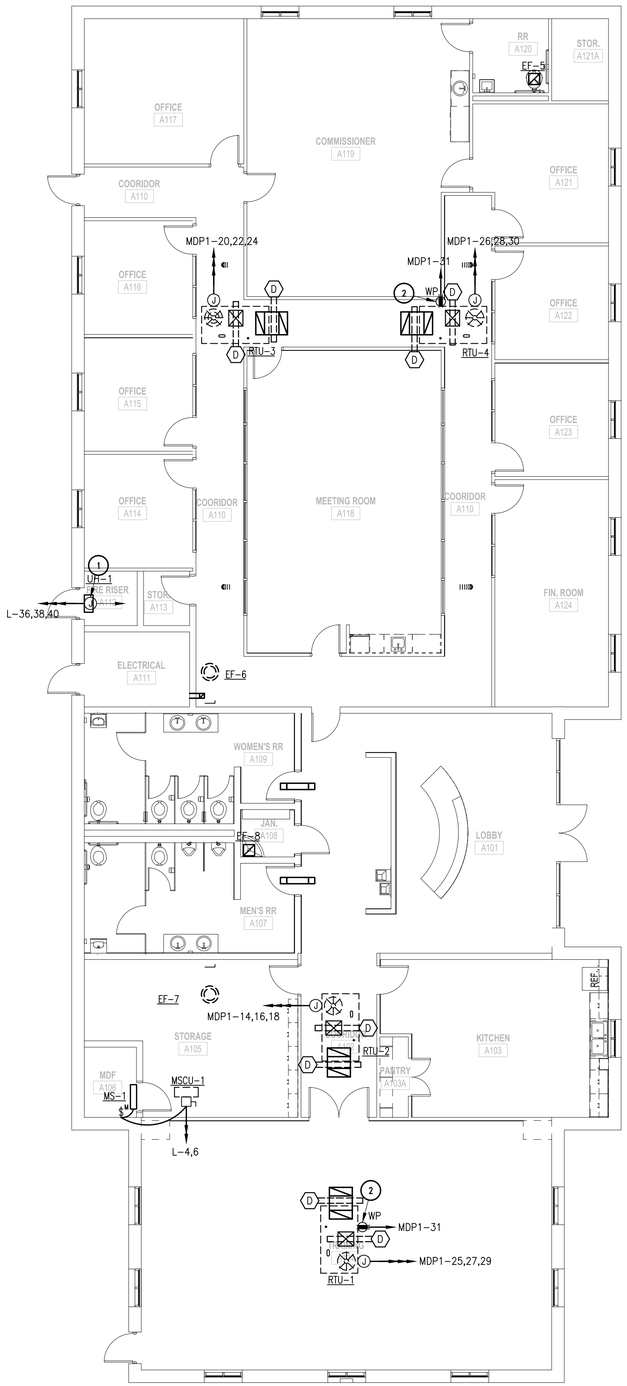
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: G.M.
CHECKED BY: RALM.

SHEET TITLE: MECHANICAL EQUIPMENT POWER PLAN - MAINTENANCE BUILDING

EP109



01 MECHANICAL EQUIPMENT POWER PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.

B. CONTRACTOR SHALL VERIFY ALL REQUIREMENTS BEFORE ANY ROUGH-IN IN ORDER TO COORDINATE MANUFACTURER'S DRAWINGS FOR EQUIPMENT LOCATION AND INSTALLATION ACCESSORIES.

C. COORDINATE RUNS FOR CONDUIT UP IN JOIST AND FOR SUSPENDING REQUIREMENTS IN ACCORDANCE STRUCTURAL PLANS.

D. REFER TO DIVISION 25 FOR ALL MECHANICAL EQUIPMENT EXACT LOCATION. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH MECHANICAL DRAWINGS TO MEET ELECTRICAL AND MECHANICAL REQUIRED CLEARANCE BY THE LATEST CODE. SOME EQUIPMENT LOCATED ON ROOF.

E. COORDINATE ALL ROOF PENETRATIONS WITH CONTRACTOR AND ALL OTHER TRADES. SEAL ALL ROOF PENETRATIONS AS RECOMMENDED BY THE WARRANTY SYSTEM. VERIFY WITH CONTRACTOR.

F. ELECTRICAL CONTRACTOR SHALL PROVIDE J-BOX AND ONE INCH CONDUIT (1"C) FOR H.V.A.C. CONTROLS AND THERMOSTATS. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.

G. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS, RELAYS, CONTACTORS AND THE REQUIRED ELECTRICAL ACCESSORIES FOR AN OPERABLE MECHANICAL SYSTEM.

H. ALL ELECTRICAL CONDUIT AND WIRING SHALL BE CONCEALED. IF NOT POSSIBLE PROVIDE SURFACE MOUNT STEEL RACEWAY. STEEL RACEWAY SHALL BE WIREMOLD #V2100 SERIES. PROVIDE ALL RELATED #V2100 SERIES ACCESSORIES FOR AN OPERABLE SYSTEM.

I. ALL EXHAUST FANS (EF-__) LOCATED ON ROOF. PROVIDE ALL CONDUIT, WIRING, RACEWAY, AND BOXES FOR AN OPERABLE SYSTEM. COORDINATE WITH DIVISION 15 FOR EXACT LOCATION.

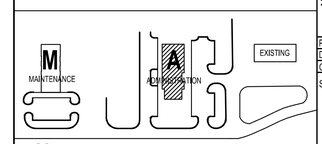
J. ALL CABLES ABOVE CEILING SHALL BE PLENUM RATED.

K. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID TO OWNER 2 DAYS (8 HOURS EACH) OF PRODUCT TRAINING AND PRODUCT WALK THROUGH/DEMONSTRATION.

L. FURNISH AND INSTALL ALL DISCONNECT SWITCHES WITHIN 3-FEET OF SDB ACCESS CONTROL BOX.

KEY NOTES:

1. FURNISH AND INSTALL J-BOX FOR UNIT HEATER. MOUNT AT 10-FEET AFF.
2. GFCI RECEPTACLE FURNISH BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID MATERIAL AND LABOR REQUIRED TO MAKE FINAL TERMINATIONS TO GFCI.



KEY PLAN

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

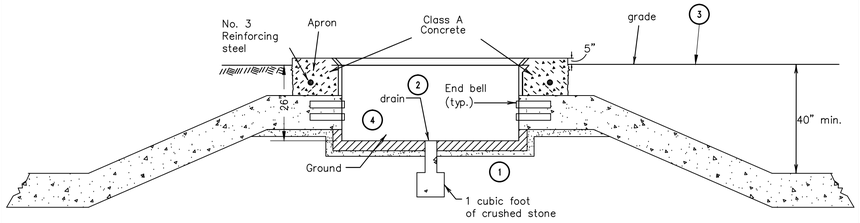
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.A.M.

SHEET TITLE: MECHANICAL EQUIPMENT POWER PLAN - ADMINISTRATION BUILDING

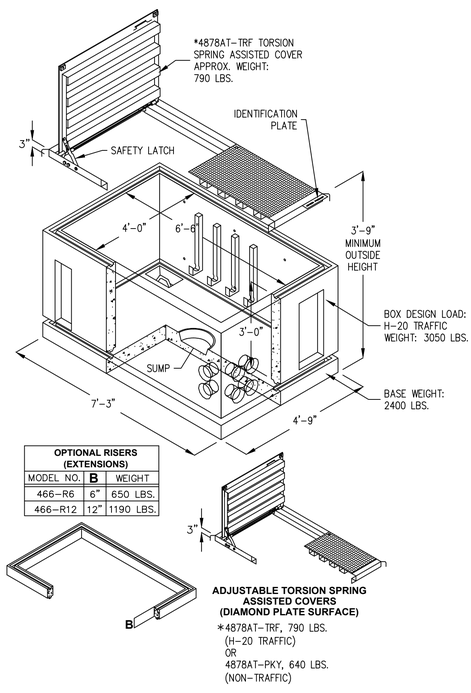
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APRON FOR GROUND BOXES

(1) Place gravel "under" the box. not "in" the box. Gravel should not encroach on the interior volume of the box.
(2) Maintain sufficient space between all conduits so as to allow for proper installation of bushings.
(3) All conduits shall be installed in a neat and workmanlike manner.
(4) All conduits installed in the ground box shall be sealed after completion of conductor installation and any required pull tests. Silicone shall not be used as sealant.



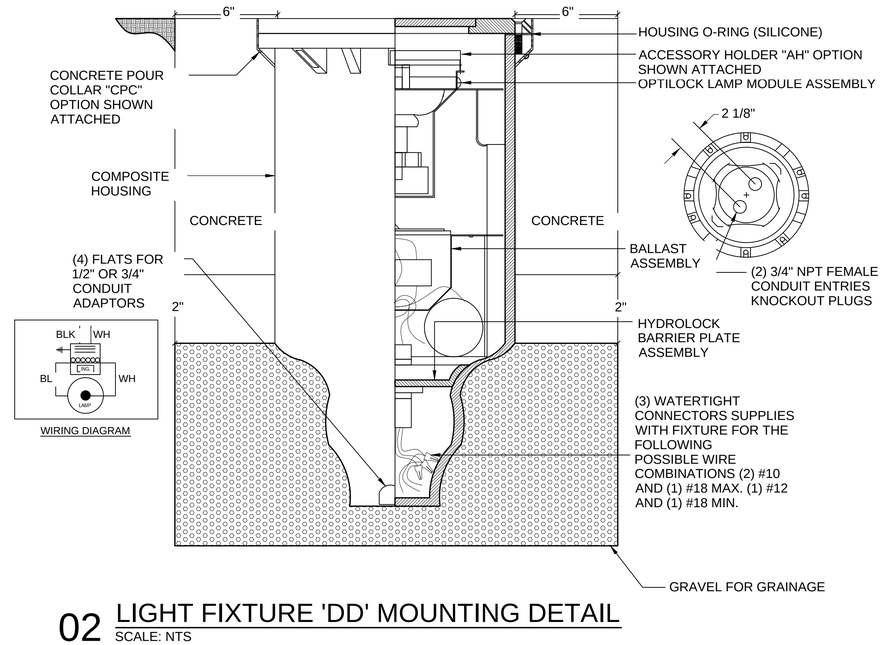
OPTIONAL RISERS (EXTENSIONS)		
MODEL NO.	B	WEIGHT
466–R6	6"	650 LBS.
466–R12	12"	1190 LBS.

ADJUSTABLE TORSION SPRING ASSISTED COVERS (DIAMOND PLATE SURFACE)
*4878AT–TRF, 790 LBS. (H–20 TRAFFIC) OR 4878AT–PKY, 640 LBS. (NON–TRAFFIC)

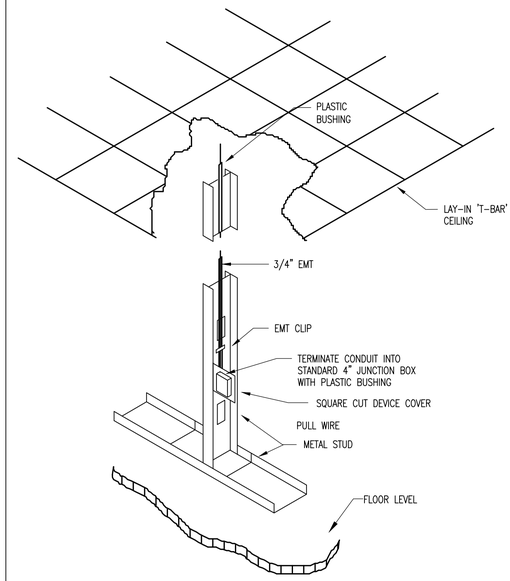
GENERAL NOTE:
DESIGNED TO WITHSTAND H–20 WHEEL LOADINGS. SUITABLE FOR USE IN OFF–STREET LOCATIONS WHERE NOT SUBJECTED TO HIGH DENSITY TRAFFIC.

KEY NOTE:
FURNISH AND INSTALL 4–INCH DIAMETER J–HOOKS FOR WIRE MANAGEMENT AT EACH INTERIOR OF PULL BOX.

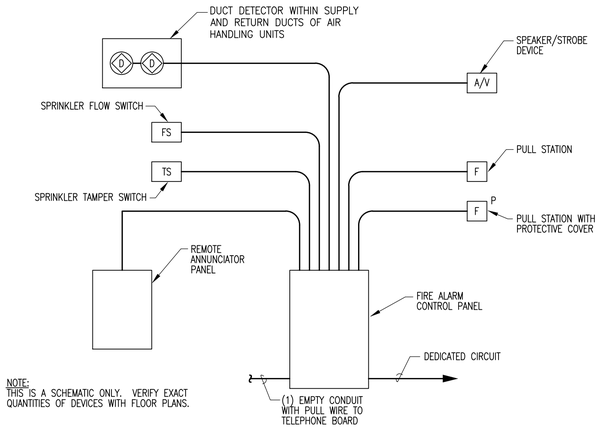
01 PULLBOX DETAIL
SCALE: NTS



02 LIGHT FIXTURE 'DD' MOUNTING DETAIL
SCALE: NTS



03 TELEPHONE OUTLET IN INSULATED METAL STUD WALL
SCALE: NTS

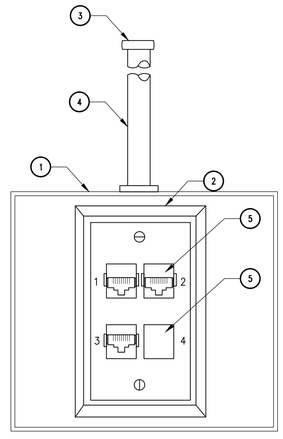


NOTE:
THIS IS A SCHEMATIC ONLY. VERIFY EXACT QUANTITIES OF DEVICES WITH FLOOR PLANS.

04 FIRE ALARM RISER DIAGRAM
SCALE: NTS

KEYED NOTES:

1. RECESSED DOUBLE GANG J–BOX(4" X 4" X 2 5/8") WITH 1"ø CONDUIT AND PULL STRING COMPLETE WITH AN INTERIOR WALL SINGLE GANG MUDRING.
2. COMMUNICATION CABLING, OUTLETS, FACE PLATES AND JACKS SUPPLIED/INSTALLED BY ELECTRICAL CONTRACTOR. COORDINATE FACE PLATE TYPE AND COLOR WITH ARCHITECT/INTERIOR DESIGNER PRIOR TO PURCHASE.
3. END OF CONDUIT DEBURRED AND FITTED WITH PROTECTIVE GROMMET.
4. 1"ø EMT CONDUIT C/W 200 LBS 1/4" POLYLINE PULL STRING.
5. PROVIDE 8 PIN/8 POSITION TERMINATION JACKS FOR EACH CABLE(#). FILL UNUSED POSITIONS WITH BLANKS. (REFER TO PLANS FOR QUANTITY REQUIRED.)



05 TYPICAL FACE PLATE DETAILS FOR SYMBOLS: (#D/#V, #D/#V, #D/#V, #D)
SCALE: NTS

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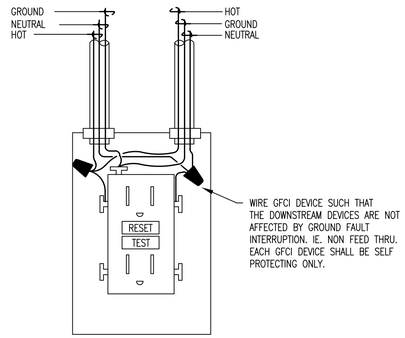
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
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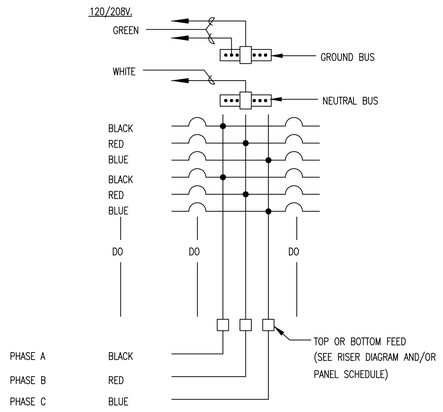
PROJECT NO.: 28493
DRAWN BY: E.B.
CHECKED BY: B.M.J.M.

SHEET TITLE: ELECTRICAL DETAILS

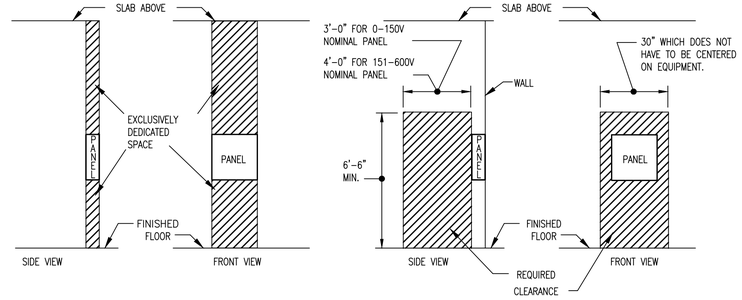
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01 GFCI RECEPTACLE - WIRING DIAGRAM
SCALE: NTS



02 TYPICAL PANEL COLOR CODE DETAIL
SCALE: NTS



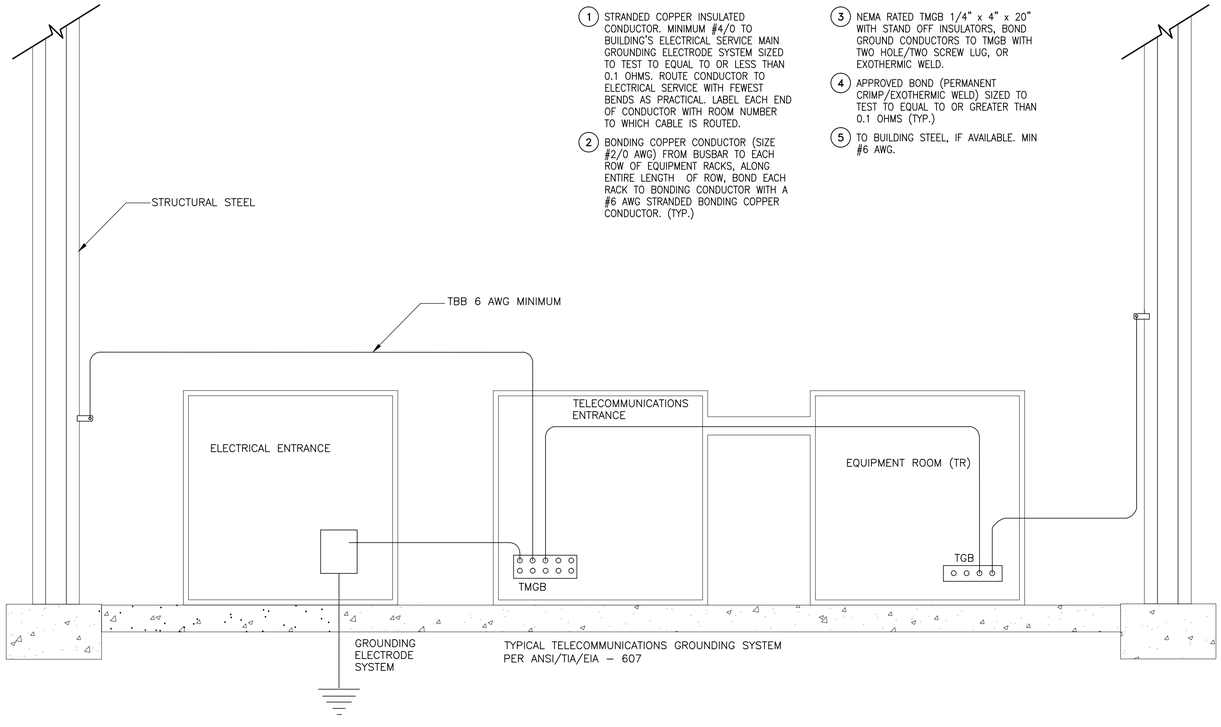
03 TYPICAL PANELBOARD REQUIRED CLEARANCE
SCALE: NTS

GENERAL NOTES

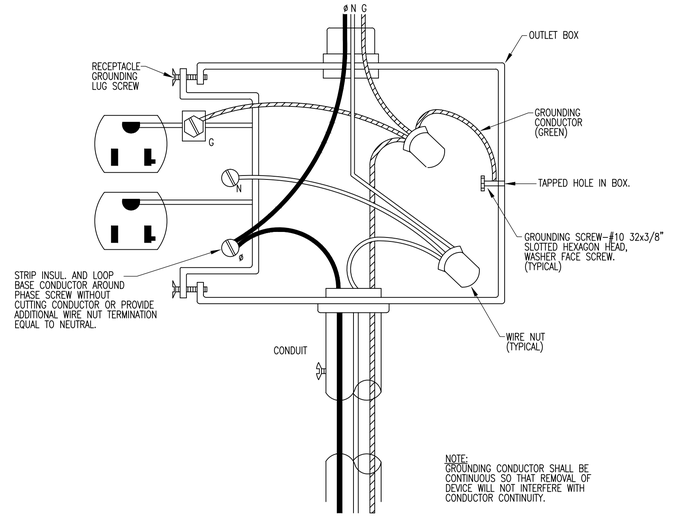
1. TELECOM GROUNDING SYSTEM PER ANSI J-STD-607A.

KEY NOTES:○

1. STRANDED COPPER INSULATED CONDUCTOR. MINIMUM #4/0 TO BUILDING'S ELECTRICAL SERVICE MAIN GROUNDING ELECTRODE SYSTEM SIZED TO TEST TO EQUAL TO OR LESS THAN 0.1 OHMS. ROUTE CONDUCTOR TO ELECTRICAL SERVICE WITH FEWEST BENDS AS PRACTICAL. LABEL EACH END OF CONDUCTOR WITH ROOM NUMBER TO WHICH CABLE IS ROUTED.
2. BONDING COPPER CONDUCTOR (SIZE #2/0 AWG) FROM BUSBAR TO EACH ROW OF EQUIPMENT RACKS, ALONG ENTIRE LENGTH OF ROW, BOND EACH RACK TO BONDING CONDUCTOR WITH A #6 AWG STRANDED BONDING COPPER CONDUCTOR. (TYP.)
3. NEMA RATED TMGB 1/4" x 4" x 20" WITH STAND OFF INSULATORS, BOND GROUND CONDUCTORS TO TMGB WITH TWO HOLE/TWO SCREW LUG, OR EXOTHERMIC WELD.
4. APPROVED BOND (PERMANENT CRIMP/EXOTHERMIC WELD) SIZED TO TEST TO EQUAL TO OR GREATER THAN 0.1 OHMS (TYP.)
5. TO BUILDING STEEL, IF AVAILABLE. MIN #6 AWG.



04 TYPICAL GROUNDING AND BONDING DETAIL
SCALE: NTS



05 TYPICAL RECEPTACLE GROUNDING DETAIL
SCALE: NTS

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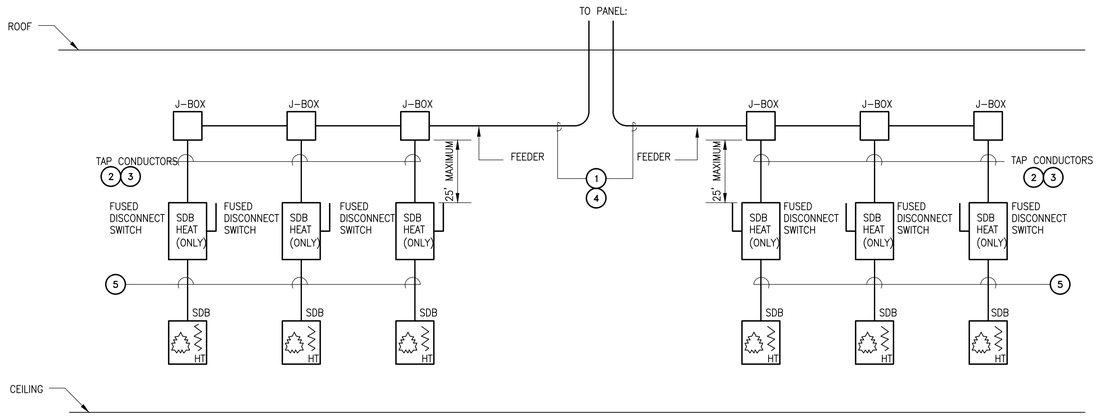
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DRAWN BY: E.M.
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SHEET TITLE:
ELECTRICAL DETAILS

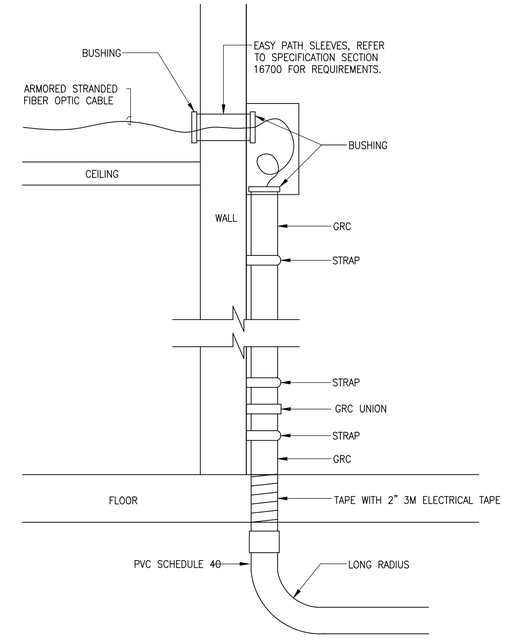
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01 WIRING SCHEMATIC - MULTIPLE SINGLE DUCT BOXES
SCALE: NTS

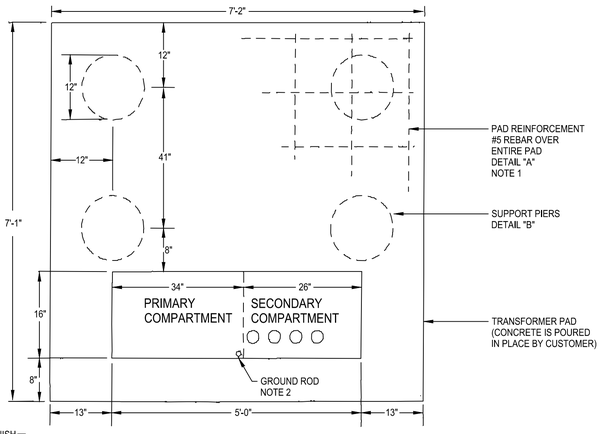
KEY NOTES:

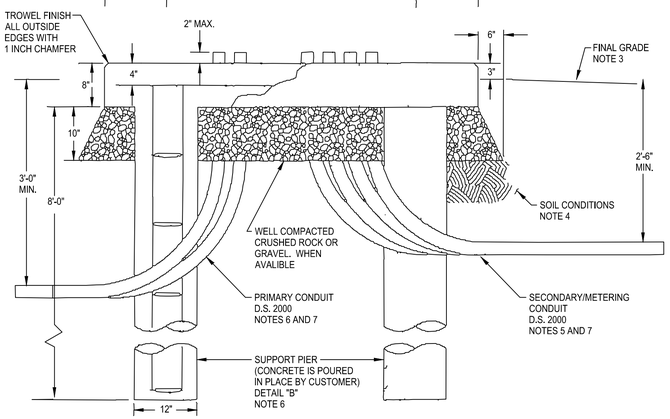
1. SIZE FEEDER BASED ON PANEL BREAKER SIZE. SUM OF THE LOADS CONNECTED TO THE FEEDER SHALL NOT EXCEED THE RATING OF THE OVERCURRENT PROTECTIVE SERVICE.
2. PROVIDE SHORT–CIRCUIT AND OVERCURRENT PROTECTION FOR TAP CONDUCTORS AS PER NEC. REFER TO MECH. EQUIP. CONNECTION SCHEDULE.
3. #12 WIRE GAUGE MINIMUM ALLOWED CONDUCTORS.
4. #6 WIRE GAUGE MAXIMUM ALLOWED CONDUCTORS.
5. REFER TO MECH. EQUIP. CONNECTION SCHEDULE FOR CONDUCTORS' AND CONDUITS' RATINGS.



02 WALL PENETRATION DETAIL
SCALE: NTS

AMERICAN ELECTRIC POWER COMPANY
DISTRIBUTION STANDARDS



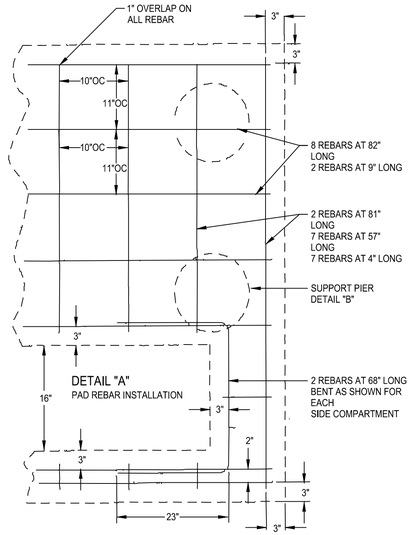


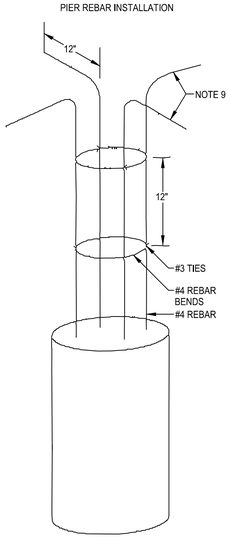
NOTES:

1. SLAB REINFORCEMENT SHALL BE .5 REBARS, ON CENTER (OC) SPACING TO FOLLOW DIMENSIONS SHOWN ON THE DRAWING WITH 4" COVER. REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AFTER 28 DAYS.
2. FOR GROUND ROD PLACEMENT, REFER TO DS 2235,2236, OR 2237.
3. FINAL GRADE SHALL BE ESTABLISHED BEFORE INSTALLATION OF PAD.
4. CONCRETE PAD WITH PIERS IS TO BE INSTALLED ONLY WHEN HIGH VOLUME CLAY OR SAND TYPE SOILS ARE ENCOUNTERED. THESE SOIL TYPES ARE CHARACTERIZED BY EXTREME SURFACE CONDITION VARIATIONS OVER TIME. WHERE SOIL IS FOUND TO BE TOTALLY BEDROCK, SHALE OR HARDPAN, ELIMINATE DRILLED PIERS AND REFER TO DS 2020 OR DS2021.
5. THE NUMBER AND PLACEMENT OF SECONDARY CONDUITS TO BE DETERMINED AS REQUIRED BY THE CUSTOMER.
6. PRIMARY CONDUIT NUMBER, SIZE, LOCATION, AND DIRECTION TO BE SPECIFIED BY ENGINEERING. CONDUIT CAN BE FLEXIBLE, TYPE EB, OR SCHEDULE 40 PVC CONDUIT WITH 90 DEGREE, 36 INCH RADIUS BENDS.
7. BURIAL DEPTH FOR DIRECT BURIED CABLE OR CONDUIT IS DEFINED AS THE DISTANCE BETWEEN FINAL GRADE AND THE TOP OF THE CABLE OR CONDUIT. UNLESS OTHERWISE DESIGNATED BY ENGINEERING, DIRECT BURIED PRIMARY SUPPLY CABLES OR CONDUITS SHALL BE INSTALLED AT A BURIAL DEPTH OF NOT LESS THAN 2'-6", THESE INITAL DEPTHS ARE TO ALLOW FOR CHANGES TO SURFACE CONDITIONS. LOCAL AGREEMENTS AND CODES MAY REQUIRE ADDITIONAL DEPTH. IF THERE ARE KNOWN, EXTENSIVE CHANGES TO THE FINAL GRADE SUCH THAT THESE DEPTHS ARE NOT MAINTAINED, CORRECTIVE SCTION SHALL BE TAKEN.
8. PIER S SHALL BE 12" MINIMUM DIAMETER, 8'DEEP WITH 4-#4 VERTICAL REBAR AND #3TIESAT 12" ON CENTER (OC), AND PROVIDE A MINIMUM 3" COVER. THE #4 BEND BARS SHOULD BE 12" LONG IN THE HORIZONTAL DIRECTION.
9. PIER REBAR BENT IN THE HORIZONTAL DIRECTION SO THAT IT MAY TIE IN WITH THE REBAR.

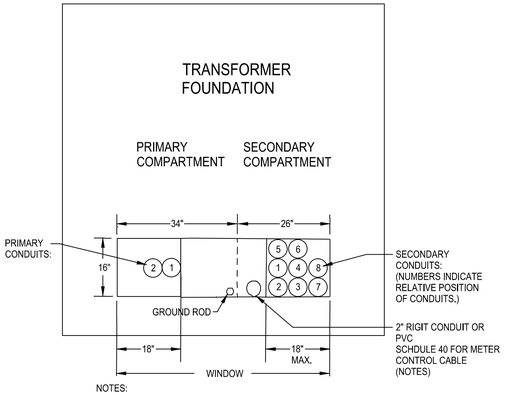
NOTE:

CONTACT AEP FOR TRANSFORMER PAD LATEST DETAIL





CONCRETE PAD AND PIERS FOR
THREE PHASE PAD-MOUNTED TRANSFORMER
HIGH VOLUME CLAY OR SAND TYPE SOIL APPLICATIONS
75KVA - 2500KVA
25KV AND BELOW



NOTES:

1. WHEN THE METERING TRANSFORMERS ARE LOCATED IN THE SECONDARY TERMINAL COMPARTMENT OF THE PADMOUNTED TRANSFORMER, THIS CONDUIT FOR THE METERING CONDUCTORS MUST BE RUN UNDERGROUND AND MUST ENTER THE TRANSFORMER PAD IN THE CONDUIT WINDOW.
2. THE METER LOCATION IS TO BE WITHIN 25 FEET OF THE TRANSFORMER PAD LOCATION.

03 TRANSFORMER PAD DETAIL
SCALE: NTS

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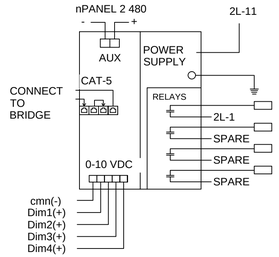
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ELECTRICAL DETAILS

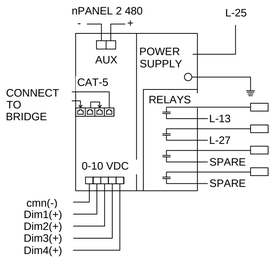
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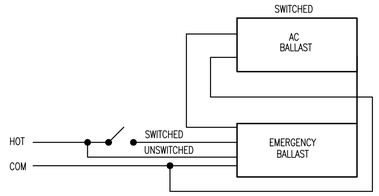


ELECTRICAL RM MAINTENANCE BLG.
N.T.S.



ELECTRICAL RM ADMIN. BLG.
N.T.S.

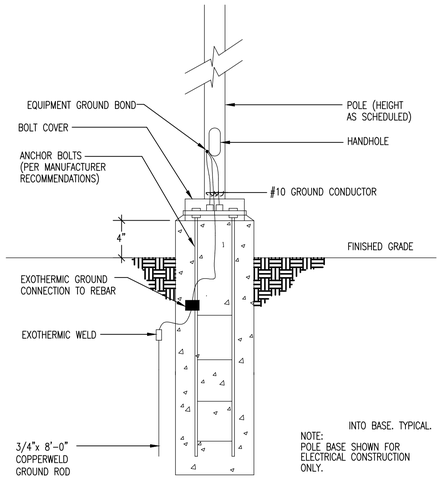
01 EXTERIOR LIGHTING CONTROL DETAIL-BASE
SCALE: NTS



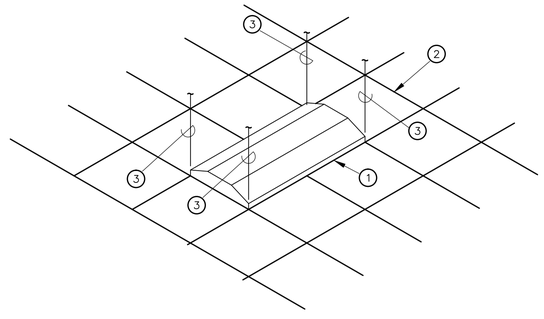
02 EMERGENCY BALLAST WIRING DETAIL
SCALE: NTS

GENERAL NOTES:

1. REFER TO STRUCTURAL DRAWINGS FOR POLE BASE STRUCTURAL REQUIREMENTS.



03 LIGHT POLE DETAIL
SCALE: NTS



NOTES BY SYMBOL "◯"

1. 2'x 4' OR 2' X 2' LAY-IN FLUORESCENT FIXTURE
2. SUSPENDED CEILING
3. TIE WIRE, CONNECT TO ALL FOUR CORNERS OF FIXTURE TO STRUCTURE ABOVE, INDEPENDENT OF CEILING SUPPORTS.

04 TYPICAL LAY-IN FIXTURE SUPPORT
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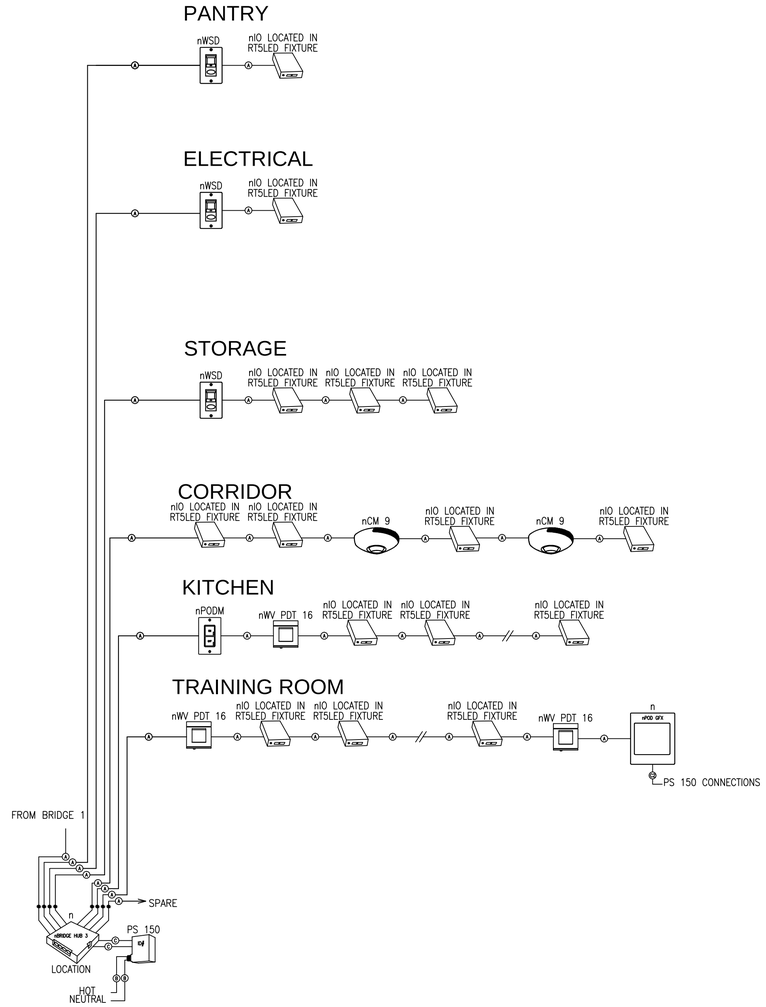
PROJECT OWNER: HIDALGO COUNTY

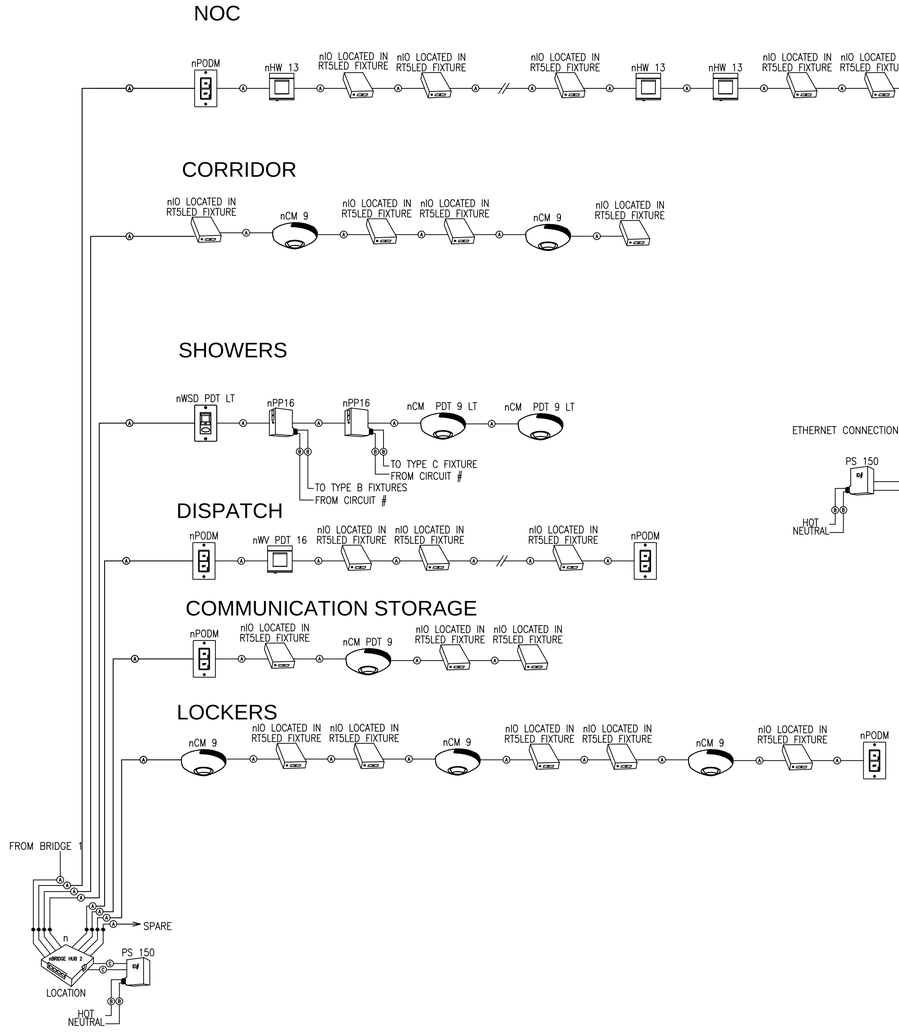
No.	Date	Description

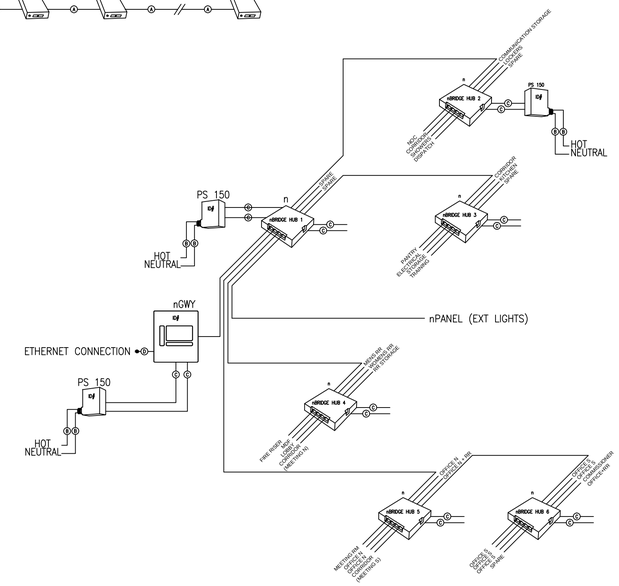
PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: RALPH

SHEET TITLE: ELECTRICAL DETAILS

EP504



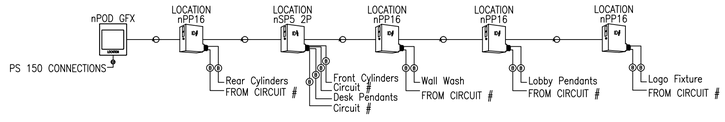




WIRE LEGEND	
A	CAT 5 (LOW VOLTAGE)
B	CLASS 1 (LINE VOLTAGE)
C	CLASS 2 (LOW VOLTAGE)
D	ETHERNET LAN (LOW VOLTAGE)

01 ELECTRICAL nLIGHT WIRING DIAGRAM - ADMIN. BLG.

SCALE: NTS



02 ELECTRICAL LOBBY LIGHITNG CONTROL nLIGHT WIRING DIAGRAM - ADMIN. BLG.

SCALE: NTS

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX. 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

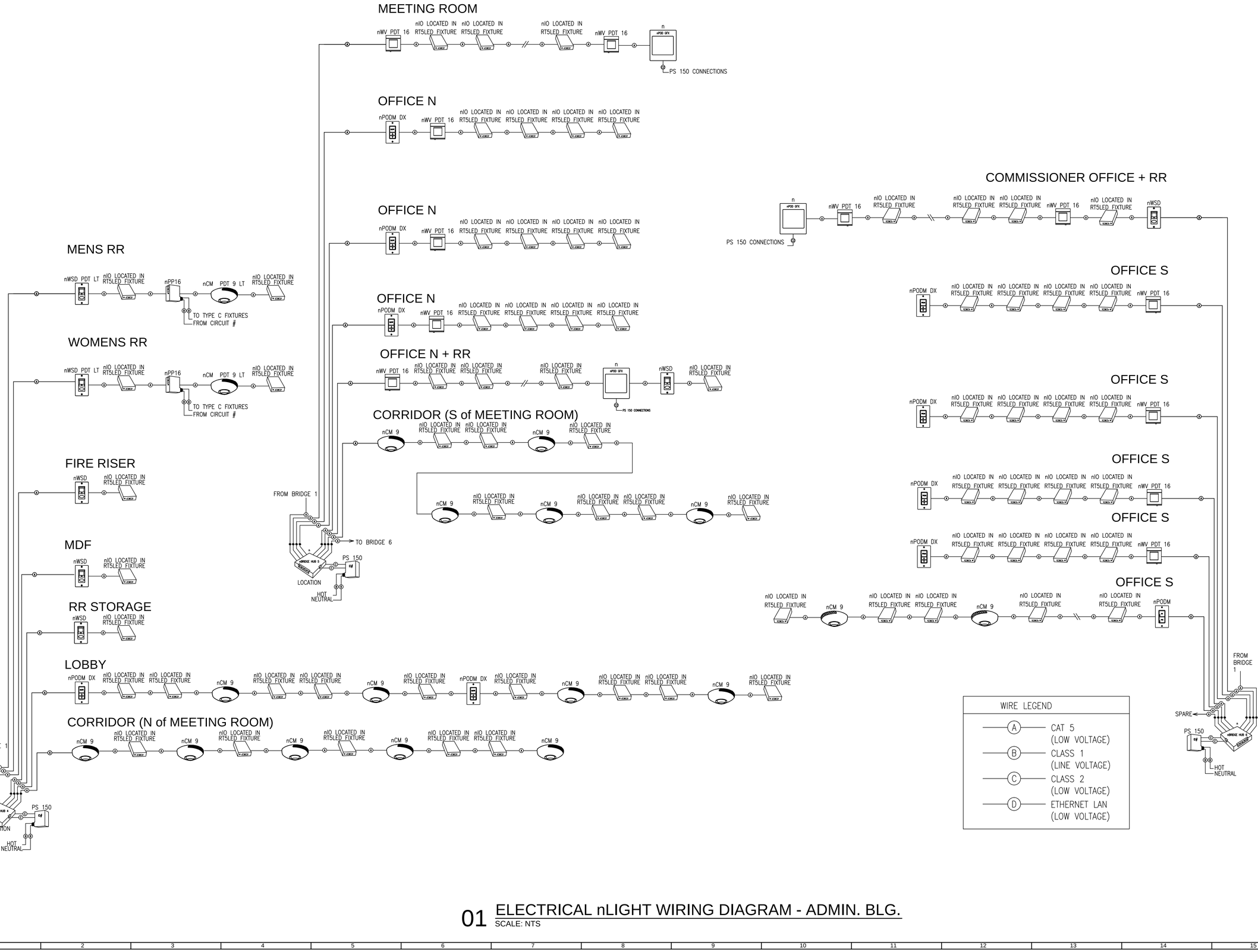
PROJECT NO.: 28493
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EP505

10/28/2011 10:19:18 AM

10/28/2011 10:19:18 AM



01 ELECTRICAL nLIGHT WIRING DIAGRAM - ADMIN. BLG.
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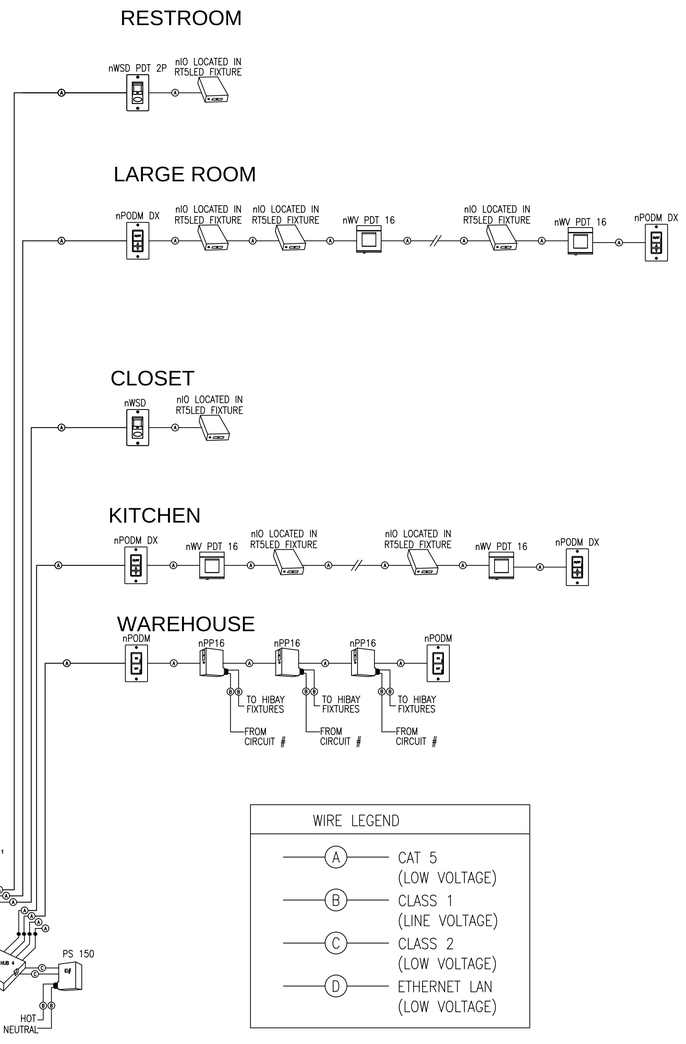
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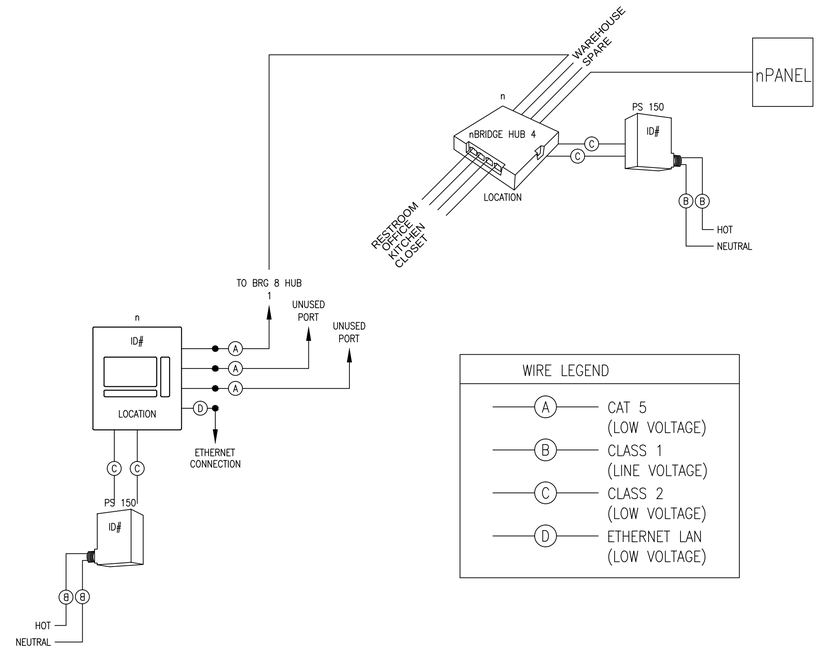
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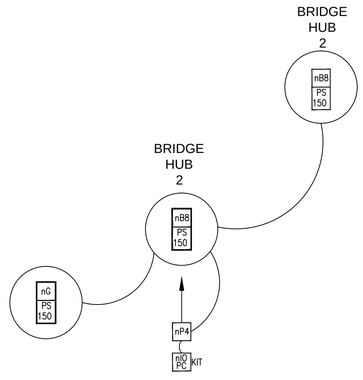
SHEET TITLE: ELECTRICAL DETAILS

EP506

10/28/2011 10:19:18 AM







01 ELECTRICAL nLIGHT WIRING DIAGRAM - MAINTENANCE BLG.
SCALE: NTS

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.ALM.

SHEET TITLE: ELECTRICAL DETAILS

EP507

10/28/2011 10:19:18 AM

PANELBOARD MDP1

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: ELECTRICAL ROOM 117

600 A MAIN BREAKER — MOUNTING: SURFACE

BUSES: MAIN -600 A; NEUTRAL - 100%; EQUIPMENT GROUND; INTEGRAL SPD — Isc = 30,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
2864	180	2020	PANEL L	250/3	1	A	2		SPACE	0	0	
3528	0	4753	"	-	3	B	4	-	"	0	0	
5234	0	4753	"	-	5	C	6	-	"	0	0	
0	1620	0	PANEL RA	125/3	7	A	8	100/3	SPD (AS REQUIERED BY MANUFACT.)	0	0	
0	1620	0	"	-	9	B	10	-		0	0	
0	1260	0	"	-	11	C	12	-		0	0	
0	5580	4900	PANEL RB	125/3	13	A	14	30/3	RTU-2	0	0	5582
0	5220	4900	"	-	15	B	16	-	"	0	0	5582
0	3780	3600	"	-	17	C	18	-	"	0	0	5582
0	180	0	PANEL RC	125/3	19	A	20	30/3	RTU-3	0	0	5942
0	540	0	"	-	21	B	22	-	"	0	0	5942
0	180	200	"	-	23	C	24	-	"	0	0	5942
0	0	5582	RTU-1	30/3	25	A	26	30/3	RTU-4	0	0	5942
0	0	5582	"	-	27	B	28	-	"	0	0	5942
0	0	5582	"	-	29	C	30	-	"	0	0	5942
0	180		RTU-1 GFCI RECEPT.	20/1	31	A	32	20/1	SPACE	0	0	

NOTE: ARRANGE BRANCH BREAKERS TO MATCH ONE LINE DIAGRAM

VA:L (LIGHTING)	11626	CONNECTED	14533 DEMAND
VA:R (RECEPTACLES)	20340	CONNECTED	15170 DEMAND
VA:O (OTHER)	94271	CONNECTED	94271 DEMAND
VA: TOTAL	126237	CONNECTED	123973 DEMAND
AMPS: TOTAL	350	CONNECTED	344 DEMAND

L	R	O		TOTAL			
2864	7740	29968	VA CONNECTED TO A PHASE	40572	VA =	338	AMPS CONNECTED TO A PHASE @ 120 VOLTS
3528	7380	32701	VA CONNECTED TO B PHASE	43609	VA =	363	AMPS CONNECTED TO B PHASE @ 120 VOLTS
5234	5220	31601	VA CONNECTED TO C PHASE	42055	VA =	350	AMPS CONNECTED TO C PHASE @ 120 VOLTS
11626	20340	94271	TOTAL	126237	VA		

PANELBOARD MDP2

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: EXTERIOR

400 A MAIN BREAKER — MOUNTING: SURFACE, NEMA 3R ENCLOSURE

BUSES: MAIN - 400 A; NEUTRAL - 100% ; EQUIPMENT GROUND;INTEGRAL SPD — Isc = 20,000 A RMS SYM AVAILABLE

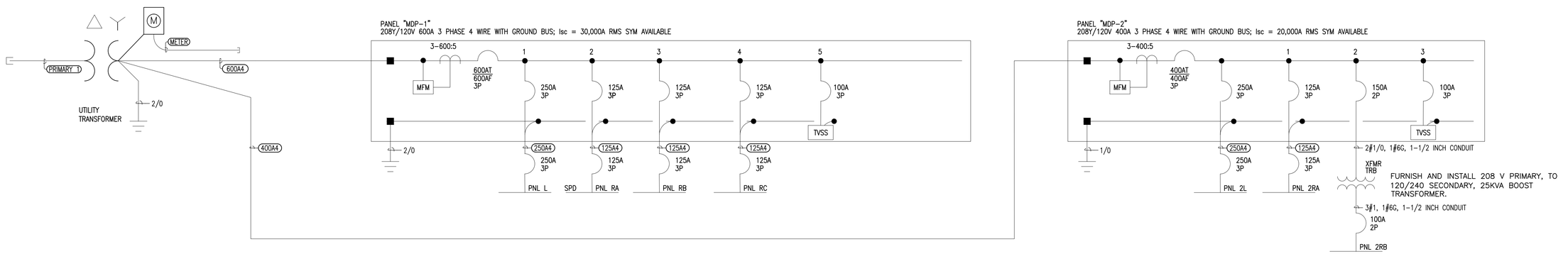
VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
2020	180	8300	PANEL 2L	125/3	1	A	2	100/3	PANEL 2RC	0	1260	0
2218	180	9362	"	-	3	B	4	-	"	0	1080	0
1404	360	10942	"	-	5	C	6	-	"	0	360	0
0	4500	6345	PANEL 2RA	125/3	7	A	8	20/1	SPACE	0	0	
0	4320	6596	"	-	9	B	10	20/1	SPACE	0	0	
0	4320	4559	"	-	11	C	12	20/1	SPACE	0	0	
0	0	9600	PANEL 2RB	150/2	13	A	14	20/1	SPACE	0	0	
0	0	9600	"	-	15	B	16	20/1	SPACE	0	0	
			SPACE	20/1	17	C	18	20/1	SPACE	0	0	

VA:L (LIGHTING)	5642	CONNECTED	7053 DEMAND
VA:R (RECEPTACLES)	16560	CONNECTED	13280 DEMAND
VA:O (OTHER)	65304	CONNECTED	65304 DEMAND
VA: TOTAL	87506	CONNECTED	85637 DEMAND
AMPS: TOTAL	243	CONNECTED	238 DEMAND

L	R	O		TOTAL			
2020	5940	24245	VA CONNECTED TO A PHASE	32205	VA =	268	AMPS CONNECTED TO A PHASE @ 120 VOLTS
2218	5580	25558	VA CONNECTED TO B PHASE	33356	VA =	278	AMPS CONNECTED TO B PHASE @ 120 VOLTS
1404	5040	15501	VA CONNECTED TO C PHASE	21945	VA =	183	AMPS CONNECTED TO C PHASE @ 120 VOLTS
5642	16560	65304	TOTAL	87506	VA		

FEEDER/BRANCH CIRCUIT SCHEDULE DATABASE

MARK	RACEWAY	PHASE CONDUCTORS	NEUTRAL CONDUCTORS	GROUND CONDUCTORS	REMARKS
100A4	1-1/2"	3#1	1#1	1#8	----
100A4N	2"	3#1	2#1	1#8	----
110A4	1-1/2"	3#1	1#1	1#6	----
125A4	2"	3#1/0	1#1/0	1#6	----
125A4N	2"	3#1/0	2#1/0	1#6	----
150A4	2"	3#1/0	1#1/0	1#6	----
175A4	2"	3#2/0	1#2/0	1#6	----
200A4	2"	3#3/0	1#3/0	1#6	----
225A4	2-1/2"	3#4/0	1#4/0	1#4	----
225A4N	2-1/2"	3#4/0	2#4/0	1#4	----
250A4	2-1/2"	3-250KCMIL	1-250KCMIL	1#4	----
300A4	3"	3-350KCMIL	1-350KCMIL	1#4	----
350A4	3-1/2"	3-500KCMIL	1-500KCMIL	1#3	----
400A4	2"	3#3/0	1#3/0	1#3	TWO PARALLEL FEEDERS REQUIRED
450A4	2-1/2"	3#4/0	1#4/0	1#2	TWO PARALLEL FEEDERS REQUIRED
500A4	2-1/2"	3#250KCMIL	1#250KCMIL	1#2	TWO PARALLEL FEEDERS REQUIRED
600A4	3"	3#350KCMIL	1#350KCMIL	1#1	TWO PARALLEL FEEDERS REQUIRED
700A4	2-1/2"	3#250KCMIL	1#250KCMIL	1#1/0	THREE PARALLEL FEEDERS REQUIRED
800A4	3"	3#300KCMIL	1#300KCMIL	1#1/0	THREE PARALLEL FEEDERS REQUIRED
1000A4	2-1/2"	3#250KCMIL	1#250KCMIL	1#2/0	FOUR PARALLEL FEEDERS REQUIRED
1200A4	3"	3#350KCMIL	1#350KCMIL	1#3/0	FOUR PARALLEL FEEDERS REQUIRED
1600A4	3"	3#400KCMIL	1#400KCMIL	1#4/0	FIVE PARALLEL FEEDERS REQUIRED
PRIMARY1	4"	----	----	----	----
PRIMARY2	4"	----	----	----	TWO PARALLEL FEEDERS REQUIRED
METER	1-1/4"	----	----	----	----
3T45DP	1"	3#4	----	1#8	----
3T45DS	1 1/2"	3#1/0	----	1#6	----
3T75DP	1 1/2"	3#1/0	----	1#6	----
3T75DS	2"	3#4/0	----	1#4	----



01 ELECTRICAL ONE LINE DIAGRAM
SCALE: NTS

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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: [illegible]
CHECKED BY: [illegible]

SHEET TITLE: ELECTRICAL ONE LINE DIAGRAM

EP601

10/28/2011 10:19:18 AM

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

BASE

EXHAUST FAN SCHEDULE				DISCONNECTING MEANS AND/OR
UNIT MARK	LOCATION	FED FROM	REMARKS	BRANCH CIRCUIT SIZE
EF-1	RM. 105	L-2	1,2	2#12, 1#12G, 1/2"C
EF-2	RM. 113	L-2	1,2	2#12, 1#12G, 1/2"C
EF-3	RM. 116	L-4	1,2	2#12, 1#12G, 1/2"C
EF-4	RM. 115	L-4	1,2	2#12, 1#12G, 1/2"C
PUMP SCHEDULE				
UNIT MARK	SERVES	FED FROM	REMARKS	
HWCP-1	JAN. 115	L-19		30/-/1 NEMA 1 DISOCNNECT, 2#12, 1#12G, 1/2"C
SP-1	MAINT. BLG. PIT	2RA-30		30/-/1 NEMA 1 DISOCNNECT, 2#12, 1#12G, 1/2"C
DX UNIT				
UNIT MARK	LOCATION	FED FROM	REMARKS	
SDX-1	AC-M103	2L-35,37		30/-/2 NEMA1, 2#12, 1#12G, 1/2"C
SDXCU-1	EXTERIOR	2L-39,41		60/-/2 NEMA3R, 2#10, 1#12G, 1/2"C
WATER HEATERS				
UNIT MARK	LOCATION	FED FROM	REMARKS	
DWH-1	JANITOR-M102	2L-14,16	3	30/-/2 NEMA 1 DISCONNECT, 2#10, 1#10G, 1/2"C
I.WH-1	OFFICE-M109	2L-10,12	3	30/-/2 NEMA 1 DISCONNECT, 2#12, 1#12G, 1/2"C
PACKAGE TERMINAL AIR CONDITIONER (PTAC)				
UNIT MARK	LOCATION/"SERVES	FED FROM	REMARKS	
PTAC	OFFICE-M109	2L-26,28		30/-/2 NEMA 3R, 2#12, 1#12G, 1/2"C
MISCELLANEOUS				
UNIT MARK	LOCATION/"SERVES	FED FROM	REMARKS	
COMPRESSOR-1	MAINTANENCE BLG.	2L-23,25,27		60/-/3 NEMA3R DISCONNECT, 3#8, #10G, 3/4"C
COMPRESSOR-2	MAINTANENCE BLG.	2L-29,31,33		60/-/3 NEMA3R DISCONNECT, 3#8, #10G, 3/4"C

GENERAL NOTES:

A. ALL DISCONNECTS AND COMBINATION STARTERS ARE NEMA 1 ENCLOSED, UNO.

REMARKS

1. FAN SHALL BE CONTROLLED WITH LIGHT SWITCH IN SPACE.
2. FACTORY PROVIDED INTEGRAL DISCONNECT.
3. FURNISH AND INSTALL WATER HEATER DISCONNECT ACCESSIBLE ABOVE CEILING. FURNISH AND INSTALL LABEL "POWER DISCONNECT LOCATED ABOVE CEILING"

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

ALTERNATE #1

ROOF TOP UNITS				DISCONNECTING MEANS AND/OR
UNIT MARK	SERVES	FED FROM	REMARKS	BRANCH CIRCUIT SIZE
RTU-1	ADMIN. BLG.	MDP1-25,27,29	2	3#10, 1#10G, 3/4"C
RTU-2	ADMIN. BLG.	MDP1-14,16,18	2	3#10, 1#10G, 3/4"C
RTU-3	ADMIN. BLG.	MDP1-20,22,24	2	3#10, 1#10G, 3/4"C
RTU-4	ADMIN. BLG.	MDP1-26,28,30	2	3#10, 1#10G, 3/4"C
EXHAUST FAN SCHEDULE				
UNIT MARK	LOCATION	FED FROM	REMARKS	
EF-5	RR-A120	L-2	2,3	2#12, 1#12G, 1/2"C
EF-6	WOMEN'S RR-A109	L-2	2,3	2#12, 1#12G, 1/2"C
EF-7	MEN'S RR-A107	L-2	2,3	2#12, 1#12G, 1/2"C
EF-8	JAN.-A108	L-2	2,3	2#12, 1#12G, 1/2"C
PUMP SCHEDULE				
UNIT MARK	SERVES	FED FROM	REMARKS	
HWCP-1	JAN. 115	L-19		30/-/1 NEMA 1 DISOCNNECT, 2#12, 1#12G, 1/2"C
SP-1	MAINT. BLG. PIT	2RA-30		30/-/1 NEMA 1 DISOCNNECT, 2#12, 1#12G, 1/2"C
WATER HEATERS				
UNIT MARK	LOCATION	FED FROM	REMARKS	
DWH-1	JAN. 115	L-15,17	4	60/-/2 NEMA 1 DISCONNECT, 2#10, 1#10G, 1/2"C
I.WH-1	RM. 148	2RA-22,24	4	30/-/2 NEMA 1 DISCONNECT, 2#12, 1#12G, 1/2"C
I.WH-2	RR. 163	2RA-26,28	4	30/-/2 NEMA 1 DISCONNECT, 2#12, 1#12G, 1/2"C
MINI SPLIT UNIT SCHEDULE				
UNIT MARK	LOCATION/"SERVES	FED FROM	REMARKS	
MSCU-1	IDF-161	2L-26,28	1	30/-/2 NEMA 3R, 2#12, 1#12G, 1/2"C
MISCELLANEOUS				
UNIT MARK	LOCATION/"SERVES	FED FROM	REMARKS	
UH-1	RM. 112	L-36,38,40	2	3#12, 1#12G, 1/2"C

GENERAL NOTES:

A. ALL DISCONNECTS AND COMBINATION STARTERS ARE NEMA 1 ENCLOSED, UNO.

REMARKS

1. FURNISH AND INSTALL POWER FROM OUTDOOR UNIT TO INDOOR UNIT AS REQURED. FURNISHED AND INSTALL HORSEPOWER RATED MANUAL DISCONNECT FOR INDOOR UNIT AS REQUIRED.
2. FACTORY PROVIDED INTEGRAL DISCONNECT.
3. FAN SHALL BE CONTROLLED WITH LIGHT SWITCH IN SPACE.
4. FURNISH AND INSTALL WATER HEATER DISCONNECT ACCESSIBLE ABOVE CEILING. FURNISH AND INSTALL LABEL "POWER DISCONNECT LOCATED ABOVE CEILING"

LIGHTING FIXTURE SCHEDULE

TYPE	MANUF & MODEL NUMBER	LAMPS	VA	VOLTAGE	DESCRIPTION
A	LITHONIA # 2SP8-G-3-17-A12125-MVOLT-BINP-LP841	3-17WT8	4100K 50	120	2'X2' STATIC RECESSED FIXTURE
AE	LITHONIA # 2SP8-G-3-17-A12125-MVOLT-BINP-LP841-EL	3-17WT8	4100K 50	120	2'X2' STATIC RECESSED FIXTURE PROVIDE WITH EMERGENCY BATTERY PACK
B	GOTHAM# AF-1-32TRT-8-**-MVOLT ** ARCHITECT TO SELECT FINISH	1-32WTRT	4100K 35	120	8" APERATURE COMPACT FLUORESCENT DOWNLIGHT
BE	GOTHAM# AF-1-32TRT-8-**-MVOLT-EL14 ** ARCHITECT TO SELECT FINISH	1-32WTRT	4100K 35	120	8" APERATURE COMPACT FLUORESCENT DOWNLIGHT PROVIDE EMERGENCY BATTERY PACK
B1	GOTHAM# LGG-1-32TRT-8-RW-T73-MVOLT	1-32WTRT	4100K 35	120	8" APERATURE COMPACT FLUORESCENT DOWNLIGHT LISTED FOR WET LOCATIONS
C	PEERLESS# LD6W-311204-T8-R4-120-GEB10-LP741-** ** ARCHITECT TO SELECT FINISH	2-32WT8	62	120	CLASSIC ROUND WALL MOUNTED FIXTURE
D	LITHONIA# IBZ-654-NDS-GEB10IS-2/3	6-54WT5HO	351	120	FLUORESCENT HIGH BAY FIXTURE
DE	LITHONIA# IBZ-654-NDS-GEB10IS-2/3-EL14	6-54WT5HO	351	120	FLUORESCENT HIGH BAY FIXTURE PROVIDE WITH EMERGENCY BATTERY PACK
F	SPECTRUM LIGHTING#SPC1010CF-142Q-EX-7510-SG-HM85-GW PORTFOLIO # M8000-746-P-Q-55000-LI	1-42WTRT	45	120/277	10 INCH PENDANT MOUNT CYLINDER
FE	SPECTRUM LIGHTING#SPC1010CF-142Q-EX-EMIT-7510-SG-HM85-GW PORTFOLIO # M8000-746Q-55000-LI FURNISH WITH EMERGENCY BALLAST	1-42WTRT	45	120/277	10 INCH PENDANT MOUNT CYLINDER
G	LITHONIA # C-2-32-MVOLT-GEB10IS-WGCUN-HC36	2-F32T8	4100K 62	120	4' FLUORESCENT STRIP FIXTURE WITH ELECTRONIC BALLAST FURNISH AND INSTALL WITH CHAIN PROVIDE WITH WIRE GUARD
GE	LITHONIA # C-2-32-MVOLT-GEB10IS-WGCUN-HC36-EL14	2-F32T8	4100K 62	120	4' FLUORESCENT STRIP FIXTURE WITH ELECTRONIC BALLAST FURNISH AND INSTALL WITH CHAIN PROVIDE WITH WIRE GUARD PROVIDE EMERGENCY BATTERY PACK
H	LITHONIA # 2SP8-F-3-17-A12125-MVOLT-BINP-LP841	3-17WT8	4100K 50	120	2'X2' STATIC RECESSED FIXTURE
HE	LITHONIA # 2SP8-F-3-17-A12125-MVOLT-BINP-LP841-EL	3-17WT8	4100K 50	120	2'X2' STATIC RECESSED FIXTURE PROVIDE WITH EMERGENCY BATTERY PACK
N	BEGA# 8414MH	1-39WMH	48	120	STRUCTURE MOUNTED FLOOD LIGHT
R	LITHONIA - #MS5-MSSSBL48-1-54T5HO-MVOLT-GEB10PS-EL55	1-54WT5HO	4100K 62	120	LOW-PROFILE T5 LOUVER PROVIDE WITH EMERGENCY BATTERY PACK
T	SHAPER#674-31-T5/2/14-120V-NA	2-14WT5	4100K 34	120	31-INCH FLUORESCENT WALL SCONCE, MOUNT FIXTURES WITH CENTER AT 6 FEET A.F.F.
X1	LITHONIA# LRP-1-RW-120/277-EL N	LED LAMP	10	120	EDGE-LIT EXITS SINGLE FACED
X2	LITHONIA# LRP-2-RW-120/277-EL N	LED LAMP	10	120	EDGE-LIT EXITS DOUBLE FACED
AA	VISIONAIRE LIGHTING# ARI-1-L-T3-48L-SOLAR-4K-24VDC-AM-**-RPP-5 ** ARCHITECT TO SELECT FINISH SOLIFTT-**-TF-3E45-T2S-2B-T25	LED LAMP	50	SOLAR 24VDC	LED SOLAR AREA LIGHTING FIXTURE
BB	LITHONIA # CSXW LED 1 30B700/40K-SR3-MVOLT-SPA-** ** ARCHITECT TO SELECT FINISH	LED LAMP	74	120	LED BUILDING-MOUNTED LUMINAIRE
CC	LITHONIA # AFN -** **FURNISH WITH WHITE FINISH	2-6W XENON LAMP	12	120	DIE-CAST ARCHITECTURAL EMERGENCY LIGHTING UNIT FURNISH AND INSTALL LIGHT FIXTURE AT 12-INCHES ABOVER DOOR MULLION.
DD	KIM#LTV-50SP70PMH-120-G12SS50	1-70WMH	86	120	IN-GRADE FLAG POLE LIGHT, CONCRETE MOUNTED. IP 6/7 RATED
FF	LITHONIA # VSL-2-32-SCE-MVOLT-GEB10IS-DL	2-F32T8	4100K 62	120	SURFACE ENCLOSED FLUORESCENT PARKING CANOPY FIXTURE
GG	VISA LIGHTING - #OW1302-1F40(120/277)-BSS-REM	1-F40W	4100K 41	120	2' FLUORESCENT WALL SCONCE, U.L. LISTED FOR DAMP LOCATIONS PROVIDE WITH EMERGENCY BATTERY PACK. MOUNT FIXTURES WITH CENTER AT 6 FEET A.F.F.

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E. M.
CHECKED BY: RALPH

SHEET TITLE:
ELECTRICAL SCHEDULES

EP602

10/28/2011 10:19:18 AM

PANELBOARD L

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: ELECTRICAL ROOM 117
250 A MAIN BREAKER — MOUNTING: SURFACE
BUSES: MAIN - 250 A; NEUTRAL - 200%; EQUIPMENT GROUND; ISOLATED GROUND;INTEGRAL SPD — Isc = 14,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
1406	0		INTERIOR LIGHTING	20/1	1	A	2	20/1	EF-5,6,7,8	0	0	740
1544	0		INTERIOR LIGHTING	20/1	3	B	4	15/2	MSCU-1 (MS-1)	0	0	654
2738	0		INTERIOR LIGHTING	20/1	5	C	6	-	"	0	0	654
798	0		INTERIOR LIGHTING	20/1	7	A	8			0	0	
1292	0		INTERIOR LIGHTING	20/1	9	B	10			0	0	
912	0		INTERIOR LIGHTING	20/1	11	C	12			0	0	
660	0		EXTERIOR LIGHTING	20/1	13	A	14			0	0	
0	0	2999	DWH-1	30/2	15	B	16			0	0	
0	0	2999	"	-	17	C	18			0	0	
0	0	180	HWCP-1	20/1	19	A	20			0	0	
434	0		EXTERIOR LIGHTING	20/1	21	B	22			0	0	
1584	0		INTERIOR LIGHTING	20/1	23	C	24			0	0	
0	180		LIGHTING CONTROL PANEL	20/1	25	A	26			0	0	
258	0		FLAG POLE LIGHTING	20/1	27	B	28			0	0	
0	0		SPARE	20/1	29	C	30			0	0	
0	0		SPARE	20/1	31	A	32			0	0	
0	0		SPARE	20/1	33	B	34			0	0	
0	0		SPARE	20/1	35	C	36	20/3	UH-1	0	0	1100
0	0		SPARE	20/1	37	A	38	-	"	0	0	1100
0	0		SPARE	20/1	39	B	40	-	"	0	0	1100
0	0		SPARE	20/1	41	C	42	20/1	SPARE	0	0	

VA:L (LIGHTING)	11626	CONNECTED	14533	DEMAND
VA:R (RECEPTACLES)	180	CONNECTED	180	DEMAND
VA:O (OTHER)	11527	CONNECTED	11527	DEMAND
VA: TOTAL	23333	CONNECTED	26239	DEMAND
AMPS: TOTAL	65	CONNECTED	73	DEMAND

L	R	O	TOTAL			
2864	180	2020	VA CONNECTED TO A PHASE	5064	VA =	42 AMPS CONNECTED TO A PHASE @ 120 VOLTS
3528	0	4753	VA CONNECTED TO B PHASE	8281	VA =	69 AMPS CONNECTED TO B PHASE @ 120 VOLTS
5234	0	4753	VA CONNECTED TO C PHASE	9987	VA =	83 AMPS CONNECTED TO C PHASE @ 120 VOLTS
11626	180	11527	TOTAL	23333	VA	

PANELBOARD RB

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: ELECTRICAL ROOM 117
125 A MAIN BREAKER — MOUNTING: SURFACE
BUSES: MAIN - 125 A; NEUTRAL - 100% EQUIPMENT GROUND — Isc = 10,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	900		RECEPT. RM. 109	20/1	1	A	2	20/1	RECEPT. RM. 156 (TV)	0	180	
0	540		RECEPT. RM. 109	20/1	3	B	4	20/1	HAND DRYER RR. 105	0	0	1200
0	720		RECEPT. RM. 112	20/1	5	C	6	20/1	HAND DRYER RR. 105	0	0	1200
0	540		RECEPT. RM. 113, 115	20/1	7	A	8	20/1	HAND DRYER RR. 113	0	0	1200
0	540		RECEPT. CORR 102	20/1	9	B	10	20/1	HAND DRYER RR. 113	0	0	1200
0	180		RECEPT. RM. 105	20/1	11	C	12	20/1	HAND DRYER RR. 115	0	0	1200
0	1080		RECEPT. RM. 103	20/1	13	A	14	20/1	HAND DRYER RR. 115	0	0	1200
0	540		RECEPT. RM 101	20/1	15	B	16	20/1	PROJECTOR RM. 103	0	180	
0	180		RECEPT. RM 101 (TV)	20/1	17	C	18	20/1	RECEPT. RM. 107	0	360	
0	180		RECEPT. RM 101	20/1	19	A	20	30/2	GENERATOR BLOCK HEATER	0	0	2500
0	540		RECEPT. RM. 151	20/1	21	B	22	-	"	0	0	2500
0	720		RECEPT. RMS. 149, 150	20/1	23	C	24	20/1	GEN. BATTERY	0	0	1200
0	720		RECEPT. RMS. 155, 238	20/1	25	A	26	20/1	REFRIGERATOR	0	180	
0	720		RECEPT. CORR. 227	20/1	27	B	28	20/1	RECEPT. EXTERIOR	0	360	
0	180		RECEPT. RM 147 (TV)	20/1	29	C	30	20/1	RECEPT. EXTERIOR	0	180	
0	360		RECEPT. RM 147	20/1	31	A	32	20/1	RECEPT. EXTERIOR	0	180	
0	540		RECEPT. RM. 140	20/1	33	B	34	20/1	RECEPT. RM 107	0	360	
0	720		RECEPT. RMS. 141,142	20/1	35	C	36	20/1	RECEPT. RM 107	0	360	
0	900		RECEPT. RMS. 143,144,145	20/1	37	A	38	20/1	RECEPT. A106	0	360	
0	900		RECEPT. RM. 156	20/1	39	B	40	20/1	RECEPT. A106	0	0	
0	180		RECEPT. EXTERIOR	20/1	41	C	42	20/1	SPARE	0	0	

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	14580	CONNECTED	12290	DEMAND
VA:O (OTHER)	13400	CONNECTED	13400	DEMAND
VA: TOTAL	27980	CONNECTED	25690	DEMAND
AMPS: TOTAL	78	CONNECTED	71	DEMAND

L	R	O	TOTAL			
0	5580	4900	VA CONNECTED TO A PHASE	10480	VA =	87 AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	5220	4900	VA CONNECTED TO B PHASE	10120	VA =	84 AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	3780	3600	VA CONNECTED TO C PHASE	7380	VA =	62 AMPS CONNECTED TO C PHASE @ 120 VOLTS
0	14580	13400	TOTAL	27980	VA	

PANELBOARD RA

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: ELECTRICAL ROOM 117
125 A MAIN BREAKER — MOUNTING: SURFACE
BUSES: MAIN - 125 A; NEUTRAL - 200% EQUIPMENT GROUND — Isc = 10,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	0		SPARE	20/1	1	A	2	20/1	FACP	0	180	
0	0		SPARE	20/1	3	B	4	20/1	SPARE	0	0	
0	0		SPARE	20/1	5	C	6	20/1	SPARE	0	0	
0	0		SPARE	20/1	7	A	8	20/1	SPARE	0	0	
0	0		SPARE	20/1	9	B	10	20/1	SPARE	0	0	
0	0		SPARE	20/1	11	C	12	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM 103	20/1	13	A	14	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM 103	20/1	15	B	16	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM 151	20/1	17	C	18	20/1	SPARE	0	0	
0	360		IG. RECEPT. RMS 150,149	20/1	19	A	20	20/1	SPARE	0	0	
0	360		IG. RECEPT. RMS 238,155	20/1	21	B	22	20/1	SPARE	0	0	
0	180		IG. RECEPT. RM. 147	20/1	23	C	24	20/1	SPARE	0	0	
0	360		IG. RECEPT. CORR. 227	20/1	25	A	26	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM. 140,141	20/1	27	B	28	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM. 142,143	20/1	29	C	30	20/1	SPARE	0	0	
0	180		IG. RECEPT. RM 156	20/1	31	A	32	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM 156	20/1	33	B	34	20/1	SPARE	0	0	
0	360		IG. RECEPT. RM. 147	20/1	35	C	36	20/1	SPARE	0	0	
0	180		IG. TV RECEPT. RM 103	20/1	37	A	38	20/1	SPARE	0	0	
0	180		IG. TV RECEPT. RM 103	20/1	39	B	40	20/1	SPARE	0	0	
0	0		SPARE	20/1	41	C	42	20/1	SPARE	0	0	

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	4500	CONNECTED	4500	DEMAND
VA:O (OTHER)	0	CONNECTED	0	DEMAND
VA: TOTAL	4500	CONNECTED	4500	DEMAND
AMPS: TOTAL	12	CONNECTED	12	DEMAND

L	R	O	TOTAL			
0	1620	0	VA CONNECTED TO A PHASE	1620	VA =	14 AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	1620	0	VA CONNECTED TO B PHASE	1620	VA =	14 AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	1260	0	VA CONNECTED TO C PHASE	1260	VA =	11 AMPS CONNECTED TO C PHASE @ 120 VOLTS
0	4500	0	TOTAL	4500	VA	

PANELBOARD RC

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: ELECTRICAL ROOM 117
125 A MAIN BREAKER — MOUNTING: SURFACE
BUSES: MAIN - 125 A; NEUTRAL - 100% EQUIPMENT GROUND — Isc = 10,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	0		SPARE	20/1	1	A	2	20/1	SPARE	0	0	
0	0		SPARE	20/1	3	B	4	20/1	SPARE	0	0	
0	0		SPARE	20/1	5	C	6	20/1	SPARE	0	0	
0	0		SPARE	20/1	7	A	8	20/1	SPARE	0	0	
0	0		SPARE	20/1	9	B	10	20/1	SPARE	0	0	
0	0		SPARE	20/1	11	C	12	20/1	SPARE	0	0	
0	0		SPARE	20/1	13	A	14	20/1	SPARE	0	0	
0	360		VENDING MACHINE	20/1	15	B	16	20/1	SPARE	0	0	
0	180		WATER COOLER	20/1	17	C	18	20/1	SPARE	0	0	
0	180		FAAP	20/1	19	A	20	20/1	SPARE	0	0	
0	180		GAP	20/1	21	B	22	20/1	SPARE	0	0	
0	0	200	LOGO LIGHTING	20/1	23	C	24	20/1	SPARE	0	0	
0	0		SPARE	20/1	25	A	26	20/1	SPARE	0	0	
0	0		SPARE	20/1	27	B	28	20/1	SPARE	0	0	
0	0		SPARE	20/1	29	C	30	20/1	SPARE	0	0	
0	0		SPARE	20/1	31	A	32	20/1	SPARE	0	0	
0	0		SPARE	20/1	33	B	34	20/1	SPARE	0	0	
0	0		SPARE	20/1	35	C	36	20/1	SPARE	0	0	
0	0		SPARE	20/1	37	A	38	20/1	SPARE	0	0	
0	0		SPARE	20/1	39	B	40	20/1	SPARE	0	0	
0	0		SPARE	20/1	41	C	42	20/1	SPARE	0	0	

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	900	CONNECTED	900	DEMAND
VA:O (OTHER)	200	CONNECTED	200	DEMAND
VA: TOTAL	1100	CONNECTED	1100	DEMAND
AMPS: TOTAL	3	CONNECTED	3	DEMAND

L	R	O	TOTAL			
0	180	0	VA CONNECTED TO A PHASE	180	VA =	2 AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	540	0	VA CONNECTED TO B PHASE	540	VA =	5 AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	180	200	VA CONNECTED TO C PHASE	380	VA =	3 AMPS CONNECTED TO C PHASE @ 120 VOLTS
0	900	200	TOTAL	1100	VA	

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: [illegible]
CHECKED BY: [illegible]

SHEET TITLE:
ELECTRICAL PANEL SCHEDULES

EP603

10/28/2011 10:19:18 AM

PANELBOARD 2L

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: EXTERIOR
250 A MAIN BREAKER — MOUNTING: SURFACE, NEMA 3R ENCLOSURE
BUSES: MAIN - 125 A; NEUTRAL - 100%; EQUIPMENT GROUND; ISOLATED GROUND — Isc = 14,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
616	0		EXTERIOR LIGHTING	20/1	1	A	2	20/1	EF-1, 2, 3	0	0	240
1404	0		SHOP BAY LIGHTING	20/1	3	B	4	20/1	EF-4	0	0	360
1404	0		SHOP BAY LIGHTING	20/1	5	C	6	20/2	PTAC	0	0	1150
1404	0		SHOP BAY LIGHTING	20/1	7	A	8	-	"	0	0	1150
814	0		INTERIOR LIGHTING	20/1	9	B	10			0	0	
0	180		LIGHTING CONTROL PANEL	20/1	11	C	12			0	0	
0	180		IDF. RECEPT.	20/1	13	A	14			0	0	
0	180		IDF. RECEPT.	20/1	15	B	16			0	0	
0	180		IDF. RECEPT.	20/1	17	C	18			0	0	
0	0		SPARE	20/1	19	A	20			0	0	
0	0		SPARE	20/1	21	B	22			0	0	
0	0	3216	COMPRESSOR-1	35/3	23	C	24			0	0	
0	0	3216	"	-	25	A	26			0	0	
0	0	3216	"	-	27	B	28			0	0	
0	0	2904	COMPRESSOR-2	35/3	29	C	30			0	0	
0	0	2904	"	-	31	A	32			0	0	
0	0	2904	"	-	33	B	34			0	0	
0	0	790	SDX-1	15/2	35	C	36			0	0	
0	0	790	"	-	37	A	38	20/1	SPARE	0	0	
0	0	2882	SDXCU-1	35/2	39	B	40	20/1	SPARE	0	0	
0	0	2882	"	-	41	C	42	20/1	SPARE	0	0	

VA:L (LIGHTING)	5642	CONNECTED	7053	DEMAND
VA:R (RECEPTACLES)	720	CONNECTED	720	DEMAND
VA:O (OTHER)	28604	CONNECTED	28604	DEMAND
VA: TOTAL	34966	CONNECTED	36377	DEMAND
AMPS: TOTAL	97	CONNECTED	101	DEMAND

L	R	O		TOTAL			
2020	180	8300	VA CONNECTED TO A PHASE	10500	VA =	88	AMPS CONNECTED TO A PHASE @ 120 VOLTS
2218	180	9362	VA CONNECTED TO B PHASE	11760	VA =	98	AMPS CONNECTED TO B PHASE @ 120 VOLTS
1404	360	10942	VA CONNECTED TO C PHASE	12706	VA =	106	AMPS CONNECTED TO C PHASE @ 120 VOLTS
5642	720	28604	**TOTAL**	34966	VA		

PANELBOARD 2RA

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: EXTERIOR
125 A MAIN BREAKER — MOUNTING: SURFACE, NEMA 3R ENCLOSURE
BUSES: MAIN - 125 A; NEUTRAL - 100%; EQUIPMENT GROUND; ISOLATED GROUND — Isc = 14,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	180		RECEPT.	20/1	1	A	2	20/1	RECEPT.	0	360	
0	180		GFI RECEPT.	20/1	3	B	4	20/1	WATER COOLERS	0	180	
0	180		GFI RECEPT.	20/1	5	C	6	20/1	CORD REEL	0	180	
0	1080		RECEPT.	20/1	7	A	8	20/1	CORD REEL	0	180	
0	900		RECEPT.	20/1	9	B	10	20/1	CORD REEL	0	180	
0	540		RECEPT.	20/1	11	C	12	20/1	CORD REEL	0	180	
0	360		RECEPT.	20/1	13	A	14	20/1	CORD REEL	0	180	
0	180		RECEPT.	20/1	15	B	16	20/1	CORD REEL	0	180	
0	360		RECEPT.	20/1	17	C	18	30/2	CAR LIFT	0	0	1799
0	720		RECEPT.	20/1	19	A	20	-	"	0	0	1799
0	720		RECEPT.	20/1	21	B	22	25/2	I.WH-1	0	0	2050
0	720		RECEPT.	20/1	23	C	24	-	"	0	0	2050
0	360		RECEPT.	20/1	25	A	26	25/2	I.WH-2	0	0	2050
0	720		RECEPT.	20/1	27	B	28	-	"	0	0	2050
0	720		RECEPT.	20/1	29	C	30	20/1	SP-1	0	0	710
0	360		GFI RECEPT.	20/1	31	A	32	30/2	ELECTRIC WINCH	0	0	2496
0	360		GFI RECEPT.	20/1	33	B	34	-	"	0	0	2496
0	360		LUBE TANK RECEPT.	20/1	35	C	36	20/1	FACP	0	180	
0	540		GFI RECEPT.	20/1	37	A	38	20/1	FAAP	0	180	
0	720		RECEPT.	20/1	39	B	40	20/1	SWTICHED GFCI RECEPT.	0	0	
0	180		GFI RECEPT.	20/1	41	C	42	20/1	RECEPT.	0	720	

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	13140	CONNECTED	11570	DEMAND
VA:O (OTHER)	17500	CONNECTED	17500	DEMAND
VA: TOTAL	30640	CONNECTED	29070	DEMAND
AMPS: TOTAL	85	CONNECTED	81	DEMAND

L	R	O		TOTAL			
0	4500	6345	VA CONNECTED TO A PHASE	10845	VA =	90	AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	4320	6596	VA CONNECTED TO B PHASE	10916	VA =	91	AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	4320	4559	VA CONNECTED TO C PHASE	8879	VA =	74	AMPS CONNECTED TO C PHASE @ 120 VOLTS
0	13140	17500	**TOTAL**	30640	VA		

PANELBOARD 2RC

VOLTAGE: 208Y/120 VOLT 3 PHASE 4 WIRE — LOCATION: EXTERIOR
100 A MAIN BREAKER — MOUNTING: SURFACE, NEMA 3R ENCLOSURE
BUSES: MAIN - 100 A; NEUTRAL - 100%; EQUIPMENT GROUND; ISOLATED GROUND — Isc = 10,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	720		RECEPT. FOR CHARGING STATIONS	20/1	1	A	2	20/1	SPARE	0	0	
0	720		RECEPT. FOR CHARGING STATIONS	20/1	3	B	4	20/1	SPARE	0	0	
0	180		RECEPT. RM M101	20/1	5	C	6	20/1	SPARE	0	0	
0	180		RECEPT. RM M101	20/1	7	A	8	20/1	SPARE	0	0	
0	180		RECEPT. RM M101	20/1	9	B	10	20/1	SPARE	0	0	
0	0		SPARE	20/1	11	C	12	20/1	SPARE	0	0	
0	180		RECEPT. WATER COOLER RM M112	20/1	13	A	14	20/1	SPARE	0	0	
0	180		RECEPT. M111	20/1	15	B	16	20/1	SPARE	0	0	
0	180		RECEPT. M110	20/1	17	C	18	20/1	SPARE	0	0	
0	180		RECEPT. TV RM M109	20/1	19	A	20	20/1	SPARE	0	0	
0	0		SPARE	20/1	21	B	22	20/1	SPARE	0	0	
0	0		SPARE	20/1	23	C	24	20/1	SPARE	0	0	

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	2700	CONNECTED	2700	DEMAND
VA:O (OTHER)	0	CONNECTED	0	DEMAND
VA: TOTAL	2700	CONNECTED	2700	DEMAND
AMPS: TOTAL	7	CONNECTED	7	DEMAND

L	R	O		TOTAL			
0	1260	0	VA CONNECTED TO A PHASE	1260	VA =	11	AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	1080	0	VA CONNECTED TO B PHASE	1080	VA =	9	AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	360	0	VA CONNECTED TO C PHASE	360	VA =	3	AMPS CONNECTED TO C PHASE @ 120 VOLTS
0	2700	0	**TOTAL**	2700	VA		

PANELBOARD 2RB

VOLTAGE: 120/240 1 PHASE 3 WIRE — LOCATION: EXTERIOR
***100A MAIN BREAKER — MOUNTING: SURFACE, NEMA 3R ENCLOSURE
BUSES: MAIN - 100 A; NEUTRAL - 100%; EQUIPMENT GROUND; — Isc = 14,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
0	0	4800	WELDER	50/2	1	A	2	50/2	WELDER	0	0	4800
0	0	4800	"	-	3	B	4	-	"	0	0	4800
0	0			20/1	5	A	6	20/1		0	0	
0	0			20/1	7	B	8	20/1		0	0	

*** PROVIDE MAIN CIRCUIT BREAKER WITH 120V SHUNT TRIP FOR EMERGENCY SHUT OFF AND CONNECT TO EPO SWITCH.

VA:L (LIGHTING)	0	CONNECTED	0	DEMAND
VA:R (RECEPTACLES)	0	CONNECTED	0	DEMAND
VA:O (OTHER)	19200	CONNECTED	19200	DEMAND
VA: TOTAL	19200	CONNECTED	19200	DEMAND
AMPS: TOTAL	80	CONNECTED	80	DEMAND

L	R	O		TOTAL			
0	0	9600	VA CONNECTED TO A PHASE	9600	VA =	80	AMPS CONNECTED TO A PHASE @ 120 VOLTS
0	0	9600	VA CONNECTED TO B PHASE	9600	VA =	80	AMPS CONNECTED TO B PHASE @ 120 VOLTS
0	0	19200	**TOTAL**	19200	VA		

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PRELIMINARY
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PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.A.J.M.

SHEET TITLE:
ELECTRICAL PANEL SCHEDULES

EP604

10/28/2011 10:19:18 AM

MECHANICAL GENERAL LEGEND

DUCTWORK SYMBOLS

DESCRIPTION	SINGLE LINE	DOUBLE LINE
ACCESS DOOR	AD	AD
BACKDRAFT DAMPER	BDD	BDD
FIRE DAMPER	F	F
FLEXIBLE CONNECTION	FC	FC
MOTORIZED DAMPER	M	M
CONTROL DAMPER	CD M	CD M
VOLUME DAMPER, MANUAL	VD	VD
DUCT ELBOW WITH TURNING VANES		
DUCT SECTION – SUPPLY AIR		
DUCT SECTION – EXHAUST AIR		
DUCT SECTION – RETURN, OUTSIDE, OR RELIEF AIR		
DUCT, INCLINED DROP		
DUCT, INCLINED RISE		
FLEXIBLE DUCT – ROUND	8"ø	8"ø
DUCT TRANSITION	14/10 → 10/10	14/10 → 10/10
DUCT TRANSITION (SQUARE OR RECTANGULAR TO ROUND)	10/10 → 8"ø	12/12 → 8"ø
RECTANGULAR DUCT, SIZE IN INCHES, FIRST DIMENSION IS SIDE SHOWN (NET CLEAR INSIDE DIMENSION)	10/14	10/14
ROUND DUCT, DIAMETER IN INCHES (NET CLEAR INSIDE DIMENSION)	8"ø	8"ø
AIR FLOW IN DIRECTION OF ARROW		
45° BRANCH TAKE-OFFS		
CONICAL LATERAL BRANCH TAKE-OFFS		
CEILING SUPPLY DIFFUSERS		
CEILING RETURN GRILLE/REGISTER		
CEILING EXHAUST FAN (EF-_)		EF-_
CEILING EXHAUST GRILLE/REGISTER		
SIDEWALL SUPPLY GRILLE/REGISTER		
SIDEWALL RETURN/EXHAUST GRILLE/REGISTER		
EXTRACTOR		
DUCT TEE WITH SPLITTER DAMPER		
DOOR UNDERCUT	—UC→	—UC→
DOOR LOUVER	—L→	—L→

PIPING SYMBOLS

SYMBOL	DESCRIPTION
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
PCWS	PRIMARY CHILLED WATER SUPPLY
PCWR	PRIMARY CHILLED WATER RETURN
SCWS	SECONDARY CHILLED WATER SUPPLY
SCWR	SECONDARY CHILLED WATER RETURN
D	DRAIN
	DIRECTION OF PITCH (DOWN)
	FLUID FLOW DIRECTION
	SECTIONAL VALVE (SEE SPECS)
	GATE VALVE
	CHECK VALVE
	THROTTLING VALVE (SEE SPECS)
	GLOBE VALVE
	BUTTERFLY VALVE
F	CALIBRATED BALANCING VALVE
	BALL VALVE
	PRESSURE REDUCING VALVE
	PRESSURE RELIEF OR SAFETY VALVE
	VACUUM RELIEF OR SAFETY VALVE
	ANGLE VALVE
S	SOLENOID VALVE
M	2-WAY MOTOR OPERATED CONTROL VALVE
M	3-WAY MOTOR OPERATED CONTROL VALVE
CV	2-WAY CONTROL VALVE
CV	3-WAY CONTROL VALVE
F	TRIPLE DUTY VALVE
	FLOW CONTROL VALVE
	PLUG VALVE
	SIGHT GLASS
	TEST COCK
	PLUGGED TEE
TFM	FLOW METER
	PRESSURE GAUGE WITH VENT COCK
T	THERMOMETER
T	THERMAL WELL WITH TEMPERATURE SENSOR
	STRAINER
	STRAINER WITH BLOWDOWN VALVE
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	UNION
	FLEXIBLE PIPE CONNECTOR
	CAPPED PIPE/OUTLET
	PLUGGED PIPE/OUTLET
	AUTOMATIC AIR VENT
ID	VALVE AND BLIND FLANGE
II	PIPE HEADER WITH BLIND FLANGE
	PIPE TURNING UP
	PIPE TURNING DOWN
	PIPE BRANCH BOTTOM CONNECTION
	PIPE BRANCH TOP CONNECTION
	PUMP (FOR WATER FLOW DIAGRAM ONLY)

MISCELLANEOUS SYMBOLS

- (P) DUCT STATIC PRESSURE SENSOR
- SD DUCT SMOKE DETECTOR
- CO_2 CARBON DIOXIDE SENSOR
- NEW CONNECTION TO EXISTING
- (H) HUMIDISTAT
- RH RELATIVE HUMIDITY SENSOR
- (T) THERMOSTAT OR TEMPERATURE SENSOR (MOUNT 48" AFF)
- T DUCT TEMPERATURE SENSOR
- TC TIME CLOCK
- F FREEZESTAT
- DIFFUSER, GRILLE OR REGISTER MARK
- 200 AIR FLOW (CFM); 12 X 8 RECTANGULAR FACE SIZE (WHERE APPLICABLE)
- 01 / M2.01 DIRECTION OF SECTION; IDENTIFYING NUMBER OR LETTER FOR SECTIONS; NUMBER OF REFERENCE DRAWING WHERE SECTION IS SHOWN.
- 01 / M2.01 IDENTIFYING NUMBER OR LETTER FOR DETAILS; NUMBER OF REFERENCE DRAWING WHERE DETAIL IS SHOWN.
- ENLARGED DETAIL REFERENCE
- MATCHLINE
- LINE WITH HATCHING DESIGNATES DEMOLITION WORK

AIRFLOW DIAGRAM SYMBOLS

- C / C COOLING COIL
- H / C HEATING COIL
- LOUVER
- BDD BACKDRAFT DAMPER
- FD/SD FIRE/SMOKE DAMPER
- A.F.M.S. AIR FLOW MEASURING STATION
- M MOTORIZED OPPOSED BLADE DAMPER
- M MOTORIZED PARALLEL BLADE DAMPER
- FAN STARTER
- FAN
- FAN WITH ADJUSTABLE FREQUENCY MOTOR CONTROLLER

GENERAL ABBREVIATIONS

AAV	AUTOMATIC AIR VALVE
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MEASURING STATION
AMB	AMBIENT
APD	AIR PRESSURE DROP
BD	BLOWDOWN
BF	BLIND FLANGE
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BHP	BRAKE HORSEPOWER
BLV	BALANCING VALVE
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STEEL
BV	BALL VALVE
CAP	CAPACITY
CCMS	CENTRAL CONTROL MONITORING SYSTEM
CENT	CENTRIFUGAL
CMBST	COMBUSTION AIR
CL	CENTERLINE
CV	CONTROL VALVE OR CONSTANT VOLUME
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
D	DIFFUSER OR DAMPER
DB	DRY BULB
DEG	DEGREES
DIA	DIAMETER
DN	DOWN
DX	DIRECT EXPANSION
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRYBULB TEMPERATURE
EFF	EFFICIENCY
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
FCV	FLOW CONTROL VALVE
FLA	FULL LOAD AMP
FLEX	FLEXIBLE
FM	FLOW METER
FWL	FIXED WALL LOUVER
GR	GRILLE
GV	GATE VALVE
HZ	CYCLES PER SECOND (HERTZ)
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LDB	LEAVING DRYBULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MFR	MANUFACTURER
MIN	MINIMUM
MVD	MOTORIZED VOLUME DAMPER
MW	MAKE UP WATER
NC	NORMALLY CLOSED
NK	NECK
NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
PD	PRESSURE DROP
PH	PHASE
PI	PRESSURE INDICATOR
PRV	PRESSURE RELIEF VAVLE
PS	PRESSURE SENSOR
PSV	PRESSURE SAFETY VALVE
PTRV	PRESSURE TEMPERATURE RELIEF VALVE
PV	PLUG VALVE
PCW	PRIMARY CHILLED WATER
PCWS	PRIMARY CHILLED WATER SUPPLY
PCWR	PRIMARY CHILLED WATER RETURN
PCWP	PRIMARY CHILLED WATER PUMP
RED	REDUCER
REG	REGISTER
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SENS	SENSIBLE
SL	SOUND LINING
SD	SMOKE DETECTOR
SOV	SOLENOID OPERATED VALVE OR SHUT-OFF VALVE
SP	STATIC PRESSURE
SS	STAINLESS STEEL
SCW	SECONDARY CHILLED WATER
SCWS	SECONDARY CHILLED WATER SUPPLY
SCWR	SECONDARY CHILLED WATER RETURN
SCWP	SECONDARY CHILLED WATER PUMP
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF STEEL
TS	TEMPERATURE SENSOR
TSTAT	THERMOSTAT
TSP	TOTAL STATIC PRESSURE
UNO	UNLESS NOTED OTHERWISE
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
WB	WET BULB
WPD	WATER PRESSURE DROP
WTR	WATER
WxHxL	WIDTH BY HEIGHT BY LENGTH

EQUIPMENT ABBREVIATIONS

AHU	AIR HANDLING UNIT
ACU	AIR CONDENSING UNIT
ACCU	AIR COOLED CONDENSING UNIT
AS	AIR SEPARATOR
B	BOILER
BCU	BLOWER COIL UNIT
CC	COOLING COIL
CF	CHEMICAL FEEDER
CH	CHILLER
CP	CONDENSOR PUMP
CT	COOLING TOWER
CWP	CHILLED WATER PUMP
EDH	ELECTRIC DUCT HEATER
DC	DUST COLLECTOR
EF	EXHAUST FAN
EH	ELECTRIC HEATER
ET	EXPANSION TANK
F	FILTER
FCU	FAN COIL UNIT
FCCU	FAN COIL CONDENSING UNIT
FPB	FAN POWER BOX
GFUH	GAS FIRED UNIT HEATER
HC	HOT WATER HEATING COIL
HWP	HOT WATER PUMP
OAH	OUTSIDE AIR HOOD
L	LOUVER
P	PUMP
PP	PRIMARY PUMP
PTAC	PACKAGE TERMINAL AIR CONDITIONING
RH	RELIEF HOOD
RHEF	RELIEF HOOD EXHAUST FAN
RTU	ROOF TOP UNIT
SDB	SINGLE DUCT BOX
SP	SECONDARY PUMP
ST	CHILLED WATER STORAGE TANK
VAV	VARIABLE AIR VOLUME BOX
VFD	VARIABLE FREQUENCY DRIVE

GENERAL MECHANICAL NOTES

(1) CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

(2) THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE WORK IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES UNDER THIS SECTION OF THE CONTRACT. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE LOCAL CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET APPLICABLE LOCAL CODES, AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE.

(3) CONTRACTOR SHALL HANG AND INSTALL ALL DUCTWORK TIGHT WITH THE BUILDING STRUCTURE TO ACCOMMODATE NEW CEILINGS. CONTRACTOR SHALL COORDINATE ALL INSTALLATION WORK WITH ARCHITECTURAL AND ELECTRICAL DESIGN. ALL DUCTWORK SHALL BE MODIFIED AS NECESSARY AND REQUIRED TO FIT AROUND BUILDING STRUCTURES, ARCHITECTURAL BUILD-OUT AND ELECTRICAL CABLE TRAY INSTALLATIONS. MECHANICAL CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK SCOPE OF OTHER TRADES AND PARTICIPATE IN COORDINATING ALL CONSTRUCTION EFFORTS.

(4) CONTRACTOR SHALL INSTALL ALL EXHAUST SYSTEMS, INCLUDING FANS AND EXHAUST DUCTS. PROVIDE COMPLETE NEW SYSTEMS AS INDICATED.

(5) CONTRACTOR SHALL PROVIDE ALL CEILING DIFFUSERS AS SHOWN. CONNECT EACH DIFFUSER TO THE MAIN DISTRIBUTION DUCT WITH A FLEX-DUCT SECTION; CONNECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE DETAIL. EACH FLEX-DUCT CONNECTION SHALL INCLUDE A BUTTERFLY DAMPER TO BE INSTALLED AT THE TRUNK DUCT.

(6) CONTRACTOR SHALL PROVIDE ALL DUCTWORK REQUIRED TO COMPLETE THE HVAC SYSTEM. TIE IN BRANCH DUCTS TO MAIN DUCTS WITH SHEET METAL FLANGES. FLANGE CONNECTION SHALL BE FASTENED WITH CRIMPED SHEET METAL STRIPS AND SEALED WITH SILICONE CAULK.

(7) CONTRACTOR SHALL SUPPLY AND INSTALL FIRE DAMPERS AND ACCESS DOORS IN THE HORIZONTAL DUCTS WHERE THEY PENETRATE FIRE BARRIERS.

(8) ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION BEFORE MAKING PENETRATIONS TO AVOID CUTTING THROUGH STRUCTURAL BEAMS AND REINFORCING. CONTRACTOR SHALL INFORM THE ENGINEER IF REINFORCING IS CUT OR DAMAGED WHILE MAKING OPENINGS. CONTRACTOR SHALL REINFORCE ALL OPENINGS AS REQUIRED BY DRAWINGS AND SPECIFICATIONS. PATCH AND SEAL OPENINGS WITH 6000 PSI CEMENT GROUT. INSTALL DECORATIVE TRIM (EQUIPMENT FLANGES, FRAMING OR ESCUTCHEONS) AROUND OPENINGS IN FINISHED AREAS. COORDINATE ALL CUTTING AND PATCHING WITH THE OTHER TRADES.

(9) ON ANY WORK SHOWN ON MECHANICAL DRAWINGS REQUIRING DEMOLITION OF EXISTING OR NEW BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS. REPAIRS SHALL BE COMPLETED ACCORDING TO ARCHITECTURAL SPECIFICATIONS. ALL REFINISHING SHALL BE APPROVED BY THE ARCHITECT.

(10) CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING THE INSTALLATION OF THE AIR DISTRIBUTION SYSTEM SHOWN. DUCTWORK, DUCT ACCESSORIES AND CONTROLS SHOWN AND REQUIRED SHALL BE SUPPLIED AND INSTALLED. ALL INSTALLATION WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE CODES, INCLUDING NFPA 90A AND 90B.

(11) CONTRACTOR SHALL BALANCE ALL AIR DISTRIBUTION SYSTEMS TO ACHIEVE THE AIR VOLUME REQUIREMENTS INDICATED. BALANCING SHALL INCLUDE ADJUSTMENT OF ALL MANUAL VOLUME DAMPERS, SPLITTER DAMPERS, ZONE DAMPERS (IF REQUIRED), BUTTERFLY DAMPERS AND INDIVIDUAL DIFFUSER VOLUME DAMPERS (FINAL BALANCING ONLY). CONTRACTOR SHALL SUPPLY THE ENGINEER WITH A COMPLETE BALANCING REPORT WHICH INCLUDES VOLUME, ROOM REFERENCE AND ZONE VOLUME TOTALS.

(12) MOUNT ALL THERMOSTATS (SENSORS) 48" ABOVE THE FINISHED FLOOR LEVEL UNLESS NOTED OTHERWISE THERMOSTATS SHOWN SHALL BE IN CONTROL OF THE ZONE SYSTEM WHICH IS SUPPLYING AIR TO THE AREA WHERE THE THERMOSTAT IS LOCATED. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF EACH THERMOSTAT WITH THE ROOM FINISHES AND USES. CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONTROL VOLTAGE WIRING AND CONDUIT FOR THERMOSTAT (DDC CONTROL) INSTALLATION.

(13) CONTRACTOR SHALL COORDINATE THE FINAL LOCATIONS OF ALL CEILING DIFFUSERS WITH LIGHTING INSTALLATIONS AND ARCHITECTURAL REFLECTED CEILING PLANS. MOVE THE DIFFUSER LOCATIONS IF REQUIRED TO AVOID OBSTRUCTIONS FROM DUCTWORK AND LIGHT FIXTURES. COORDINATE RELOCATION WITH ENGINEER.

(14) CONTRACTOR SHALL INSTALL NEW REFRIGERANT PIPING FLUSH WITH THE BUILDING STRUCTURE AND MECHANICAL ROOM BOUNDARIES AS SHOWN. CONTRACTOR SHALL COORDINATE ALL INSTALLATION WORK WITH DUCTS AND ELECTRICAL CONDUIT. MECHANICAL CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK SCOPE OF OTHER TRADES AND PARTICIPATE IN COORDINATING ALL CONSTRUCTION EFFORTS.

(15) ALL PIPING SHALL BE INSULATED AND JACKETED. REFER TO THE SPECIFICATIONS. CONDENSER COILS ARE TO BE COATED IN ACCORDANCE WITH THE SPECIFICATIONS.

(16) VERIFY THE LOCATION OF ALL WALLS, PARTITIONS, DOORS, CABINETS, AND CEILINGS FROM ACTUAL FIELD MEASUREMENTS.

(17) PROVIDE SMOKE DETECTOR AND SHUTDOWN CONTROLS ON AIR HANDLERS AND SUPPLY FANS. SMOKE DETECTORS SHALL BE PROVIDED, INSTALLED AND WIRED FOR SHUT DOWN BY DIVISION 16. PROVIDE BOTH SUPPLY AND RETURN SIDE DEVICES.

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

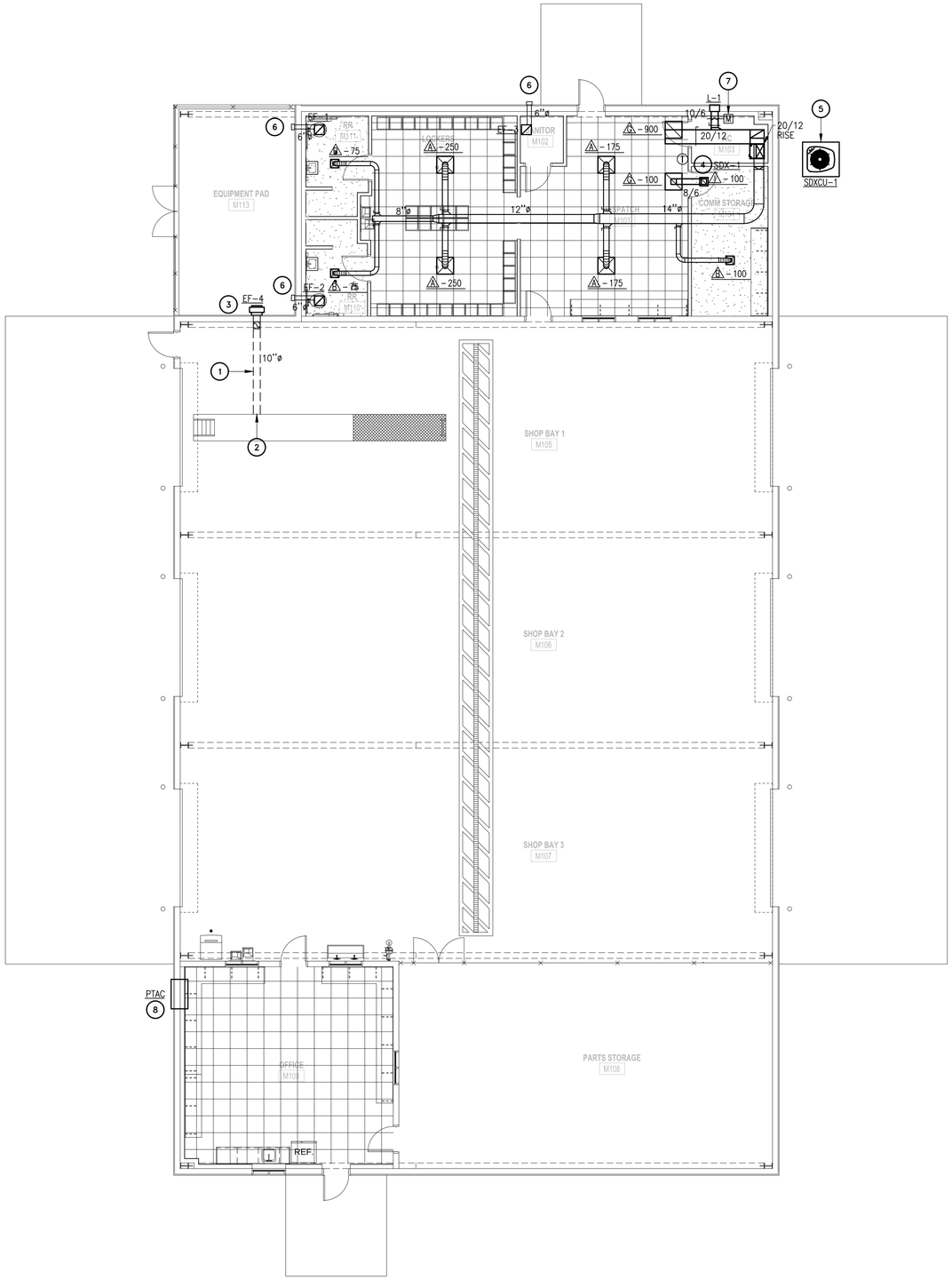
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE: MECHANICAL GENERAL NOTES

MH001

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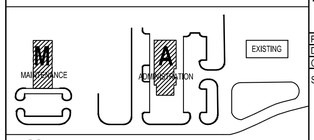
01 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO MH001 FOR GENERAL MECHANICAL NOTES.

KEY NOTES: (#)

1. UNDERGROUND 10"ø SCHEDULE 40 PVC PIPE. TRANSITION TO GALVANIZED STEEL ABOVE GROUND.
2. BOTTOM OF DUCT SHALL BE NO MORE THAN 4" ABOVE PIT FLOOR.
3. WALL MOUNTED FAN SHALL BE MOUNTED AS HIGH AS POSSIBLE ON EXTERIOR WALL.
4. CONTRACTOR SHALL FIELD FABRICATE TUBULAR STEEL SUPPORT FRAME FOR SDX-1.
5. FURNISH AND INSTALL 4" CONCRETE HOUSE KEEPING PAD FOR CONDENSING UNIT. PAD SHALL BE 4" BIGGER THAN CONDENSING UNIT.
6. PROVIDE HOODED WALL CAP, REFER TO EXHAUST FAN SCHEDULE.
7. PROVIDE AND INSTALL MODULATING CONTROL DAMPER IN OUTSIDE AIR DUCT. DAMPER SHALL BE EQUAL TO RUSKIN MODEL "CD60," HIGH-PERFORMANCE, AIRFOIL, OPPOSED BLADE. IN ADDITION, PROVIDE MANUAL BALANCING DAMPERS IN OUTSIDE AND RETURN AIR DUCTS.
8. COORDINATE FINAL LOCATION AND ELEVATION WITH ARCHITECTURAL PLANS.



N
PLAN NORTH

KEY PLAN

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

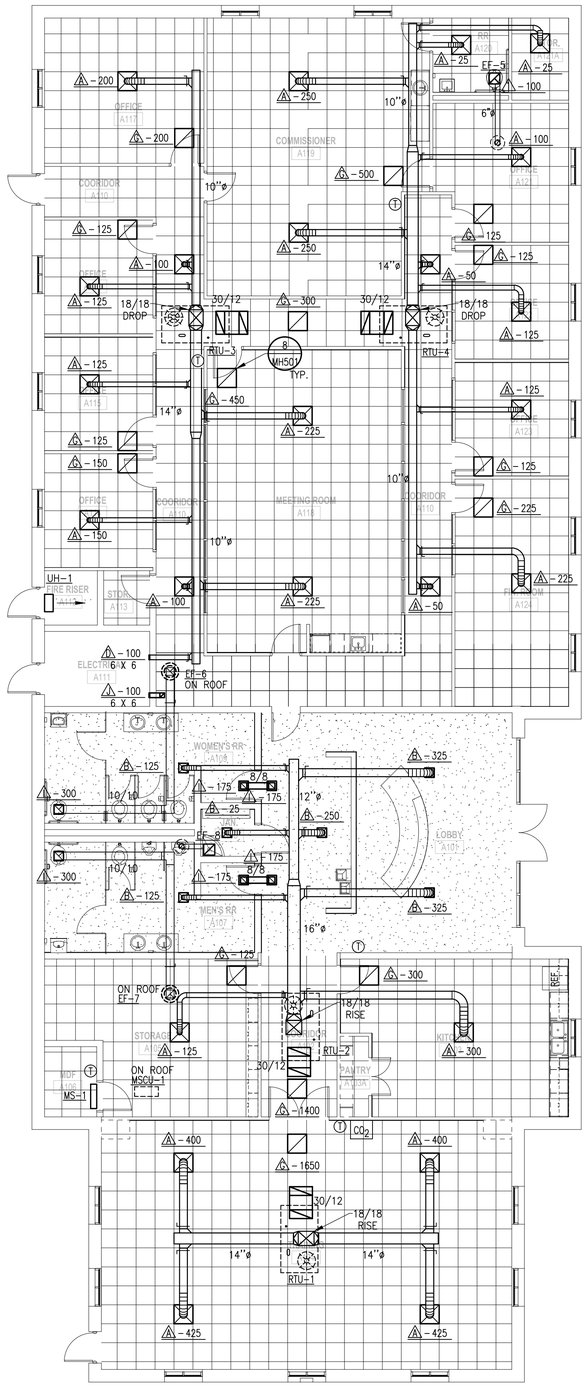
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE: MECHANICAL PLAN - MAINTENANCE BUILDING

MH101

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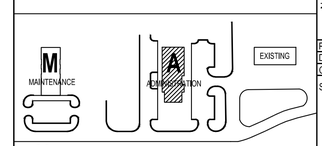


01 MECHANICAL PLAN (ALTERNATE #1)
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO MH001 FOR GENERAL MECHANICAL NOTES.

B. FOR SPACES WITH INACCESSIBLE CEILINGS, PROVIDE AND INSTALL CABLE OPERATED BALANCING DAMPER EQUAL TO ROTO-TWIST MODEL RT-150. EXTEND CABLE TO SUPPLY AIR DEVICE AND TERMINATE.



KEY PLAN

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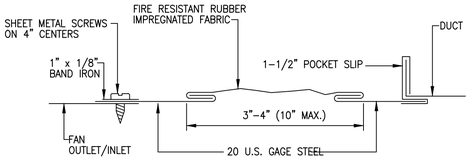
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

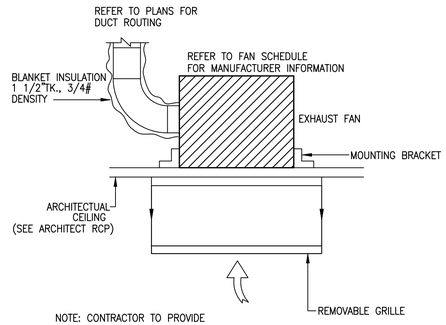
PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:
MECHANICAL PLAN - ADMINISTRATION BUILDING

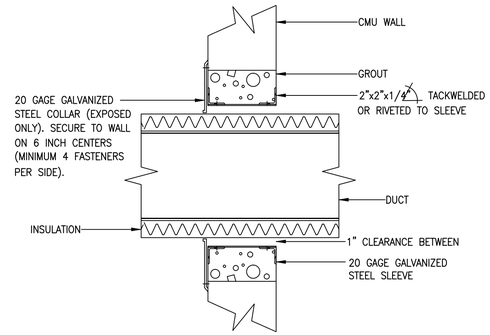
MH102



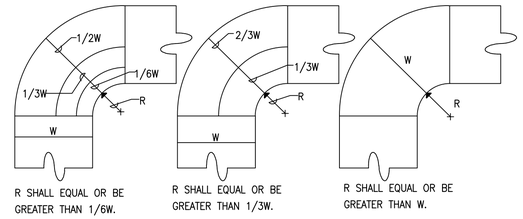
01 FLEXIBLE CONNECTION
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02 CEILING MOUNTED EXHAUST FAN
SCALE: N.T.S.

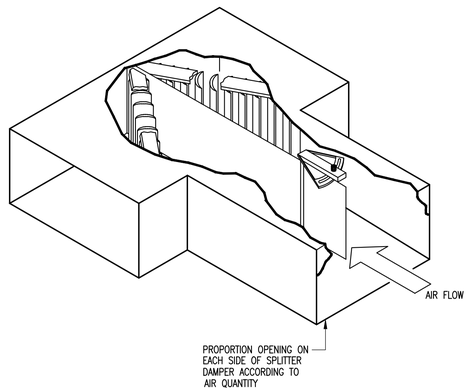


03 DUCT PENETRATION THRU WALL
SCALE: N.T.S.

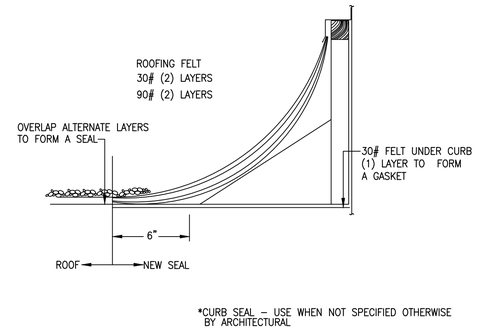


NOTES:
1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND
2. ALL STANDARD RADIUS ELBOWS SHOWN ON PLANS MAY BE MADE SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOM-MENDED BY SMACNA.

04 RADIUS DUCT ELBOW
SCALE: N.T.S.

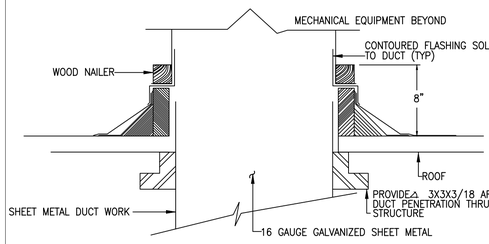


05 TYPICAL SPLITTER DAMPER
SCALE: N.T.S.

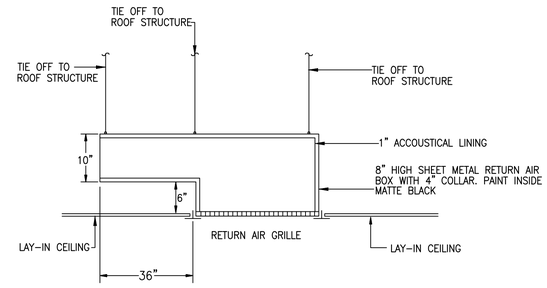


*CURB SEAL – USE WHEN NOT SPECIFIED OTHERWISE BY ARCHITECTURAL

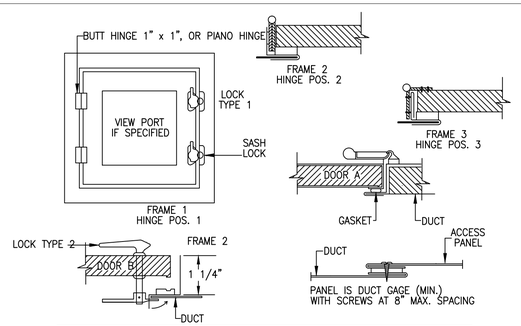
06 CURB SEAL
SCALE: N.T.S.



07 DUCT ROOF PENETRATION
SCALE: N.T.S.

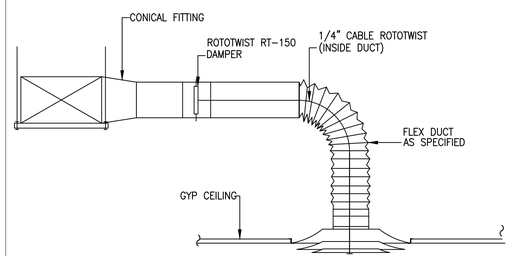


08 RETURN AIR DETAIL
SCALE: N.T.S.

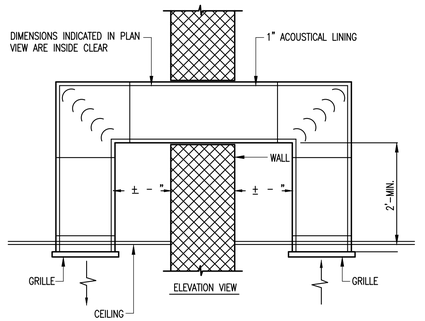


	DOOR SIZE	NO. HINGES	NO. LOCKS	METAL GAGE FRAME	METAL GAGE DOOR	METAL GAGE BACK
2" W.G. STATIC AND LESS	12" x 12" 16" x 20" 24" x 24"	2 2 3	1-S 2-S 2-S	24 22 22	26 24 22	26 26 26
3" W.G. STATIC	12" x 12" 16" x 20" 24" x 24"	2 2 3	1-S 1-S,1-T,1-B 2-S,1-T,1-B	22 20 20	22 20 20	26 26 24
4" W.G. TO 10" W.G.	12" x 12" 16" x 20" 24" x 24"	2 3 3	1-S,1-T,1-B 2-S,1-T,1-B 2-S,2-T,2-B	20 18 18	20 18 18	26 24 24
S = SIDE OPPOSITE HINGES, T = TOP, B = BOTTOM						

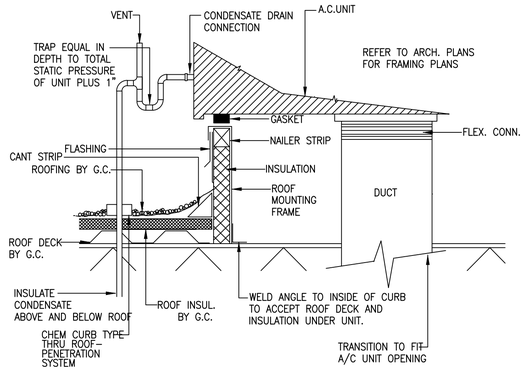
09 DUCT ACCESS DOOR
SCALE: N.T.S.



10 REMOTE CABLE OPERATED DAMPER
SCALE: N.T.S.



11 TRANSFER DUCT DETAIL
SCALE: N.T.S.



12 ROOF TOP UNIT MTG
SCALE: N.T.S.

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

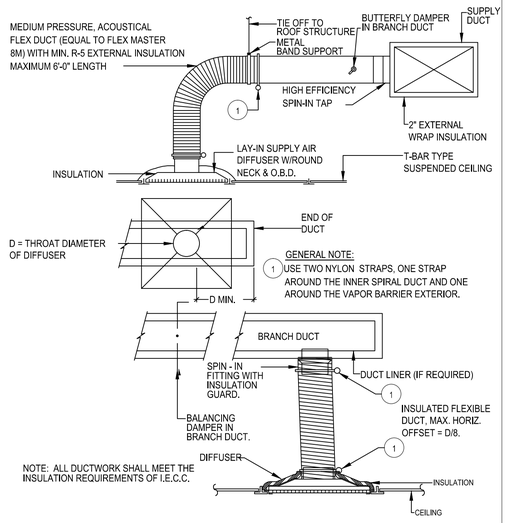
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

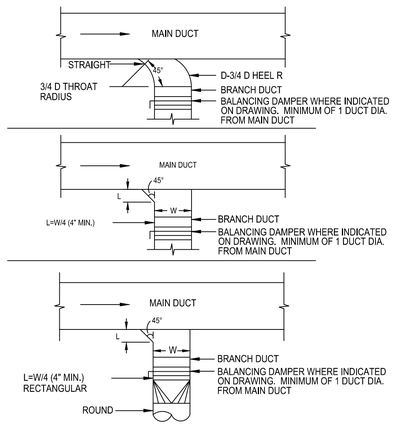
SHEET TITLE: MECHANICAL DETAILS

MH501

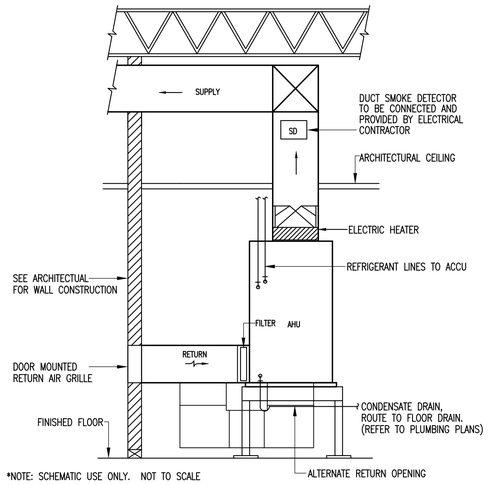
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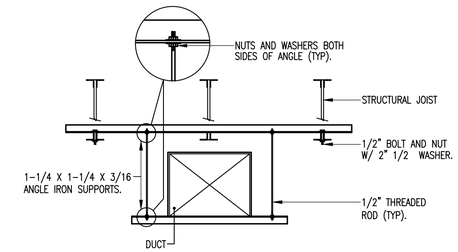
01 SUPPLY AIR DIFFUSER
SCALE: N.T.S.



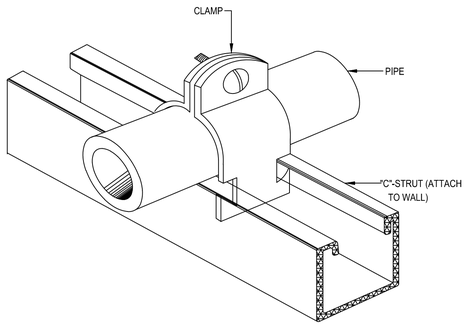
02 TYP BRANCH CONNECTION
SCALE: N.T.S.



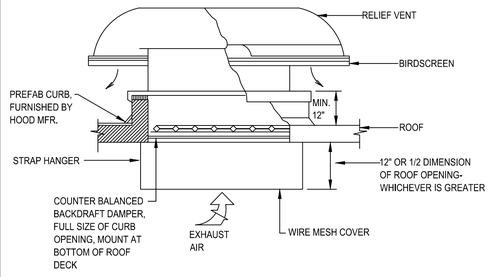
03 FAN/COIL - SECTION VIEW
SCALE: N.T.S.



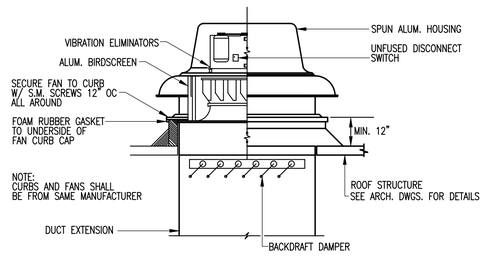
04 DUCT HANGER DETAIL
SCALE: N.T.S.



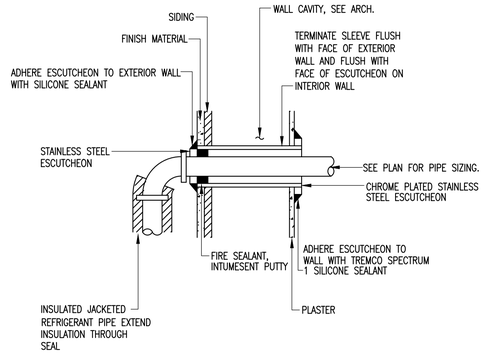
05 WALL SUPPORT
SCALE: N.T.S.



06 TYPICAL HOOD
SCALE: N.T.S.



07 ROOF MOUNTED CENTRIFUGAL EXHAUST FAN - DOWNBLAST
SCALE: N.T.S.



08 TYPICAL EXTERIOR WALL PENETRATION
SCALE: N.T.S.

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

PROJECT NO.:	28493
DRAWN BY:	E.M.
CHECKED BY:	M.J.M.

SHEET TITLE:
MECHANICAL DETAILS

MH502

10/28/2011 10:19:18 AM

SPLIT DX HEAT PUMP SCHEDULE

Air Handling Unit																	Condensing Unit									System Efficiency	
Tag	Manufacturer	Model	L x W x H (in)	Weight (LBS)	Airflow (CFM)	Outside Air (CFM)	E.S.P. (in. WC)	Power (HP)	Sensible Capacity (Btu/hr)	Total Capacity (Btu/hr)	EAT-DB °F	EAT-WB °F	LAT-DB °F	LAT-WB °F	Heat Pump Pump 40 Deg (F) (KW)	Voltage / Phase	Minimum Circuit Amps	MOCP	Tag	Manufacturer	Model	L x W x H (in)	Weight (LBS)	Ambient Air Temp.	Voltage	Minimum Circuit Amps	MOCP	EER	SEER
SDX-1	LENNOX	CBX27UH	59x22x24	194	1100	200	0.6	1	27637	34985	79.2	66.1	55.3	55.3	8.8	208/1	7.6	15	SDXCU-1	LENNOX	XP21-036	37x39x35	303	100F	208/1	22.9	35	12.7	17.7

NOTES:
1. CONTRACTOR TO PROVIDE 4" CONCRETE PAD FOR CONDENSING UNIT.
2. PROVIDE WITH SINGLE POINT POWER FOR INDOOR UNIT AND INDEPENDENT SINGLE POINT POWER FOR OUTDOOR UNIT.
3. FAN COIL UNIT TO INCLUDE MULTI-SPEED ECM MOTOR.
4. PROVIDE THERMIDISTAT WITH 2 STAGE HEAT/COOL FOR HEAT PUMP OPERATION.
5. PROVIDE TUBULAR STEEL SUPPORT FRAME.
6. CONDENSING UNIT IS A TWO SPEED HEAT PUMP.

EXHAUST FAN SCHEDULE

MARK	CFM	SERVICE	LOCATION	TYPE	RPM	EXT SP (IN WG)	HP	DRIVE	VOLTAGE	MAX. SONES	CONTROL	MANUFACTURER	MODEL	NOTES
EF-1	75	RR	CEILING	CABINET	950	0.375	80w	DIRECT	115/1Ø	1.5	LIGHTS	GREENHECK	CSP-B110	1-4
EF-2	75	RR	CEILING	CABINET	950	0.375	80w	DIRECT	115/1Ø	1.5	LIGHTS	GREENHECK	CSP-B110	1-4
EF-3	50	JAN	CEILING	CABINET	950	0.375	80w	DIRECT	115/1Ø	1.5	LIGHTS	GREENHECK	CSP-B110	1-4
EF-4	300	PIT	WALL	CENT. S.B.	1536	0.5	1/20	DIRECT	115/1Ø	7.4	LIGHTS	GREENHECK	CW-085-D	1-5

NOTES:

1. FAN SHALL HAVE INTEGRAL DISCONNECT SWITCH FROM FACTORY.
2. FAN SHALL BE PROVIDED WITH BACK DRAFT DAMPER.
3. FAN SHALL BE PROVIDED WITH FACTORY MOUNTED FAN SPEED CONTROL.
4. PROVIDE HOODED WALL CAP WITH ROUND CONNECTION EQUAL TO GREENHECK MODEL WC-6.
5. FAN SHALL BE CONTROLLED BY AN INDIVIDUAL SWITCH FURNISHED & INSTALLED BY ELECTRICAL CONTRACTOR.

GRILLE/DIFFUSER/REGISTER SCHEDULE

MARK	SERVICE	DESCRIPTION	MANUFACTURER MODEL NO.	MAX. NC. LEVEL (1)	REMARKS
A	SUPPLY	24"X24" MODULE SIZE, ALUMINUM, LOUVERED, LAY IN DIFFUSER WITH 4 WAY THROW, ROUND NECK, FACE SIZE AS INDICATED BELOW.	PRICE AMD	30	WHITE FINISH
B	SUPPLY	12"X12" MODULE SIZE, ALUMINUM, LOUVERED, SURFACE-MOUNTED DIFFUSER WITH 4-WAY THROW, ROUND NECK, FACE SIZE AS INDICATED BELOW.	PRICE AMD	30	WHITE FINISH
G	RETURN	24"X24" EGGCRATE FACE, CEILING RETURN GRILL WITH BORDER FOR LAY-IN CEILING, ALUMINUM CONSTRUCTION.	PRICE 80	30	WHITE FINISH
I	RETURN	12"X12" EGGCRATE FACE, CEILING RETURN GRILLE, SURFACE MOUNTED, ALUMINUM CONSTRUCTION.	PRICE 80	30	WHITE FINISH

F =THIS WILL DESIFNATE A STEEL FIRE RATED AIR DEVICE TYPE.

CBA = COLOR BY ARCHITECT

* = SEE ARCHITECTURAL DRAWINGS PROPER BORDER TYPES

AIR OUTLET DESIGNATION ON PLANS

MARK → A - 200 ← AIR FLOW (CFM
12 X 8 ← RECTANGULAR FACE SIZE (WHERE APPLICABLE

CAPACITY	FACE	NECK/FLEXIBLE CONNECTION
0-150	6 X 6	6"
151-285	9 X 9	8"
286-440	12 X 12	10"
441-550	12 X 12	12"
551-750	15 X 15	14"
750-1000	18 X 18	16"

NOTE: COORDINATE ALL AIR DEVICE TYPE WITH ARCHITECTURAL RCP.

PACKAGE TERMINAL AIR CONDITION (PTAC) SCHEDULE

MARK	COOLING CAPACITY (BTU/H)	EER	WEIGHT (LBS)	AIR CIRCULATION H \ L (CFM)	DEHUMID. (PTS/HR)	POWER SUPPLY (V/Hz/Ph)	ELECTRIC HEATER (KW)	MOP (A)	MCA (A)	COOLING RATED AMP (A)	COOLING POWER INPUT (W)	MANUF.	MODEL	NOTES
PTAC	14800	9.7	150	270	4.6	208/60/1	2.3	20	19.3	6.5	10.8	CARRIER	52PQ-215---3--AA	ALL

NOTES:
1. CONDENSATE DRAIN KIT.
2. WALL SLEEVE AND WALL SLEEVE MOLDING KIT.
3. ALUMINUM ARCHITECTURAL OUTDOOR GRILLE (LOUVERED).
4. POWER CORD.
5. ELECTRICAL SUBBASE ASEMBLY.
6. INSTALL PER MANUFACTURER RECOMMENDATIONS.

LOUVER SCHEDULE

MARK	SERVES	CFM	WIDTH (IN)	HEIGHT (IN)	MINIMUM FREE AREA (FT2)	MAX. PRESSURE DROP AT 750 FPM INTAKE (" w.g.)	MANUF. MODEL	NOTES
L-1	SDX-1	200	14	12	0.31	0.07	RUSKIN EME520DD	ALL

NOTES:
1. FINISH SHALL BE KYNAR FINISH. PAINT COLOR BY ARCHITECT. COORDINATE FINAL ELEVATION LOCATION WITH ARCHITECT.
2. LOUVER SHALL PROVIDE MINIMUM 99% EFFECTIVENESS IN PREVENTING WATER PENETRATIONIN WIND DRIVEN RAIN TEST (29 mph, 3 in/hr).

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No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE: MECHANICAL SCHEDULES

BASE

MH601

10/28/2011 10:19:18 AM

PACKAGED DX ROOFTOP UNIT SCHEDULE

BASIS OF DESIGN							SUPPLY FAN								DX COIL										MIXING BOX				HOT GAS REHEAT	ELECTRIC HEAT		POWER		
							FAN							MOTOR																				
MARK	MANUF.	MODEL	LXWXH (IN)	WEIGHT (LB)	AMBIENT TEMP. (°F)	EER	TYPE	CLASS	AIRFLOW (CFM)	RPM	BHP	E.S.P. (IN H20)	T.S.P. (IN H20)	POWER (HP)	RPM	TOTAL CAPACITY (BTU/HR)	SENSIBLE CAPACITY (BTU/HR)	EAT-DB °F	EAT-WB °F	LAT-DB °F	LAT-WB °F	ROWS (MIN)	FPI (MAX)	REFRIGERANT	MIN COOLING STAGES	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	FILTER TYPE	DEPTH (IN)	EFF, (%)	MOISTURE REMOVED (lbs/hr)	KW	STAGES	VOLTAGE	MCA	MOCP
RTU-1	LENNOX	LCH060S4T	85x47x47	950	100	15.5	Forward	Belt	1650	1197	0.72	1.0	1.23	1	1250	57991	42568	78.4	65.5	54	53.4	4	12	R-410A	2	250	1400	PLEATED MERV 8	2	30	14.5	15	1	460/3/60	26	30
RTU-2	LENNOX	LCH060S4T	85x47x47	950	100	15.5	Forward	Belt	1600	1185	0.69	1.0	1.22	1	1250	57656	41736	78.3	65.5	53.6	53	4	12	R-410A	2	240	1360	PLEATED MERV 8	2	30	15	15	1	460/3/60	26	30
RTU-3	LENNOX	LCH048S4T	85x47x39	840	100	15	Forward	Belt	1350	1209	0.61	1.0	1.23	2	1429	46332	34515	78.5	65.6	54.3	53.8	4	12	R-410A	2	210	1140	PLEATED MERV 8	2	30	11.1	15	1	460/3/60	27	30
RTU-4	LENNOX	LCH048S4T	85x47x39	840	100	15	Forward	Belt	1250	1191	0.56	1.0	1.21	2	1429	45989	33969	78.9	65.7	53.7	53.3	4	12	R-410A	2	200	1050	PLEATED MERV 8	2	30	11.3	15	1	460/3/60	27	30

NOTES:

1. SINGLE POINT POWER.
2. INTEGRAL, NON-FUSED, DISCONNECT.
3. GFCI OUTLET, FACTORY MOUNTED, FIELD WIRED.
4. PROVIDE HOT GAS REHEAT COIL.
5. CONDESER COIL CORROSION PROTECTION: E-COATING PER ASTM-B117, 6000 HOUR SALT SPRAY RATING AND UV RESISTANT.
6. DIFFERENTIAL ENTHALPY ECONOMIZER WITH BAROMETRIC RELIEF DAMPER.
7. 14" ROOF CURB.
8. HAIL GUARDS.
9. SPACE MOUNTED HUMIDISTAT & THERMOSTAT TO BE PROVIDED BY UNIT MANUFACTURER.
10. PROVIDE MICROPROCESSOR CONTROLLER WITH SCROLLING DIGITAL TEXT DISPLAY FOR UNIT DIAGNOSTICS.
11. PROVIDE DUAL STAGE COMPRESSOR AND DUAL STAGE ECM EVAP/COND FAN MOTORS FOR FIRST STAGE DEHUMIDIFICATION.
12. PROVIDE RTU-1 WITH CO2 SENSOR FOR DEMAND CONTROLLED VENTILLATION.

EXHAUST FAN SCHEDULE

MARK	CFM	SERVICE	LOCATION	TYPE	RPM	EXT SP (IN WG)	HP	DRIVE	VOLTAGE	MAX. SONES	CONTROL	MANUFACTURER	MODEL	NOTES
EF-5	100	RR	CEILING	CABINET	1050	0.375	129 WATTS	DIRECT	115/1Ø	1.5	LIGHTS	GREENHECK	SP-B150	1-5
EF-6	300	RR	ROOF	CENT. D.B.	1550	0.5	1/20	DIRECT	115/1Ø	7.5	LIGHTS	GREENHECK	G-085-D	1-4,6
EF-7	300	RR	ROOF	CENT. D.B.	1550	0.5	1/20	DIRECT	115/1Ø	7.5	LIGHTS	GREENHECK	G-085-D	1-4,6
EF-8	75	JAN	CEILING	CABINET	950	0.375	80w	DIRECT	115/1Ø	1.5	LIGHTS	GREENHECK	CSP-B110	1-5

NOTES:

1. FAN SHALL HAVE INTEGRAL DISCONNECT SWITCH FROM FACTORY.
2. FAN SHALL BE PROVIDED WITH BACK DRAFT DAMPER.
3. FAN SHALL BE PROVIDED WITH FACTORY MOUNTED FAN SPEED CONTROL.
4. PROVIDE HOODED WALL CAP WITH ROUND CONNECTION EQUAL TO GREENHECK MODEL WC-6.
5. FAN SHALL BE PROVIDED WITH 14"GALVANIZED ROOF CURB AND ROOF CAP EQUAL TO COOK PR8.
6. FAN SHALL BE PROVIDED WITH 14" GALVANIZED CURB WITH DAMPER TRAY.

UNIT HEATER SCHEDULE

MARK	MANUFACTURER	MODEL	SERVES	ELECTRIC HEAT		ELECTRICAL			PERFORMANCE			REC MOUNTING HEIGHT	APPROX. WEIGHT (LBS.)	NOTES
				KW	STAGES	VOLTS/Ø/HZ	AMPS	CONTROL VOLTAGE	TEMP. RISE (°F)	AIR THROW	CFM			
UH-1	REDD-1	F2F5103N	RISER	3.3	1	208/3/60	7	208	26	12'	400	9'	25	ALL

NOTES:

1. INTEGRAL DISCONNECT SWITCH.
2. UNIT-MOUNTED THERMOSTAT.
3. OVERHEAT PROTECTION, AUTOMATIC RESET TYPE.
4. HORIZONTAL DISCHARGE CONFIGURATION.
5. WALL/CEILING BRACKET

HIGH EFF. WALL MOUNT SPLIT SYSTEM SCHEDULE

INDOOR UNIT MARK	MS-1
INDOOR UNIT TYPE	WALL
MAX SUPPLY CFM	250
MINIMUM O/A (CFM)	N/A
ENTERING AIR (DB/WB)	80/67
TOTAL COOLING CAP. (BTUH)	8500
SENSIBLE COOLING CAP. (BTUH)	5440
HEATING CAPACITY (BTUH)	10000
VOLTAGE/PHASE	208/1
MCA	N/A
MAX. FUSE SIZE	N/A
FLA	0.18
MANUFACTURER	DAIKIN
MODEL NO.	FTXS09HVJU
WEIGHT (LBS)	16.6
CONDENSING UNIT MARK	MSCU-1
VOLTAGE/PHASE	208/1
MCA	6.1
MAX. FUSE SIZE (AMPS)	15
POWER FACTOR (%)	80.4
AMB. AIR TEMP. (CLG°F/HTG°F)	95/47
REFRIGERANT	R-410A
COOLING MODE OPER. RANGE	14°F - 115°F
HEATING MODE OPER. RANGE	5°F - 64°F
MANUFACTURER	DAIKIN
MODEL NO.	RXS09DAVJU
WEIGHT (LBS)	74
SEER	16
HTG EFF. (HSPF)	8.8
MAX EQUIV. LINE LENGTH (FT)	65
MAX. VERTICAL RISE (FT)	49
NOTES	ALL

NOTES:

1. ELECTRICAL CONTRACTOR TO PROVIDE SINGLE CIRCUIT POWER FROM SERVICE TO OUTDOOR UNIT AND WIRE TO INDOOR UNIT.
2. PROVIDE INDOOR UNITS WITH MOUNTING BRACKETS
3. PROVIDE HYDROPHILIC CONDENSER COIL CORROSION PROTECTION.
4. PROVIDE BUILT-IN CANT EQUIPMENT SUPPORTS EQUAL TO RPS ER-4 FOR CONDENSING UNIT ON ROOF.
5. BOTH LIQUID AND SUCTION LINES MUST BE INSULATED.
6. SIGHT GLASSES, FILTER DRYERS, AND FIELD SUPPLIED EXPANSION VALVES ARE NOT TO BE USED.
7. PROVIDE INVERTER DRIVEN COMPRESSOR FOR IMPROVED HUMIDITY CONTROL.
8. INSTALL PER MANUFACTURERS INSTRUCTIONS AND PIPING RECOMMENDATIONS.
9. PROVIDE WALL MOUNTED AND WIRED 7-DAY T-STAT IN LIEU OF WIRELESS REMOTE.
10. PROVIDE CONDENSATE PUMP FACTORY MOUNTED OR FIELD WIRED TO INDOOR UNIT (SINGLE POINT POWER).

GRILLE/DIFFUSER/REGISTER SCHEDULE

MARK	SERVICE	DESCRIPTION	MANUFACTURER MODEL NO.	MAX. NC. LEVEL (1)	REMARKS
A	SUPPLY	24"X24" MODULE SIZE, ALUMINUM, LOUVERED, LAY IN DIFFUSER WITH 4 WAY THROW, ROUND NECK, FACE SIZE AS INDICATED BELOW.	PRICE AMD	30	WHITE FINISH
B	SUPPLY	12"X12" MODULE SIZE, ALUMINUM, LOUVERED, SURFACE-MOUNTED DIFFUSER WITH 4-WAY THROW, ROUND NECK, FACE SIZE AS INDICATED BELOW.	PRICE AMD	30	WHITE FINISH
D	SUPPLY	SURFACE MOUNTED SUPPLY DIFFUSER WITH 3/4" SPACING, ALUMINUM CONSTRUCTION, DOUBLE DEFLECTION WITH OPPOSED BLADE DAMPER.	PRICE 620	30	WHITE FINISH
G	RETURN	24"X24" EGGCRATE FACE, CEILING RETURN GRILL WITH BORDER FOR LAY-IN CEILING, ALUMINUM CONSTRUCTION.	PRICE 80	30	WHITE FINISH
I	RETURN	12"X12" EGGCRATE FACE, CEILING RETURN GRILLE, SURFACE MOUNTED, ALUMINUM CONSTRUCTION.	PRICE 80	30	WHITE FINISH
J	RETURN	SURFACE MOUNTED RETURN GRILLE WITH 3/4" SPACING. ALUMINUM CONSTRUCTION, 35° DEFLECTION.	PRICE 630	30	WHITE FINISH

F =THIS WILL DESIFNATE A STEEL FIRE RATED AIR DEVICE TYPE.

CBA = COLOR BY ARCHITECT

* = SEE ARCHITECTURAL DRAWINGS PROPER BORDER TYPES

AIR OUTLET DESIGNATION ON PLANS

MARK → A - 200 ← AIR FLOW (CFM

12 X 8 ← RECTANGULAR FACE SIZE (WHERE APPLICABLE)

CAPACITY	FACE	NECK/FLEXIBLE CONNECTION
0-150	6 X 6	6"
151-285	9 X 9	8"
286-440	12 X 12	10"
441-550	12 X 12	12"
551-750	15 X 15	14"
750-1000	18 X 18	16"

NOTE: COORDINATE ALL AIR DEVICE TYPE WITH ARCHITECTURAL RCP.

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:

MECHANICAL SCHEDULES

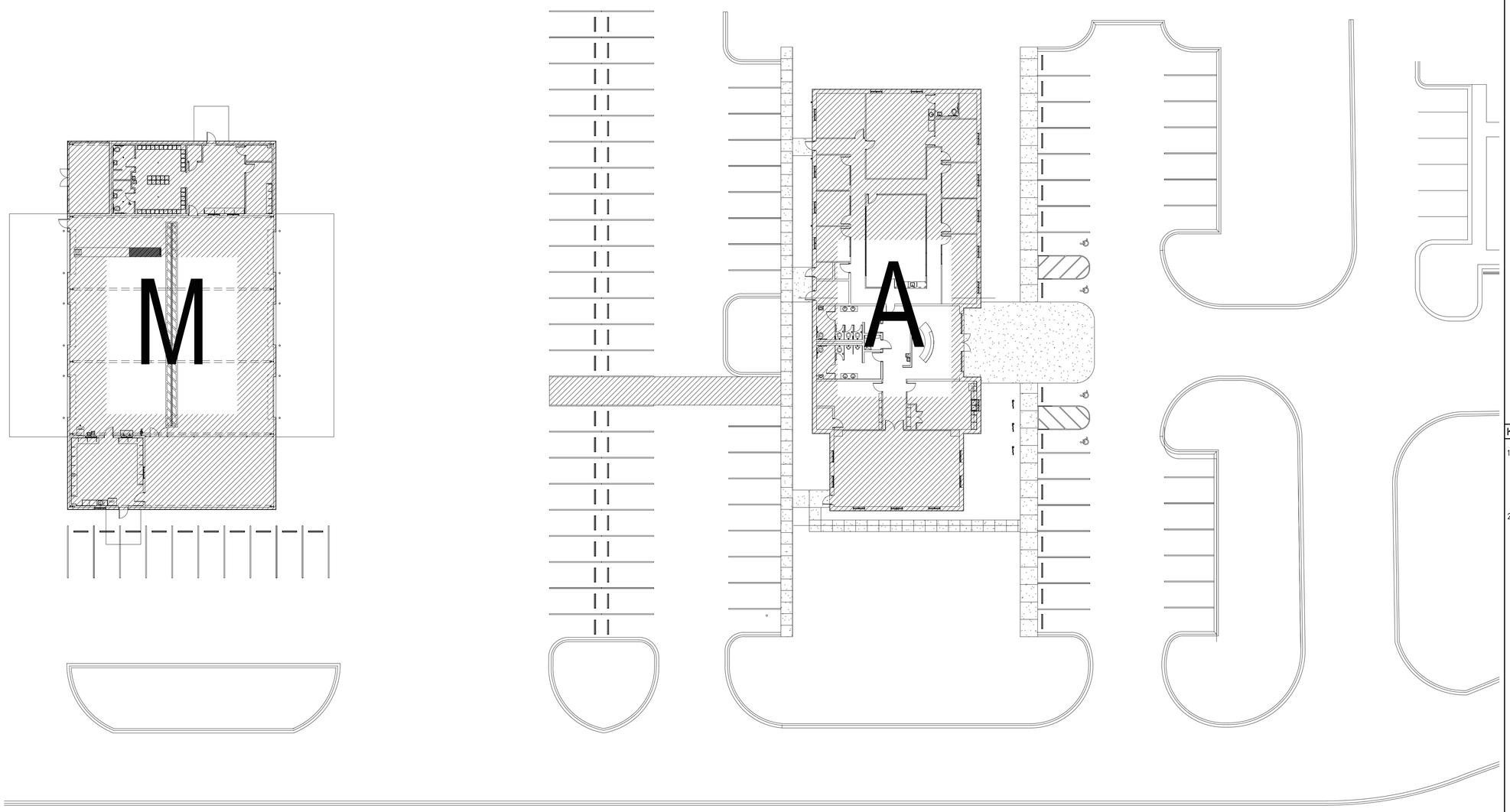
ALTERNATE #1

MH602

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WHERE BEAM PENETRATIONS ARE REQUIRED FOR PROPER SLOPE AND CONNECTION OF SEWER LINE, PIPES SHALL BE SLEEVED. COORDINATE ANY BEAM PENETRATION WITH STRUCTURAL ENGINEER.

PLUMBING CONTRACTOR SHALL COORDINATE DOMESTIC WATER AND SANITARY SEWER LINE DIRECTION OF FLOW, SIZE, INVERT, AND POINT OF CONNECTION WITH CIVIL PLANS PRIOR TO INSTALLATION OF ROUGH-IN TO AVOID CONFLICT. ANY DISCREPANCIES FOUND BY THE PLUMBING CONTRACTOR SHALL BE REPORTED TO THE ENGINEER/ARCHITECT IMMEDIATELY AND PRIOR TO ANY INSTALLATION. FAILURE TO COMPLY SHALL MAKE ALL CORRECTIONS AND/OR MODIFICATIONS THE FULL RESPONSIBILITY OF THE CONTRACTOR.



N
PLAN NORTH

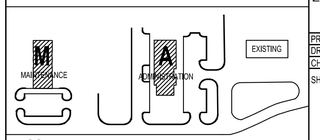
01 PLUMBING SITE PLAN
SCALE: 1" = 30'-0"

GENERAL NOTES:

A. REFER TO SHEET PL101 FOR GENERAL NOTES.

KEY NOTES: (#)

1. PROPOSED FIRE SPRINKLER SUPPLY LINE, REFER TO CIVIL UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE AND BACK FLOW PREVENTION OF LINE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS.
2. PROPOSED FIRE SPRINKLER FIRE DEPARTMENT CONNECTION LINE. REFER TO UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS. ALL FIRE PROTECTION PIPE SYSTEMS (INCLUDING ALL UNDERGROUND SERVICE PIPING) SHALL BE INSTALLED BY A LICENSED FIRE PROTECTION CONTRACTOR.



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PROJECT OWNER: HIDALGO COUNTY

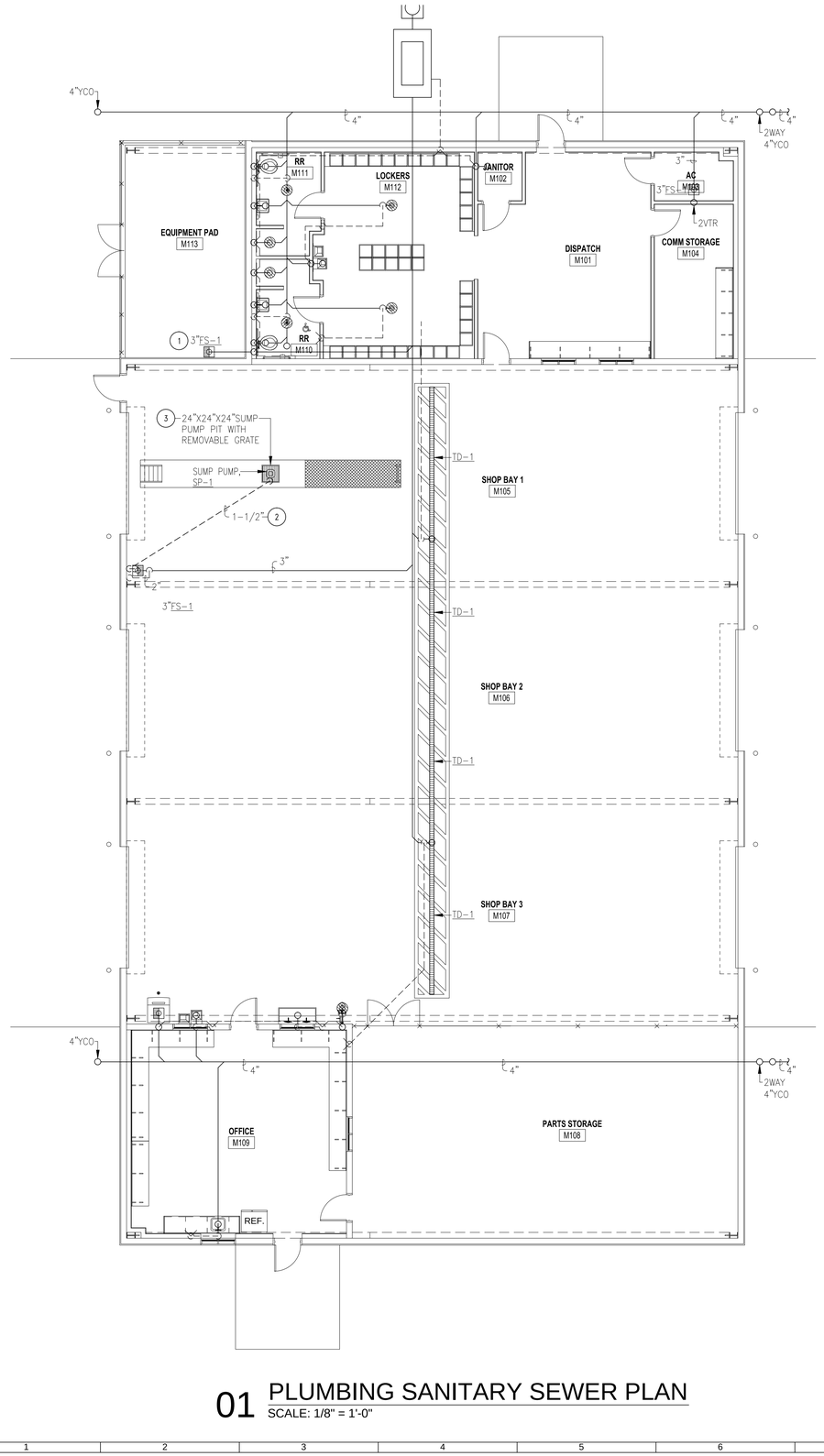
No.	Date	Description

PROJECT NO.:	28493
DRAWN BY:	E.M.
CHECKED BY:	M.J.M.

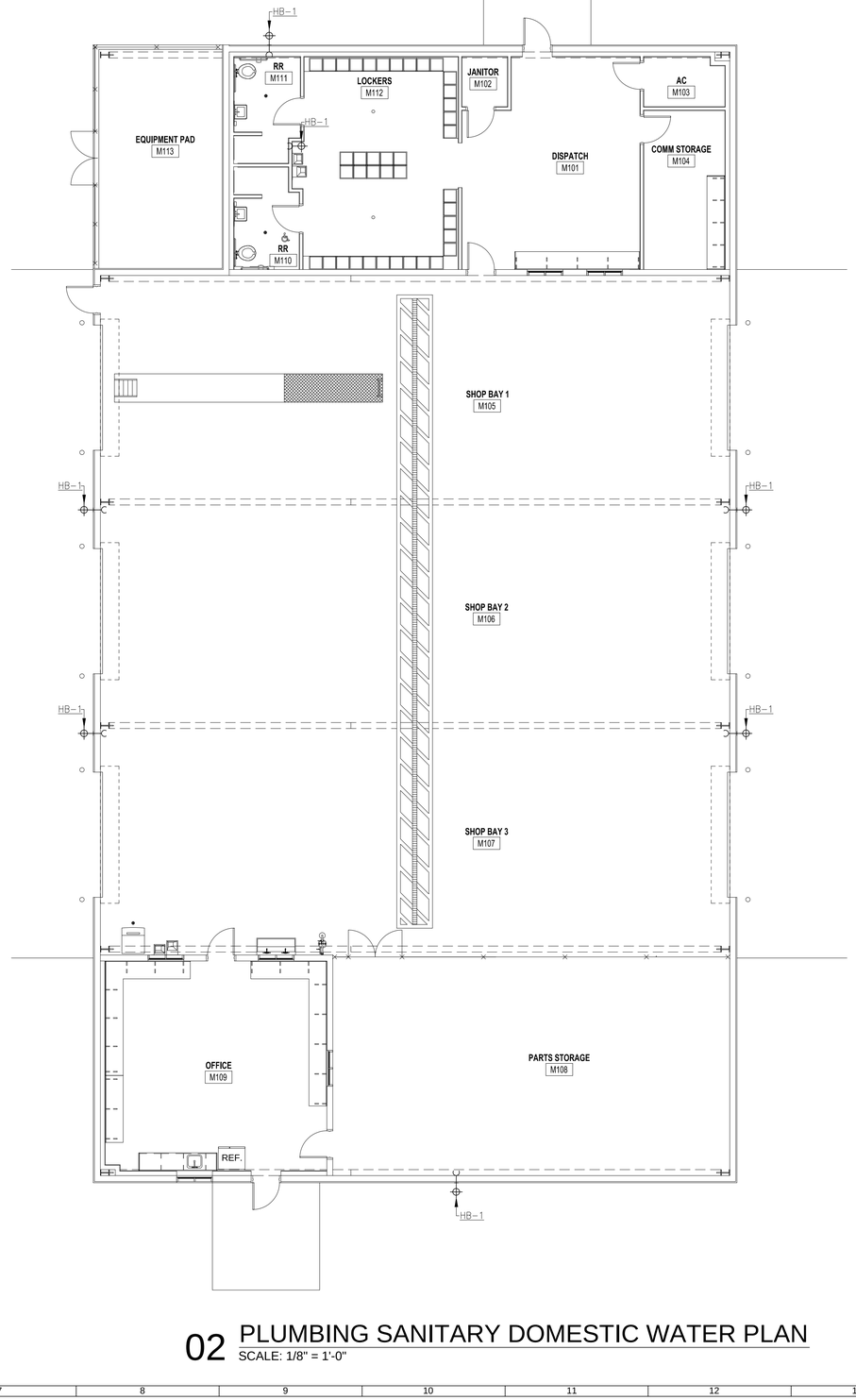
SHEET TITLE: PLUMBING SITE PLAN

PS100

10/28/2011 10:19:18 AM



01 PLUMBING SANITARY SEWER PLAN
SCALE: 1/8" = 1'-0"



02 PLUMBING SANITARY DOMESTIC WATER PLAN
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATION OF ALL FLOOR DRAINS WITH MECHANICAL EQUIPMENT LOCATION AND CONDENSATE DRAIN REQUIREMENTS PRIOR TO ANY INSTALLATION.

B. ALL FLOOR DRAINS SHALL BE PROVIDED WITH TRAP PRIMER CONNECTION.

C. PLUMBING CONTRACTOR SHALL ADHERE TO ALL CITY CODES AND OTHER STATE CODES AND LOCAL CODES THAT HAVE AUTHORITY OVER THIS PROJECT.

D. PLUMBING CONTRACTOR SHALL EXTEND ALL CONDENSATE AND INDIRECT DRAINS FROM EQUIPMENT TO FLOOR DRAINS

E. PLUMBING CONTRACTOR SHALL TERMINATE ALL WATER ROUGH-IN WITH SHUT-OFF VALVES BEFORE CONNECTING TO EQUIPMENT AND RELATED FIXTURES.

F. PLUMBING CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR FOR ANY INSTALLATION OF PIPING AND DUCTWORK PRIOR TO BEGINNING OF CONSTRUCTION

G. INSULATE "P" TRAPS AND SUPPLIES AT HANDICAP LAVATORIES WITH INSULATION KIT.

H. PROVIDE VACUUM BREAKER TO ALL FIXTURES WITH HOSE CONNECTION AND APPLIANCES WITH DIRECT CONNECTIONS TO DOMESTIC WATER.

I. REFER TO ARCHITECTS DRAWINGS FOR MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES

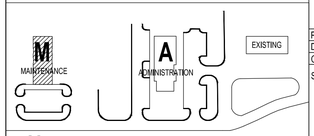
J. PROVIDE STOPS AND WATER HAMMER ARRESTORS AT EACH FIXTURE OR GROUP OF FIXTURES

K. ALL VENTS THROUGH ROOF SHALL BE FLASHED A MINIMUM OF 12" ABOVE ROOF. ALL VENTS SHALL BE MINIMUM OF 10' AWAY FROM ANY OUTSIDE AIR INTAKE.

L. PROVIDE CEILING ACCESS PANEL FOR WATER ISOLATION VALVES, WATER HAMMER ARRESTORS AND TRAP PRIMER VALVES IN OTHERWISE INACCESSIBLE AREAS.

KEY NOTES: (#)

1. PLUMBING CONTRACTOR SHALL COORDINATE FLOOR SINK LOCATION WITH LUBE AND AIR COMPRESSOR CONTRACTOR FOR FINAL LOCATION OF AIR COMPRESSORS PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICTS.
2. ROUTE SUMP PUMP DRAIN LINE BELOW SLAB AND RISE NEAR WALL NEXT TO FLOOR SINK SHOWN. DRAIN LINE INDIRECTLY INTO FLOOR SINK. PROVIDE 1" AIR GAP MINIMUM.
3. PLUMBING CONTRACTOR SHALL COORDINATE SUMP PUMP PIT REQUIREMENTS WITH STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT. REMOVABLE GRATE SHALL BE PROVIDED BY GENERAL CONTRACTOR.
4. RISE 1/2" TRAP PRIMER LINE UP IN WALL AND CONNECT TO TRAP PRIMER VALVE ABOVE CEILING. REFER TO PLUMBING DOMESTIC WATER PLAN FOR TRAP PRIMER VALVE LOCATION ABOVE CEILING.
5. INSULATED COPPER CONDENSATE DRAIN LINE IN ATTIC SPACE. PROVIDE PIPE HANGER SUPPORTS MAXIMUM 5'-0" O.C. SPACING. ROUTE AND DROP CONDENSATE LINE EXPOSED ALONG THE WALL INTO NEAREST FLOOR SINK.
6. ROUTE FULL SIZE CONDENSATE DRAIN LINE TO NEAREST FLOOR SINK.



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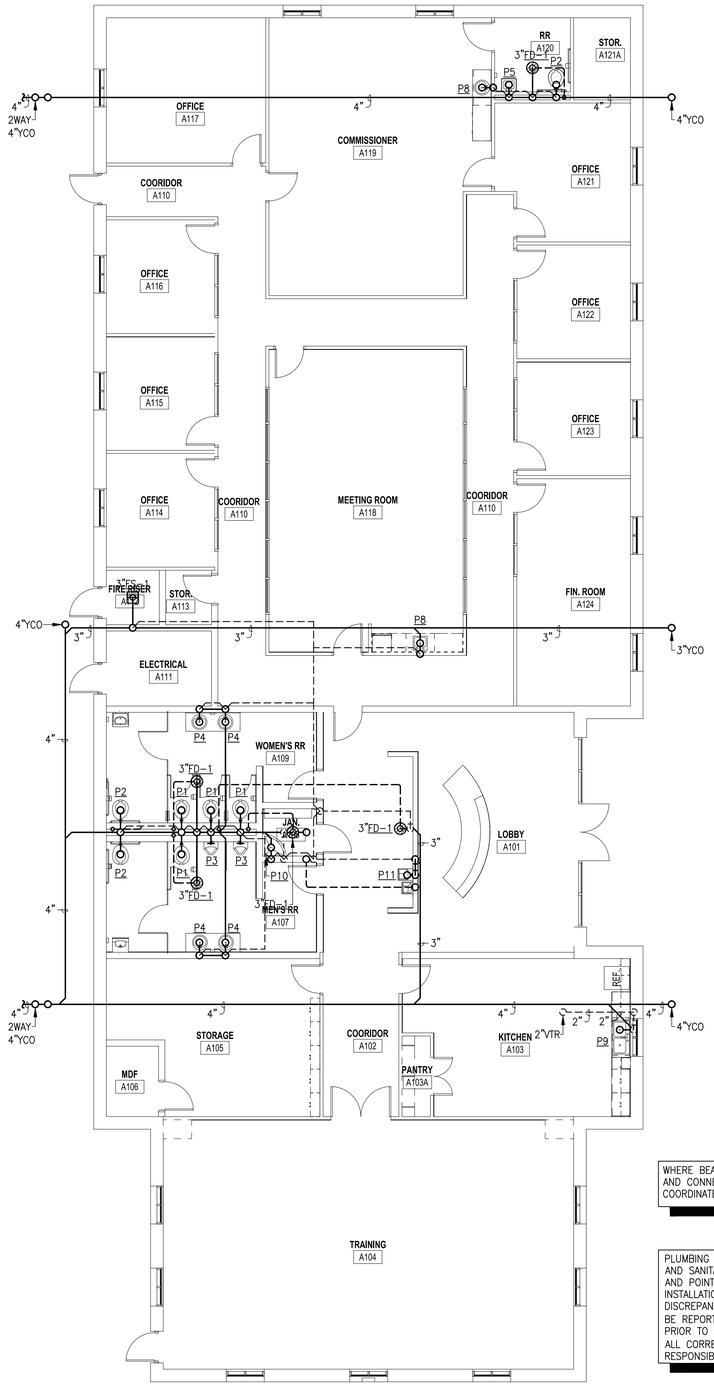
PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.
SHEET TITLE:
PLUMBING SANITARY SEWER PLAN MAINTENANCE BUILDING

PL101

10/28/2011 10:19:18 AM

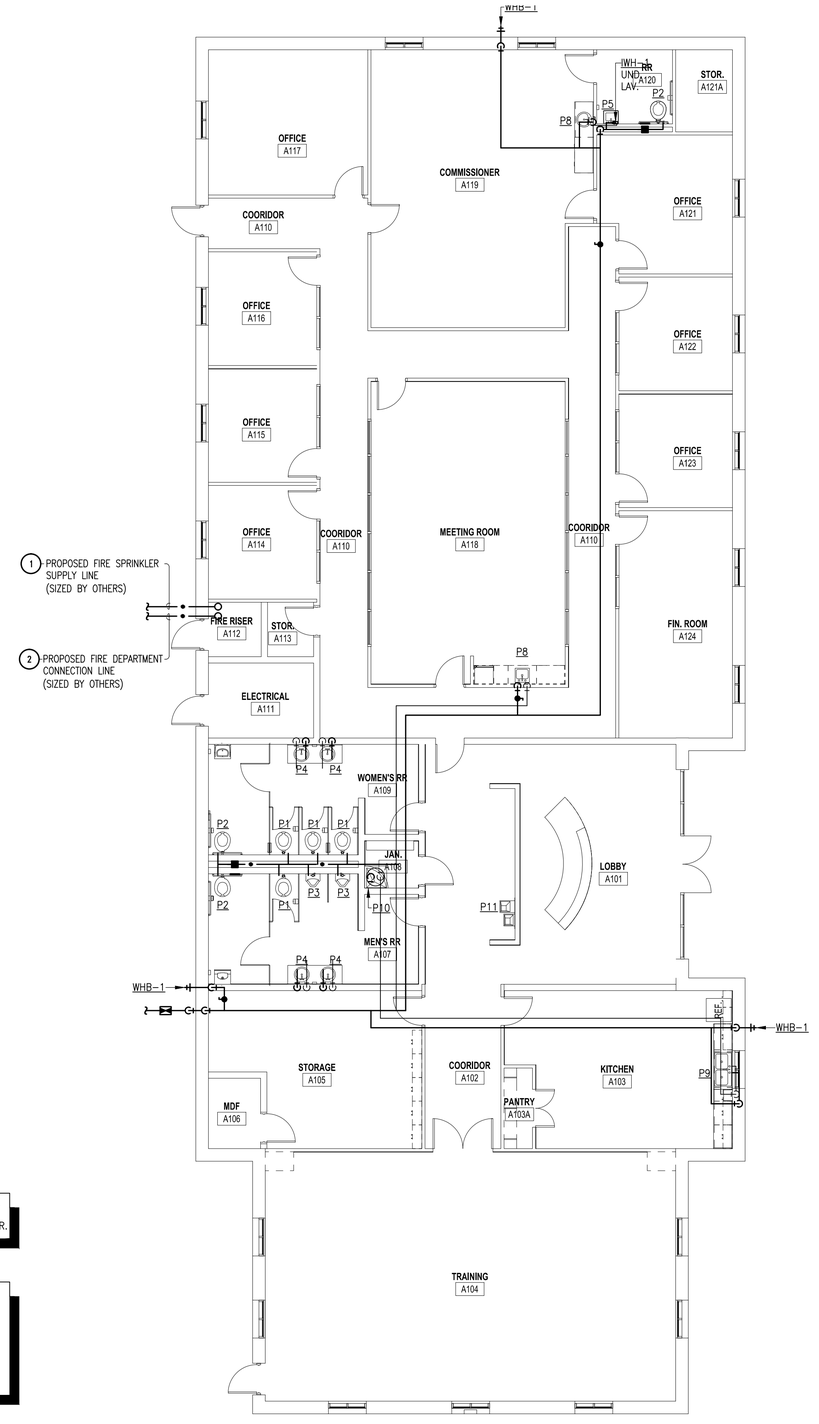


WHERE BEAM PENETRATIONS ARE REQUIRED FOR PROPER SLOPE AND CONNECTION OF SEWER LINE, PIPES SHALL BE SLEEVED. COORDINATE ANY BEAM PENETRATION WITH STRUCTURAL ENGINEER.

PLUMBING CONTRACTOR SHALL COORDINATE DOMESTIC WATER AND SANITARY SEWER LINE DIRECTION OF FLOW, SIZE, INVERT, AND POINT OF CONNECTION WITH CIVIL PLANS PRIOR TO INSTALLATION OF ROUGH-IN TO AVOID CONFLICT. ANY DISCREPANCIES FOUND BY THE PLUMBING CONTRACTOR SHALL BE REPORTED TO THE ENGINEER/ARCHITECT IMMEDIATELY AND PRIOR TO ANY INSTALLATION. FAILURE TO COMPLY SHALL MAKE ALL CORRECTIONS AND/OR MODIFICATIONS THE FULL RESPONSIBILITY OF THE CONTRACTOR.

01 PLUMBING SANITARY SEWER PLAN

SCALE: 1/8" = 1'-0"



1 PROPOSED FIRE SPRINKLER SUPPLY LINE (SIZED BY OTHERS)

2 PROPOSED FIRE DEPARTMENT CONNECTION LINE (SIZED BY OTHERS)

02 PLUMBING DOMESTIC WATER PLAN

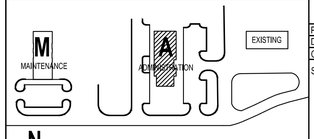
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. REFER TO SHEET PL101 FOR GENERAL NOTES.

KEY NOTES: (#)

1. PROPOSED FIRE SPRINKLER SUPPLY LINE, REFER TO CIVIL UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE AND BACK FLOW PREVENTION OF LINE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS.
2. PROPOSED FIRE SPRINKLER FIRE DEPARTMENT CONNECTION LINE. REFER TO UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS. ALL FIRE PROTECTION PIPE SYSTEMS (INCLUDING ALL UNDERGROUND SERVICE PIPING) SHALL BE INSTALLED BY A LICENSED FIRE PROTECTION CONTRACTOR.
3. ALL FLOOR DRAINS SHALL BE PRIMED FROM NEAREST WATER CLOSET FLUSH VALVE UNLESS INDICATED OTHERWISE.
4. RISE 1/2" TRAP PRIMER LINE UP IN WALL AND CONNECT TO TRAP PRIMER VALVE ABOVE CEILING. REFER TO PLUMBING DOMESTIC WATER PLAN FOR TRAP PRIMER VALVE LOCATION ABOVE CEILING.
5. INSULATED COPPER CONDENSATE DRAIN LINE IN ATTIC SPACE. PROVIDE PIPE HANGER SUPPORTS MAXIMUM 5'-0" O.C. SPACING. ROUTE AND DROP CONDENSATE LINE EXPOSED ALONG THE WALL INTO NEAREST MOP SINK.
6. WATER HAMMER ARRESTOR IN CHASE. PROVIDE 12"X12" HINGED 16 GAUGE STEEL ACCESS PANEL WITH LOCKABLE KEYED DOOR. PRIME COATED WITH RUST INHIBITIVE ELECTROSTATIC POWDER, BAKED GREY ENAMEL AND SHALL BE PAINTED TO MATCH SURROUNDING AREAS. COORDINATE LOCATION TO AVOID CONFLICTS WITH GRAB BARS, FLUSH VALVE AND/OR OTHER EQUIPMENT AND DEVICES.
7. REVERSE OSMOSIS SYSTEM, MOUNTED IN COUNTER SPACE. PLUMBING CONTRACTOR SHALL COORDINATE FINAL CONNECTION OF RO SYSTEM WITH CULLIGAN AND ALL OTHER TRADES PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT. ALL PIPING DOWNSTREAM OF RO SYSTEM SHALL BE CPVC AND INSTALLED BY PLUMBING CONTRACTOR.



KEY PLAN

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Halff Associates tlrm registration number is 312

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

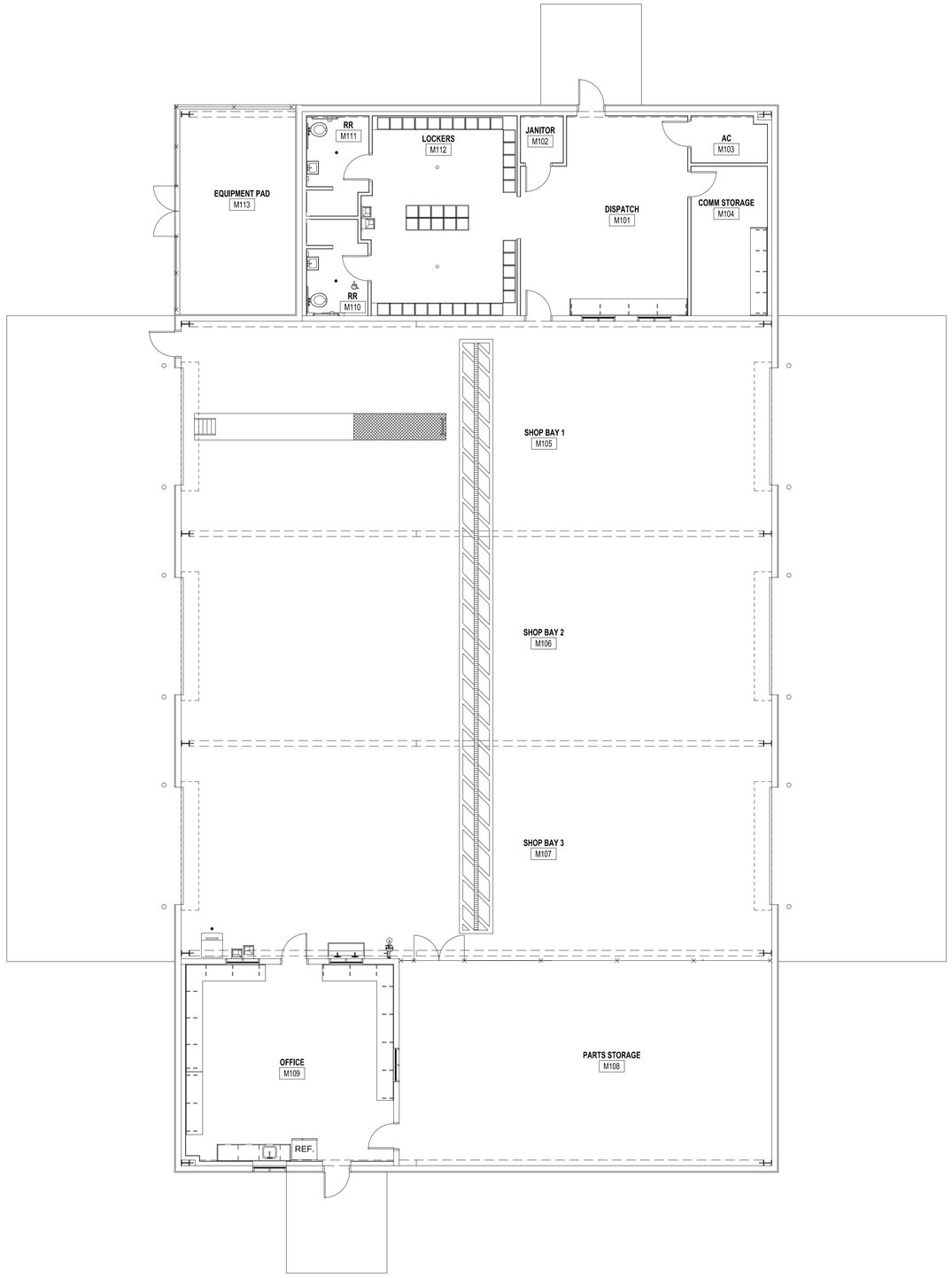
No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:
PLUMBING SANITARY SEWER PLAN ADMINISTRATION BUILDING

PL102

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01 PLUMBING LUBE AND COMPRESSED AIR PLAN
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

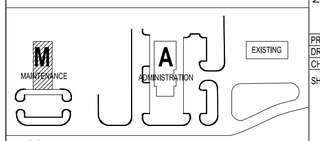
A. REFER TO SHEET PL101 FOR GENERAL NOTES.

B. WALL MOUNTED COMPRESSED AIR CONNECTION: PROVIDE A WALL MOUNTED COMPRESSED AIR LINE WITH CUTOFF VALVE, REGULATOR, GAUGE, AND QUICK DISCONNECT LOCATED 48" ABOVE FINISH FLOOR.

C. WORK OR EQUIPMENT NOT SPECIFICALLY IDENTIFIED AS THE RESPONSIBILITY OF THE OWNER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

KEY NOTES: (#)

1. WALL MOUNTED COMPRESSED AIR HOSE REEL PROVIDED BY OWNER. LUBE AND COMPRESSED AIR SYSTEMS CONTRACTOR SHALL COORDINATE CONNECTION AND FINAL MOUNTING HEIGHT AND LOCATION OF HOSE REEL WITH OWNER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.
2. WALL MOUNTED COMPRESSED AIR CONNECTION. PROVIDE WALL MOUNTED COMPRESSED AIR LINE WITH CUTOFF VALVE, REGULATOR, GAUGE, AND QUICK DISCONNECT LOCATED 48" ABOVE FINISH FLOOR, COORDINATE FINAL LOCATION OF CONNECTION WITH OWNER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.
3. AIR COMPRESSOR 50-60 GALLON TANK HORIZONTAL/UPRIGHT PROVIDED BY OWNER. LUBE AND COMPRESSED AIR SYSTEMS CONTRACTOR SHALL COORDINATE FINAL LOCATION OF AIR COMPRESSOR WITH OWNER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.
4. LUBE DISPENSING CONSOLE PROVIDED BY OWNER. LUBE AND COMPRESSED AIR SYSTEMS CONTRACTOR SHALL COORDINATE FINAL LOCATION OF LUBE DISPENSING CONSOLE WITH OWNER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.
5. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING AIR COMPRESSOR/AIR DRYER-2. UNIT SHALL BE EQUAL TO QUINCY COMPRESSOR #QTD-7.5, 208v/3ø. UNIT SHALL BE COMPLETE WITH TANK-MOUNTED DUPLEX AIR COMPRESSORS, AIR RECEIVER, AND NON-CYCLING TYPE. COMPRESSORS SHALL BE 7.5HP EACH WITH 120 GALLON RECEIVER. AIR SHALL BE DISTRIBUTED AT 115 PSI OR AS RECOMMENDED BY OIL AND LUBE SYSTEM PROVIDER.
6. ROUTING OF LUBE PIPING AND FINAL OWNER PROVIDED EQUIPMENT LOCATIONS SHALL BE COORDINATED WITH OWNER AND ALL OTHER TRADES PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.
7. REFER TO TO DETAIL 05 ON SHEET PL502 FOR UTILITY TRENCH DETAIL. COORDINATE FINAL TRENCH REQUIREMENTS WITH STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT.



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PROJECT OWNER: HIDALGO COUNTY

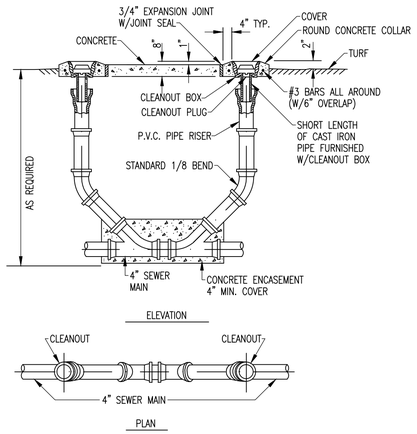
No.	Description	Date

PROJECT NO.:	28493
DRAWN BY:	E.M.
CHECKED BY:	M.J.M.

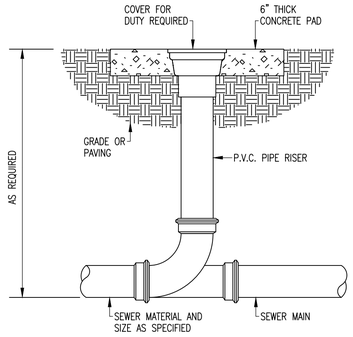
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PQ103

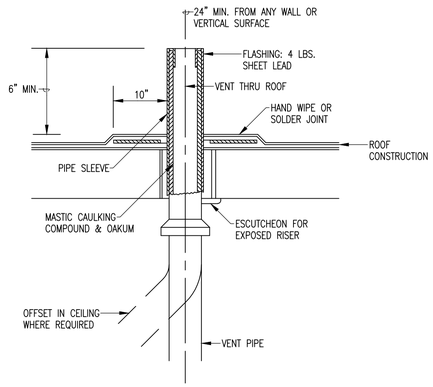
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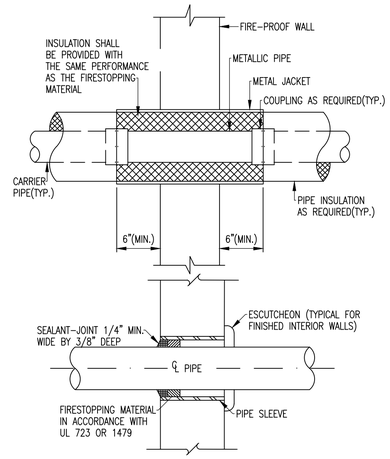
01 TYPICAL EXTERIOR TWO WAY CLEANOUT DETAIL
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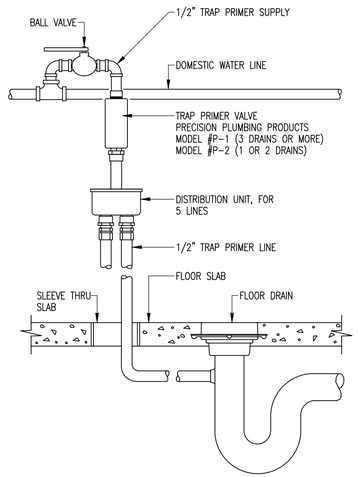
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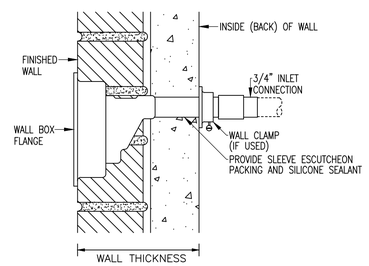
03 VENT THROUGH ROOF DETAIL
SCALE: N.T.S.



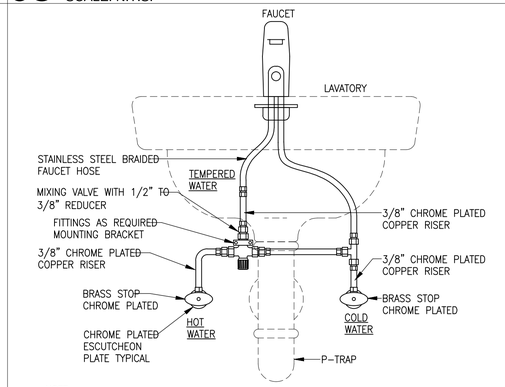
04 TYPICAL FIRE PROOF & WALL PENETRATION DETAIL
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05 TRAP SEAL PRIMER DETAIL
SCALE: N.T.S.

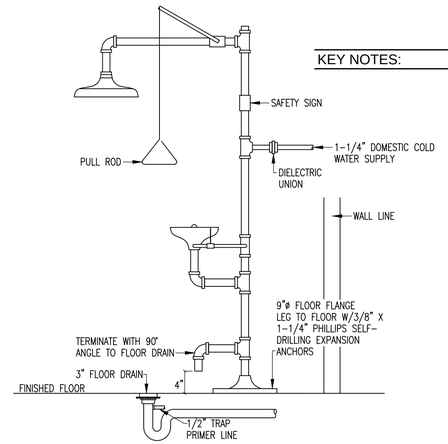


06 FREEZEPROOF WALL HYDRANTDETAIL
SCALE: N.T.S.



NOTE:
1. MIXING VALVE AND WATER LINES SHALL BE INSTALLED BETWEEN WALL AND P-TRAP TAILPIECE
2. PROVIDE AND INSTALL COVER KIT FOR P-TRAP AND STOPS.
3. FIELD INSULATE MIXING VALVE AND PIPING FROM MIXING VALVE TO FAUCET CONNECTION. JACKET INSULATION TO MATCH TRAP COVER KIT.
4. PROVIDE AND INSTALL REQUIRED 1/2" TO 3/8" REDUCERS AND CONNECTION FITTINGS.

07 MIXING VALVE UNDER LAVATORY DETAIL
SCALE: N.T.S.



KEY NOTES:

08 EMERGENCY SHOWER/EYEWASH DETAIL
SCALE: N.T.S.

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

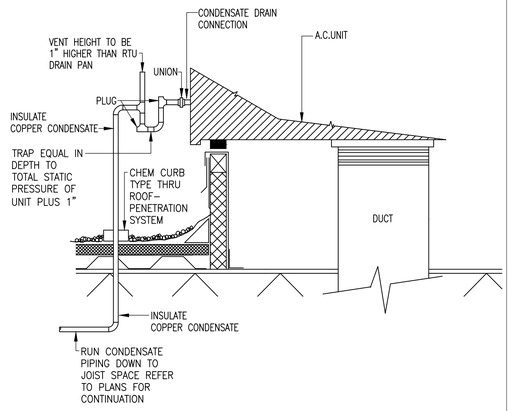
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

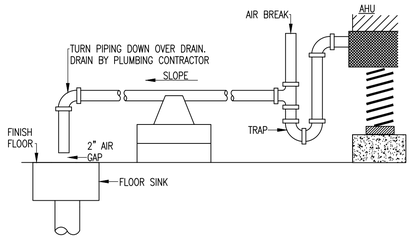
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PLUMBING DETAILS

PL501

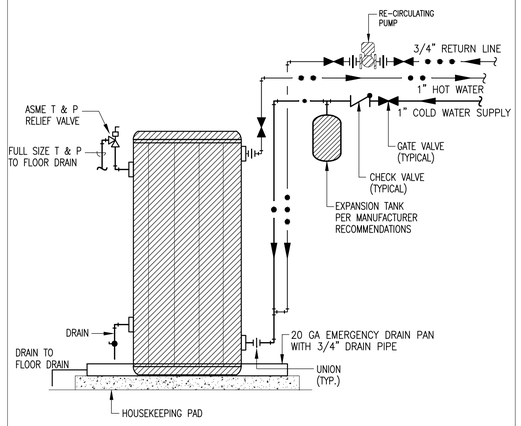
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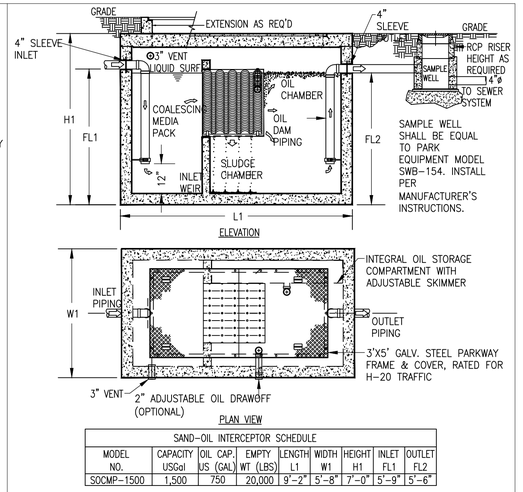
01 ROOF TOP UNIT CONDENSATE CONNECTION DETAIL
SCALE: N.T.S.



02 CONDENSATE DRAIN DETAIL
SCALE: N.T.S.



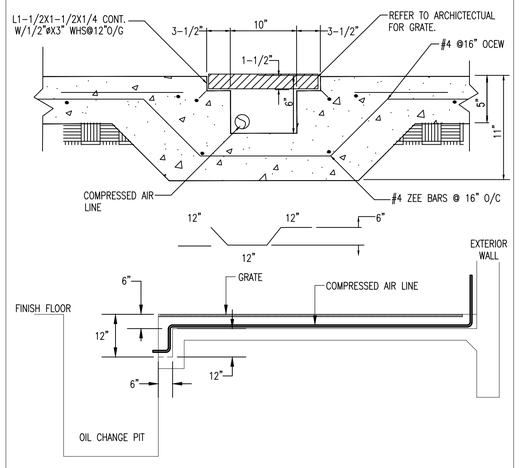
03 FLOOR MOUNTED WATER HEATER DETAIL
SCALE: N.T.S.



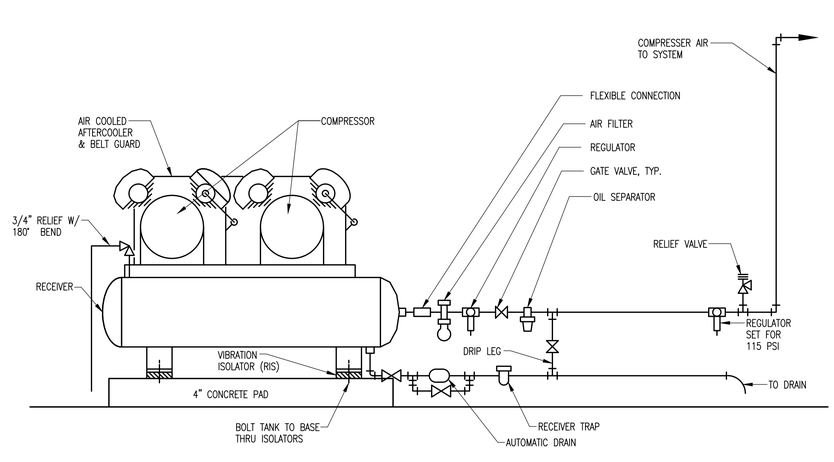
SAND-OIL INTERCEPTOR SCHEDULE

MODEL NO.	CAPACITY USGal	OIL CAP. US (GAL)	EMPTY WT (LBS)	LENGTH L1	WIDTH W1	HEIGHT H1	INLET FL1	OUTLET FL2
SOCMP-1500	1,500	750	20,000	9'-2"	5'-8"	7'-0"	5'-9"	5'-6"

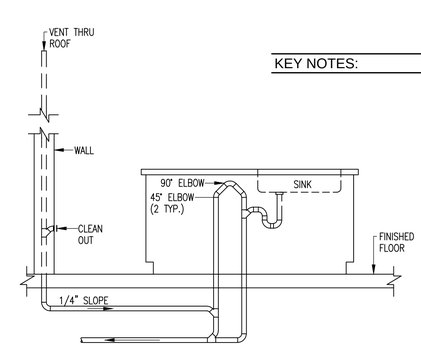
04 SAND-OIL INTERCEPTOR DETAIL
SCALE: N.T.S.



05 UTILITY TRENCH DETAIL
SCALE: N.T.S.



06 AIR COMPRESSOR DETAIL WITH AIR DRYER
SCALE: N.T.S.



KEY NOTES:

07 ISLAND SINK VENTING DETAIL
SCALE: N.T.S.

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PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.
SHEET TITLE: PLUMBING DETAILS

PL502

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PLUMBING SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
—•—	DOMESTIC COLD WATER LINE		BALL VALVE		BRANCH – TOP CONNECTION	F.F.E.	FINISH FLOOR ELEVATION
—••—	DOMESTIC HOT WATER LINE		CHECK VALVE		PIPE RISER	FU	FIXTURE UNITS
—•••—	DOMESTIC HOT WATER RETURN LINE		GATE VALVE		PIPE DROP	GW	GREASE WASTE
—TW—	DOMESTIC TEMPERED WATER LINE	FCO	FLOOR CLEANOUT		THERMOMETER	I.E.	INVERT ELEVATION
— —	SANITARY SEWER VENT LINE	YCO	YARD CLEANOUT		DIRECTION OF FLOW	HW	HOT WATER
———	SANITARY WASTE LINE		FLOOR SINK	CV	CALIBRATING VALVE	SS	SANITARY SEWER
—CD—	CONDENSATE LINE		FLOOR DRAIN	WCO	WALL CLEANOUT	TP	TRAP PRIMER
—GW—	GREASE WASTE LINE		ROOF DRAIN	P / 1	PLUMBING RISER DESIGNATION	TYP	TYPICAL
—GAS—	GAS LINE		HUB DRAIN	02 / P-3.1	PLUMBING DETAIL REFERENCE	UND. LAV.	UNDER LAVATORY
— A —	AIR LINE		WALL HYDRANT	ABV. CLG.	ABOVE CEILING	V	VENT
—AW—	ACID WASTE LINE		HOSE BIBB	B.F.F.	BELOW FINISH FLOOR	VTR	VENT THRU ROOF
—RD—	ROOF DRAIN LINE	WHA	WATER HAMMER ARRESTOR	CO	CLEAN OUT		
—OD—	OVERFLOW DRAIN LINE		UNION	CW	COLD WATER		

NOTE: NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT

INSTANTANEOUS TANKLESS WATER HEATER SCHEDULE

MARK	LOCATION	SERVING	SELECTION BASED ON		VOLTAGE/	WATTS	TEMP. RISE @	NOTES
			MFR	MODEL	PHASE	INPUT	0.5 GMP FLOW	
IWH-1	BREAK ROOM 148	DOMESTIC HOT WATER	EeMAX	SP4208	208/1	4100	56° F RISE	
IWH-2	RR 163	DOMESTIC HOT WATER	EeMAX	SP4208	208/1	4100	56° F RISE	

NOTES

SUMP PUMP SCHEDULE

MARK	LOCATION	SELECTION BASED ON		GPM	HP	RPM	MOTOR DATA		NOTES
		MFR	MODEL				WATTS	VOLTS/PH/HZ	
SP-1	AUTO SERVICE PIT	LITTLE GIANT	WRS-6	35	3/10	1750	720	115/1/60	(1)

NOTES (1) PROVIDE FLOAT SWITCH FOR AUTOMATIC OPERATION.

WATER HAMMER ARRESTOR SIZING TABLE

P.D.I. SYMBOLS	A	B	C	D	E	F	REMARKS
FIX. UNIT CAP	1-11	12-32	33-60	61-113	114-154	155-330	(1) (2)

NOTES (1) IF WATER PRESSURE EXCEEDS 65 PSI USE THE NEXT LARGER SIZE

(2) ALL WATER HAMMER ARRESTER SHALL HAVE ACCESS PANEL FOR MAINTENANCE.

PLUMBING SCHEDULE

MARK	FIXTURE TYPE	CONNECTION SIZE				DESCRIPTION
		SEWER	VENT	CW	HW	
P1	WATER CLOSET	4"	2"	1"	–	VITREOUS CHINA, ELONGATED RIM, FLOOR MOUNTED WATER CLOSET WITH 1-1/2" TOP SPUD. KOHLER "WELLCOMME" MODEL "K-4350". 14" RIM HEIGHT, 1.6 GPF, 10" ROUGH-IN, SIPHON JET ACTION WITH SLOAN "ROYAL" FLUSH MODEL "111", CHURCH MODEL"9500C" OPEN FRONT SEAT LESS COVER.
P2	WATER CLOSET (HANDICAP)	4"	2"	1"	–	VITREOUS CHINA, ELONGATED RIM, FLOOR MOUNTED WATER CLOSET WITH 1-1/2" TOP SPUD. KOHLER "HIGHCREST" MODEL "K-4302". 16-3/4" RIM HEIGHT, 1.6 GPF, 10" ROUGH-IN, SIPHON JET ACTION WITH SLOAN "ROYAL" FLUSH MODEL "111", CHURCH MODEL"9500C" OPEN FRONT SEAT LESS COVER.
P3	URINAL (HANDICAP)	2"	2"	3/4"	–	VITREOUS CHINA, WALL HUNG, SIPHON JET ACTION WITH 3/4" TOP SPUD AND WALL HANGERS. MINIMUM 14" RIM TO WALL DISTANCE. EQUAL TO KOHLER "DEXTER" MODEL No. "K-5016-ET". WITH MANUAL EXPOSED FLUSH VALVE SLOAN ROYAL "186-1" 1.0 GPF. PROVIDE APPROVED CARRIER.
P4	LAVATORY COUNTERTOP (HANDICAP)	2"	2"	1/2"	1/2"	VITREOUS CHINA, SELF RIMMING, OVAL (20"X17") LAVATORY WITH FAUCET HOLES ON 4" CENTERS. EQUAL TO KOHLER "PENNINGTON" MODEL "K-2196-4" COMPLETE WITH LAVATORY FAUCET CHICAGO MODEL "802A-317" CHROME PLATED, 1/2" IPS CONNECTIONS, VANDAL RESISTANT, WRIST BLADE HANDLES, HOT AND COLD INDICATORS, 2.0 GPM, ADA APPROVED. PROTECTIVE COVER ON P-TRAP. INSTALL UNDER COUNTER THERMOSTATIC WATER MIXING VALVE EQUAL TO LEONARD MODEL "170-BRKT-BP". COMPLETE WITH MOUNTING BRACKET AND COLD WATER BYPASS PORT. REFER TO DETAIL FOR INSTALLATION REQUIREMENTS.
P5	LAVATORY WALL HUNG (HANDICAP)	2"	2"	1/2"	1/2"	VITREOUS CHINA, WALL-HUNG LAVATORY WITH HOLES ON 4" CENTERS EQUAL TO KOHLER "CHESAPEAKE" MODEL "K-1728-0". COMPLETE WITH LAVATORY FAUCET CHICAGO MODEL "802A-317". CHROME PLATED, 1/2" IPS CONNECTIONS, VANDAL RESISTANT, WRIST BLADE HANDLES, HOT AND COLD INDICATORS, 2.0 GPM. ADA APPROVED, PROTECTIVE COVER ON P-TRAP. INSTALL UNDER COUNTER THERMOSTATIC WATER MIXING VALVE EQUAL TO LEONARD MODEL "170-BRKT-BP". COMPLETE WITH MOUNTING BRACKET AND COLD WATER BYPASS PORT. REFER TO DETAIL FOR INSTALLATION REQUIREMENTS.
P6	SHOWER	–	–	1/2"	1/2"	COMBINATION THERMOSTATIC/PRESSURE BALANCING VALVE WITH INTEGRAL CHECK STOPS, VOLUME CONTROLS AND HOT WATER LIMIT STOPS EQUAL TO CHICAGO MODEL "2500VOC". COMPLETE WITH ADJUSTABLE PATTERN SHOWER HEAD WITH ARM, FLANGE, BALL JOINT AND 1/2" MALE NPT INLET EQUAL TO CHICAGO MODEL "600A".
P7	SHOWER (HANDICAP)	–	–	1/2"	1/2"	COMBINATION THERMOSTATIC/PRESSURE BALANCING VALVE WITH INTEGRAL CHECK STOPS, VOLUME CONTROLS AND HOT WATER LIMIT STOPS EQUAL TO CHICAGO MODEL "2500VOC". COMPLETE WITH HAND HELD SHOWER, 69" METAL CLAD HOSE, 51" SLIDE BAR, 1/2" FEMALE COUPLING INLET EQUAL TO CHICAGO MODEL "153" ADA COMPLIANT.
P8	STAINLESS STEEL SINK COUNTERTOP	2"	2"	1/2"	1/2"	SINGLE COMPARTMENT STAINLESS STEEL SINK EQUAL TO ELKAY MODEL "LRAD-1716-60-3". SELF RIMMING, 17"X16"X6", 3 HOLES ON 4" CENTERS, 18 GAUGE, UNDERCOATED. COMPLETE WITH ELKAY MODEL "LK2433BH" HI-ARC, CHROMED METAL WRIST BLADE HANDLES, CONCEALED MOUNT FAUCET WITH VEGETABLE SPRAY AND "LK-35" STRAINER WITH BASKET.
P9	STAINLESS STEEL SINK COUNTERTOP (HANDICAP)	2"	2"	1/2"	1/2"	DOUBLE COMPARTMENT, STAINLESS STEEL SINK EQUAL TO ELKAY MODEL "LRAD-3321-60-4". SELF RIMMING, 32"X21"X6", 4 HOLE ON 4" CENTERS, 18 GAUGE, UNDERCOATED. COMPLETE WITH ELKAY MODEL "LK2433" HI-ARC, CHROMED METAL WING HANDLES, CONCEALED MOUNT FAUCET WITH VEGETABLE SPRAY AND "LK-35" STRAINER WITH BASKET.
P10	MOP SINK FLOOR MOUNTED	2"	2"	3/4"	3/4"	FLOOR-MOUNTED TERRAZZO CORNER SERVICE SINK EQUAL TO STERN-WILLIAMS MODEL "SBC-1700". 24"X24"X12" WITH 6" DROP FRONT AND STAINLESS STEEL RIM GUARDS ON ALL SIDES. COMPLETE WITH SERVICE SINK FAUCET EQUAL TO CHICAGO MODEL "540-LD-8975-WXF" WITH 8" CENTERS, PAIL HOOK, WALL BRACKET, VACUUM BREAKER SPOUT, AND LEVER HANDLES. MOP HANGER AND 5' REINFORCED RUBBER HOSE.
P11	BI-LEVEL ELECTRICAL WATER COOLER (HANDICAP)	2"	2"	1/2"	–	BI-LEVEL SELF-CONTAINED WALL HUNG, REFRIGERATED WATER COOLER EQUAL TO ELKAY "EZSTL-8". SELF CLOSING CONTROLS ON FRONT AND SIDE, STAINLESS STEEL BASIN. FLEX-GUARD BUBBLER CAPABLE OF DELIVERING 8.0 GPH OF 50° F WATER WITH 80° F INLET WATER AND 90° F ROOM TEMPERATURE. WITH APPROVED CARRIER.
P12	BI-LEVEL ELECTRICAL WATER COOLER EXTERIOR USE (HANDICAP)	2"	2"	1/2"	–	BILEVEL, SELF-CONTAINED WALL HUNG, REFRIGERATED WATER COOLER EQUAL TO ELKAY "OBFATL8C". SELF CLOSING PUSH BUTTON CONTROL ON FRONT, STAINLESS STEEL BASIN. VANDAL RESISTANT BRASS BUBBLER, CAPABLE OF DELIVERING 8.0 GPH OF 50°F WATER WITH 80°F INLET AND 90°F ROOM TEMPERATURE. WITH CARRIER
P13	STAINLESS STEEL SINK WALL MOUNTED	2"	2"	1/2"	1/2"	SINGLE COMPARTMENT STAINLESS STEEL SCRUB-UP SINK EQUAL TO ELKAY MODEL "EWS2520W4C". WALL MOUNTED, 25"X19.5"X10.5", 2 HOLES ON 8" CENTERS, 14 GAUGE. COMPLETE WITH ELKAY MODEL "LK940GN0574H" HI-ARC, CHROMED 4" WRIST BLADE HANDLES, AND "LK18B" DRAIN WITH PERFORATED STRAINER GRID.
P-14	COMBINATION SHOWER/EYE WASH (HANDICAP)	2"	2"	1-1/4"	–	COMBINATION DRENCH SHOWER/EYE WASH UNIT, STAINLESS STEEL SHOWER HEAD AND BOWL EQUAL TO BRADLEY MODEL S19-310BF. ADA APPROVED
	SAND-OIL INTERCEPTOR	4"	3"	–	–	750 GALLON SAND/OIL SEPARATOR SHALL BE EQUAL TO PARK EQUIPMENT MODEL "SOCMP-750". COMPLETE WITH PARK EQUIPMENT SAMPLE WELL. UNITS SHALL BE TRAFFIC DUTY AND INSTALLED AS PER MANUFACTURER RECOMMENDATIONS.
	AIR COMPRESSOR-2	–	–	–	–	AIR COMPRESSOR/AIR DRYER-2. UNIT SHALL BE EQUAL TO QUINCY COMPRESSOR #QTD-7.5, 208V/3ø. UNIT SHALL BE COMPLETE WITH TANK-MOUNTED DUPLEX AIR COMPRESSORS, AIR RECEIVER, AND NON-CYCLING TYPE, REFRIGERATED AIR DRYER. COMPRESSORS SHALL BE 7.5HP EACH WITH 120 GALLON RECEIVER. AIR SHALL BE DISTRIBUTED AT 115 PSI OR AS RECOMMENDED BY OIL AND LUBE SYSTEM PROVIDER.
HWCP-1	HOT WATER CIRCULATING PUMP	–	–	–	–	ITT BELL & GOSSETT MODEL No. LR-15B, WITH MAXIMUM WORKING PRESSURE OF 125 PSI AND MAXIMUM OPERATING TEMPERATURE OF 225°F. 1/12 H.P. 115 VOLTS, 60 MHz, SINGLE PHASE. PUMP SHALL BE OF THE HORIZONTAL, OIL LUBRICATED TYPE, STEEL SHAFT SUPPORTED BY HORIZONTAL SLEEVE BEARING DESIGN TO CIRCULATE OIL. PUMP SHALL BE EQUIPPED WITH A WATER-TIGHT SEAL TO PREVENT LEAKAGE. MECHANICAL SEAL FACES TO BE CARBON ON CERAMIC. MOTOR SHALL BE OF THE DRIP-PROOF SLEEVE BEARING, QUIET-OPERATING CONSTRUCTION. THE PERMANENT SPLIT-CAPACITOR MOTOR SHALL BE EQUIPPED WITH THERMAL OVERLOAD PROTECTION.
WHB-1	WALL HYDRANT	–	–	3/4"	–	ZURN MODEL "Z-1300" ENCASED ANTI SIPHON, NON FREEZE, AUTOMATIC DRAINING WALL HYDRANT FOR FLUSH WALL INSTALLATION COMPLETE WITH BACK FLOW PREVENTER, CLOSURE VALVE, AND HINGED, KEY LOCKED COVER STAMPED "WATER".
HB-1	HOSE BIBB	–	–	3/4"	–	WOODFORD MODEL "26-P" CHROME FINISH WALL MOUNTED FAUCET, WITH BACK FLOW PREVENTER, AND LOOSE TEE KEY
HB-2	PEDESTAL HYDRANT (ROOF MOUNTED)	–	–	3/4"	–	MAPA PRODUCT "MPH-24" PEDESTAL HYDRANT WITH WEATHER GUARD DOME, PIPING INSULATION, DRAIN DOWN FITTING, UNDER DECK SUPPORT FLANGE AND MOUNTING HARDWARE.
FD-1	GENERAL DUTY FLOOR DRAIN	3"	2"	1/2"	–	ZURN MODEL "Z-415-B" LACQUERED CAST IRON FLOOR DRAIN. COMPLETE WITH "TYPE B" NICKEL BRONZE STRAINER AND 1/2" TRAP PRIMER CONNECTION.
FD-2	SHOWER DRAIN	2"	2"	–	–	ZURN MODEL "Z-415-B" LACQUERED CAST IRON FLOOR DRAIN. COMPLETE WITH "TYPE B" NICKEL BRONZE STRAINER AND PRO-SET TRAP GUARD SYSTEM.
FS-1	FLOOR SINK	3"	2"	1/2"	–	ZURN MODEL "Z-1910-P-2" PROCELAIN-ENAMELED CAST IRON FLOOR SINK . 8"X8" X6" WITH ANTI-SPLASH INTERIOR BOTTOM DOME STRAINER, PORCELAIN-ENAMELED CAST IRON 1/2 GRATE, AND 1/2" TRAP PRIMER CONNECTION. WHERE TRAP PRIMER LINE IS NOT SHOWN A PRO-SET TRAP GUARD SYSTEM SHALL BE PROVIDED AND INSTALLED.
TD-1	TRENCH DRAIN	4"	2"	–	–	ZURN Z886-HDD CHANNELS SHALL BE 80" LONG, 4.75" WIDE REVEAL AND HAVE A 4" THROAT. MODULAR CHANNEL SECTIONS SHALL BE MADE OF 0%%% WATER ABSORBENT HIGH DENSITY POLYETHYLENE (HDPE). SHALL HAVE A POSITIVE MECHANICAL CONNECTION BETWEEN CHANNEL SECTIONS THAT WILL NOT SEPARATE DURING THE INSTALLATION AND SHALL MECHANICALLY LOCK INTO THE CONCRETE SURROUND A MINIMUM OF EVERY 10' CHANNELS SHALL HAVE REBAR CLIPS STANDARD TO SECURE TRENCH IN ITS FINAL LOCATION. SHALL BE PROVIDED WITH STANDARD HDD GRATES THAT LOCK INTO THE CONCRETE SURROUND DURING INSTALLATION AND IS INTENDED FOR DYNAMIC TRAFFIC LOADINGS. ZURN 4.75" WIDE REVEAL HIGHWAY DOMESTIC DUCTILE IRON SLOTTED GRATE CONFORMING TO ASTM SPECIFICATION A536-84, GRADE 80-55-06.
ICB	ICE CONNECTION BOX	–	–	1/2"	–	ICE CONNECTION BOX, GUY GRAY MODEL No. BIM 875
ROS-1	REVERSE OSMOSIS SYSTEM	3"	2"	–	–	REVERSE OSMOSIS SYSTEM SHALL BE EQUAL TO CULLIGAN MODEL "H30 BFS RO SYSTEM" FIVE STAGE PURIFICATION PROCESS. MOUNT SYSTEM IN CABINET SPACE, COORDINATE INSTALLATION REQUIREMENTS WITH CULLIGAN TO AVOID CONFLICT.

WATER HEATER SCHEDULE

MARK	STORAGE	RECOVERY	DEGREE	WATER TEMP.	WATER	WATER	DESCRIPTION
	GALLONS	G.P.H.	RISE °F	LEAVING	INLET	OUTLET	
DWH-1	65	24	100°	110°	3/4"	3/4"	RHEEM COMMERCIAL WATER HEATER, MODEL No. ELDS66, ELECTRICAL TANK TYPE, 6.0KW, 208V, 1ø

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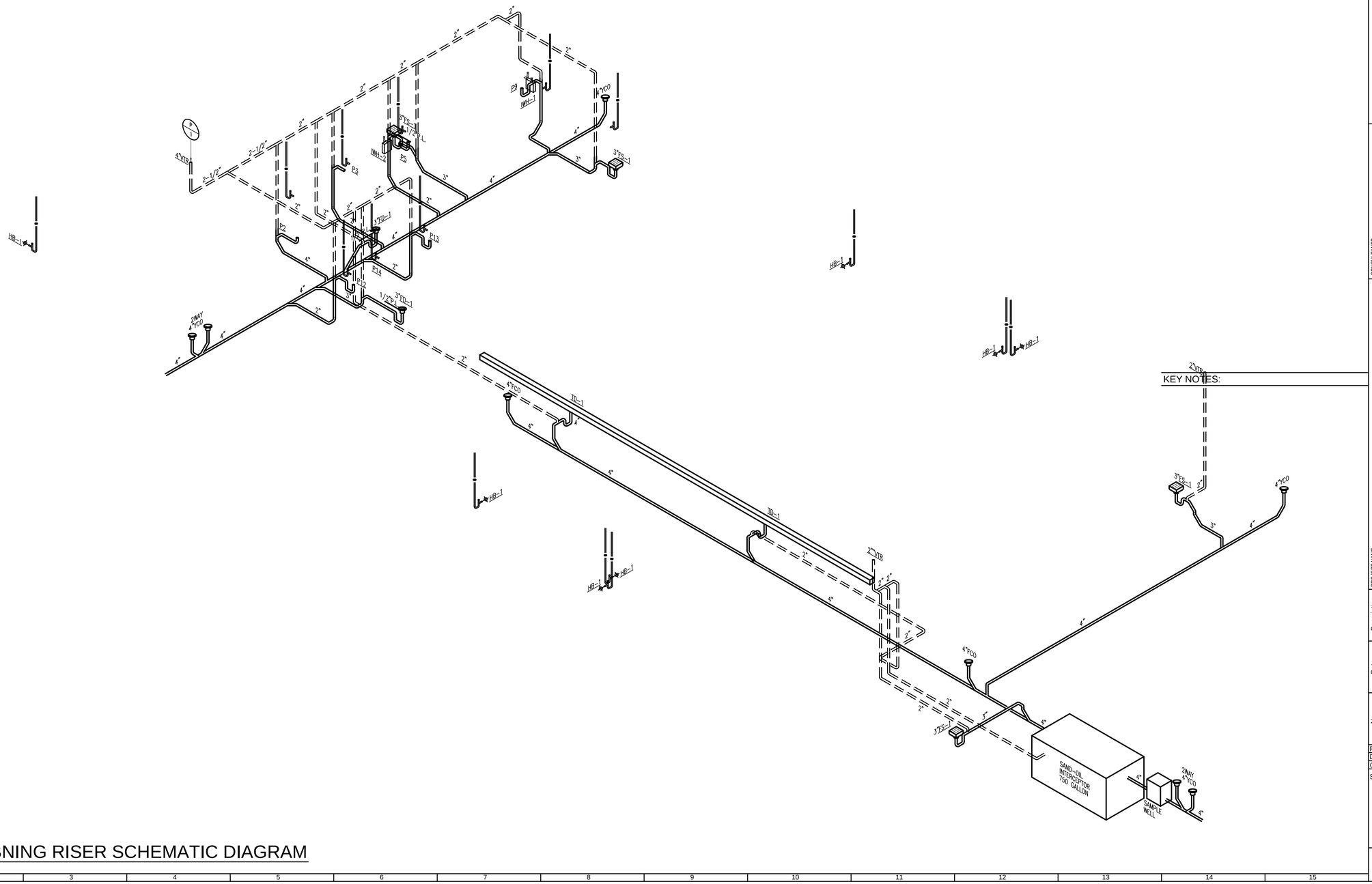
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SHEET TITLE: PLUMBING SCHEDULES

PL601

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KEY NOTES:

01 PLUMBNING RISER SCHEMATIC DIAGRAM
SCALE: N.T.S.

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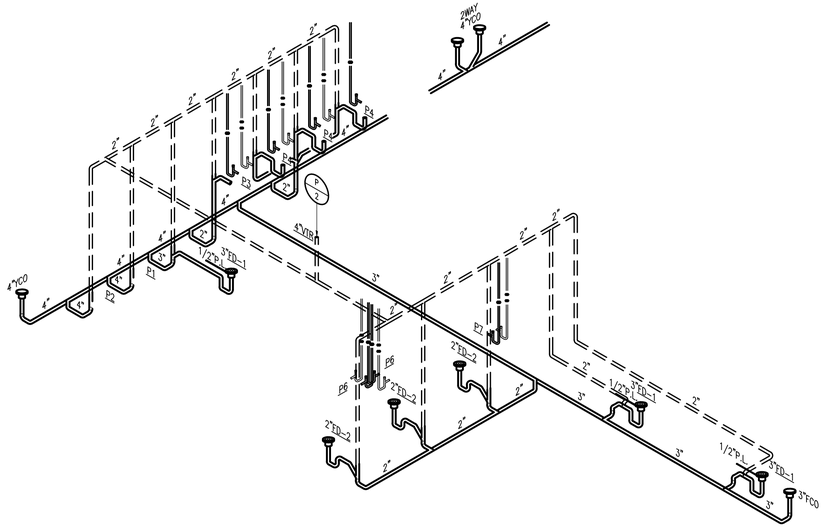
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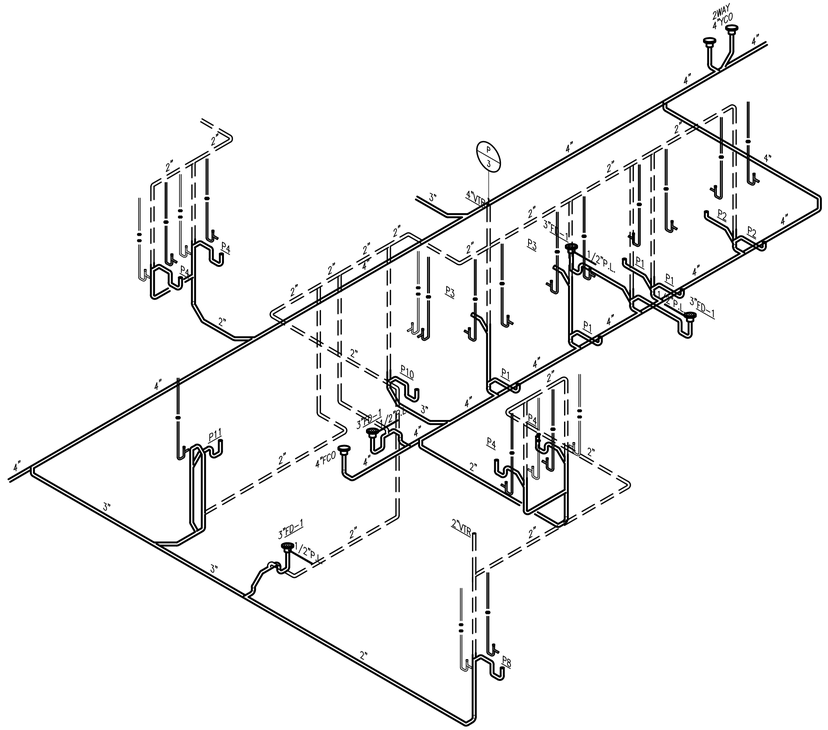
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CHECKED BY:	M.J.M.

SHEET TITLE:
PLUMBING RISER SCHEMATIC DIAGRAMS

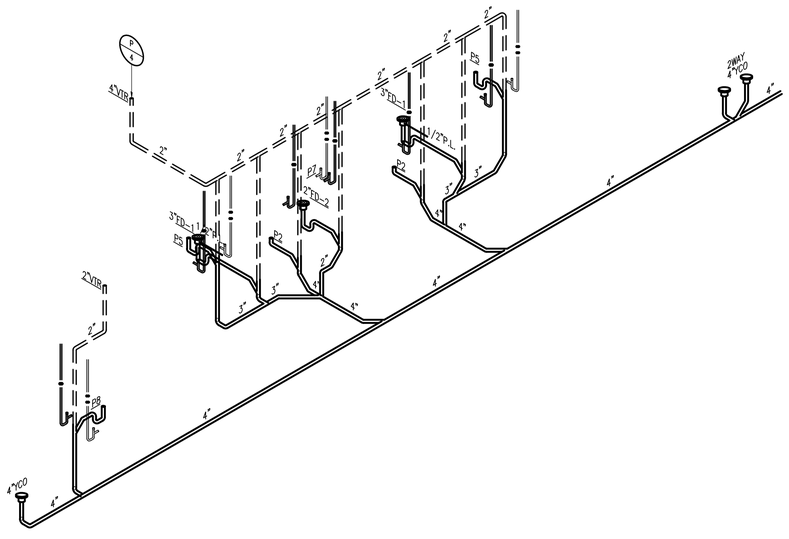
PL602



01 PLUMBNING RISER SCHEMATIC DIAGRAM
SCALE: N.T.S.



02 PLUMBNING RISER SCHEMATIC DIAGRAM
SCALE: N.T.S.



03 PLUMBNING RISER SCHEMATIC DIAGRAM
SCALE: N.T.S.

KEY NOTES:

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PRELIMINARY
-NOT FOR CONSTRUCTION-

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:
PLUMBING RISER SCHEMATIC DIAGRAMS

PL603

10/28/2011 10:19:18 AM

AUTOMATIC SPRINKLER SYSTEM PERFORMANCE SPECIFICATION NOTES:

PART 1 – GENERAL

1.01 SCOPE:

A. FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND RELATED ITEMS REQUIRED FOR THE COMPLETE DESIGN AND INSTALLATION OF AUTOMATIC SPRINKLER SYSTEM.

B. ALL AREAS OF THE BUILDING SHALL BE PROTECTED BY WET AUTOMATIC FIRE SPRINKLERS.THE SYSTEM SHALL BE HYDRAULICALLY CALCULATED. DENSITY SHALL BE IN ACCORDANCE WITH NFPA–13, NFPA 24 AND NFPA 231.

C. THE FIRE SPRINKLER CONTRACTOR SHALL OBTAIN A FLOW TEST, FROM THE CITY, PERFORMED WITHIN THE LAST 12 MONTHS TO VERIFY ADEQUATE WATER SUPPLY FOR THE FIRE SPRINKLER SYSTEM PRIOR TO BIDDING.

D. FIRE SPRINKLER CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO DESIGNING AND INSTALLING SYSTEM.

E. WATER SUPPLY SHALL COME FROM A NEW FIRE LINE SERVICE COMPLETE WITH. DOUBLE CHECK BACKFLOW PREVENTER, AND VALVING AS REQUIRED BY THE CITY. THE FIRE SPRINKLER CONTRACTOR SHALL PAY ALL TAP FEES, PERMITS, AND CHARGES NECESSARY FOR A COMPLETE AND APPROVED INSTALLATION.

1.02 QUALITY ASSURANCE:

A. SPRINKLER SYSTEM SHALL COMPLY WITH ALL APPLICABLE STATE AND CITY CODES, NFPA REQUIREMENTS, AND OWNER'S INSURANCE COMPANY REQUIREMENTS; INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:

1. UNIFORM BUILDING CODE.
2. NFPA CHAPTER 13,24 & 231.
3. LIFE SAFETY CODE NFPA–101.
4. OWNER'S INSURANCE UNDERWRITER REQUIREMENTS.
5. UNIFORM FIRE CODE.

1.03 SUBMITTALS:

A. PREPARE DETAILED WORKING DRAWINGS OF THE AUTOMATIC SPRINKLER SYSTEM.

B. SUBMIT DRAWINGS AND CALCULATIONS TO FIRE MARSHAL, AND OWNER'S INSURANCE UNDERWRITER AND OBTAIN THEIR APPROVAL.

C. SUBMIT FOUR (4) COPIES OF APPROVED DRAWINGS AND CALCULATIONS TO THE ARCHITECT AND TWO (2) COPIES TO THE FIRE MARSHALL FOR THEIR REVIEW AND APPROVAL.

D. SUBMIT "CUTSHEET" SAMPLES OF SPRINKLER HEADS TO ARCHITECT FOR APPROVAL.

PART 2 – PRODUCTS

2.01 GENERAL:

A. ALL MATERIALS, EQUIPMENT, VALVES AND DEVICES INSTALLED OR FURNISHED UNDER THIS CONTRACT SHALL BE UNDERWRITERS LABORATORIES (UL) LISTED AND FACTORY MUTUAL (FM) APPROVED FOR USE BY THE AUTHORITIES, AGENCIES, CODES AND STANDARDS CITED IN THIS SECTION OF THE SPECIFICATIONS.

2.02 PIPING:

A. SPRINKLER PIPING SMALLER THAN 4" SHALL BE SCHEDULE 40 (ASTM SPECIFICATIONS A–120 OR A–53) BLACK STEEL PIPE WHICH SHALL BE ASSEMBLED WITH 175 PSIG STANDARD CAST IRON, THREADED FITTINGS OR WITH FLANGED SPRINKLER TYPE FITTINGS OR GROOVED FITTINGS AS REQUIRED. PIPING 4" AND LARGER MAY BE UL APPROVED STEEL PIPE WITH GROOVED OR WELDED FITTINGS AS APPROVED BY THE LOCAL AUTHORITIES. GROOVED FITTINGS SHALL BE VICTAULIC OR APPROVED EQUAL, THE GROOVING MACHINE SHALL BE THE SAME AS THAT RECOMMENDED BY THE FITTINGS MANUFACTURER.

B. SCHEDULE 10 (THIN WALL) SPRINKLER PIPING MAY BE USED WHERE APPROVED BY THE AUTHORITIES.

C. PIPING FROM 5'–0" OUTSIDE BUILDING TO ALARM CHECK VALVE INSTALLATION SHALL BE DUCTILE IRON PIPING WRAPPED WITH 3 MIL POLYETHYLENE.

2.03 HANGERS:

A. PROVIDE NECESSARY UL APPROVED HANGERS TO SUPPORT THE SPRINKLER PIPINGS. HANGERS SHALL BE SPACED IN ACCORDANCE WITH REQUIREMENTS OF THE NFPA CHAPTER 13.

2.04 SPRINKLERS:

A. SPRINKLER HEADS IN AREAS WITH FINISHED CEILINGS SHALL BE PENDENT SPRAY TYPE, CHROME FINISH WITH CHROME ESCUTCHEON AND SHALL BE EQUAL TO GRINNELL ISSUE 'C' DURASPEED 1/2" ORIFICE AND UL AND FM LISTED.

B. HEADS IN AREAS WITHOUT CEILINGS AND WITH EXPOSED PIPING SHALL BE UPRIGHT TYPE, BRASS FINISH AND SHALL BE EQUAL TO GRINNELL QUICK RESPONSE MODEL "A" 1/2" ORIFICE AND UL AND FM LISTED.

C. HEAD IN VICINITY OF HEATING EQUIPMENT AND ELECTRICAL EQUIPMENT SHALL BE HIGH TEMPERATURE HEADS OF THE TYPE APPROVED BY FM AND UL.

2.05 FIRE DEPARTMENT SIAMESE:

A. SHALL BE EQUAL TO W.D. ALLEN NO. 231 UPRIGHT TWO WAY 2 1/2", 2–1/2" X 4" SIZE, CHROME PLATED, FRONT PLATE WITH RAISED LETTERING, "AUTOMATIC SPRINKLER", AND CHROME PLATED CAPS ATTACHED WITH SUFFICIENT AMOUNT OF CHAIN.

2.06 GATE VALVES:

A. GATE VALVES 2–1/2" AND LARGER SHALL BE UNDERWRITER'S APPROVAL EQUAL TO JENKINS 825A OR CRANE 467.

2.07 CHECK VALVES:

A. ALL CHECK VALVES SHALL BE EQUAL TO JENKINS 729, CRANE 375 OR WALWORTH 883F AND EQUIPPED WITH AN AUTOMATIC BALL DRIP TO DRAIN THE LINE BETWEEN THE FIRE DEPARTMENT CONNECTION AND THE CHECK VALVE.

2.08 FLOW SWITCHES:

A. PROVIDE A GRINNELL SERIES WFD FLOW SWITCH IN EACH SPRINKLER SYSTEM CONNECTION SERVING EACH SPRINKLER ZONE. SWITCHES SHALL BE SUITABLE FOR CONNECTION INTO THE FIRE ALARM SYSTEM.

2.09 MONITOR SWITCHES:

A. EACH MANUAL SECTIONALIZING VALVE AND SHUTOFF VALVE IN THE SPRINKLER SYSTEM SHALL BE PROVIDED WITH A GRINNELL F640 MONITORING SWITCH TO INDICATE WHETHER THE VALVE IS OPEN OR CLOSED. WIRING FROM SWITCHES TO THE FIRE ALARM SYSTEM WILL BE DONE UNDER DIVISION 16. THE SWITCH SHALL HAVE A TAMPER INDICATION IF REMOVED FROM ITS MOUNTING OR THE HOUSING COVER IS REMOVED; IT SHALL SIGNAL AN ALARM WHEN THE VALVE POSITION IS ALTERED.

2.10 ALARM VALVE ASSEMBLIES:

A. THE ALARM VALVE ASSEMBLY SHALL BE EQUAL TO GRINNELL MODEL A–3 CONSISTING OF A SERVICE SHUTOFF VALVE, A CLAPPER TYPE MAIN CHECK VALVE, AN AUXILIARY SEAT (ALARM OUTLET), A RETARDING CHAMBER, AND ELECTRIC CIRCUIT CLOSER, GAUGES, CHECK VALVES, GATE VALVES, GLOBE OR ANGLE VALVES AND COCKS.

2.11 WATER MOTOR GONG:

A. WATER POWERED GONG WITH CLAPPER ROLLER, CLAPPER, STRAINER, WATER WHEEL SHAFT, HOUSING, COVER PLATES AND OTHER STANDARD COMPONENTS.

2.12 SPARE SPRINKLERS:

A. PROVIDE A WALL MOUNTED SPRINKLER CABINET WITH A MINIMUM OF 12 SPRINKLERS OF EACH TYPE INSTALLED AND A SPRINKLER WRENCH. MOUNT CABINET NEXT TO SPRINKLER ALARM VALVE.

2.13 DOUBLE CHECK BACKFLOW PREVENTER

A. FURNISH AND INSTALL A DOUBLE–CHECK BACKFLOW PREVENTER ASSEMBLY WITH POST INDICATOR VALVE AND FIRE DEPARTMENT CONNECTION AS MANUFACTURED BY PARK EQUIPMENT, HOUSTON, TX, MODEL BPPF–1, OR APPROVED EQUAL.

PART 3 – EXECUTION

3.01 SCOPE:

A. FURNISH AND INSTALL WITH ALL RELATED ITEMS, A COMPLETELY DESIGNED FIRE PROTECTION AUTOMATIC SPRINKLER SYSTEM.

3.02 CERTIFIED CONTRACTORS:

A. FABRICATION AND INSTALLATION SHALL BE BY STATE LICENSED FIRE SPRINKLER COMPANY WITH EXPERIENCED, COMPETENT WORKMEN REGULARLY ENGAGED IN THE WORK.

3.03 COORDINATION:

A. WORK SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING:
1. REQUIRED FITTINGS AND VALVES,
2. OVERHEAD SPRINKLER SYSTEM FOR ENTIRE BUILDING, INCLUDING ALL REQUIRED ITEMS, EXCEPT UNDER EXTERIOR CANOPIES AND/OR OVERHANGS OVER WALKWAYS.

3.04 DESIGN:

A. PIPING IN AREAS HAVING CEILINGS, OTHER THAN THE UNDERSIDE OF THE ROOF DECK, SHALL BE CONCEALED; PIPING IN STORAGE AND SERVICE AREAS MAY BE EXPOSED BUT KEPT AT A MINIMUM DISTANCE FROM CEILING. ALL PIPING SHALL BE NEW, CLEAN AND FREE FROM RUST.

B. THE SPRINKLER CONTRACTOR SHALL COORDINATE HIS WORK AND SERVICES WITH ALL OTHER CEILING MOUNTED, SUSPENDED OR OVERHEAD EQUIPMENT AND WITH STRUCTURAL SYSTEM. NO SPRINKLER LINES SHALL PASS THROUGH DUCTWORK.

C. DEEP ESCUTCHEONS MAY BE USED IN ORDER TO LOCATE HEADS CLOSE TO LIGHTING FIXTURES. WHERE SPRINKLER HEADS OCCUR UNDER OVERHANGS, ESCUTCHEONS OF LESSER DEPTH MAY BE USED WHERE ACCEPTABLE TO THE CITY FIRE MARSHAL AND NFPA 13.

D. RISERS SHALL BE LOCATED WHERE INDICATED ON THE DRAWINGS AND BE EQUIPPED WITH VARIABLE PRESSURE ALARM VALVES. VALVES SHALL BE COMPLETE WITH ALL NECESSARY ITEMS, FITTINGS, IDENTIFICATION TAGS OR PLATES, AND ACCESSORIES INCLUDING ALARM VALVE AND WATER MOTOR GONG. DESIGN SHALL ALLOW FOR SUITABLE VENTING AND DRAINAGE OF SAME, ALL TO MEET WITH THE APPROVAL OF THE CITY FIRE MARSHAL AND THE OWNER'S INSURANCE UNDERWRITER AND NFPA 13.

DESIGNS REQUIRING CUTTING OF STRUCTURAL MEMBERS FOR PASSAGE OF SPRINKLER PIPE AND HANGER SHALL BE AVOIDED. WHEN DESIGN, DUE TO ECONOMY, APPEARANCE AND SIMILAR ASPECTS, DENOTE THE NECESSITY OF CUTTING, IT SHALL BE HELD TO AN ABSOLUTE MINIMUM AND DONE ONLY WITH THE ARCHITECT'S WRITTEN APPROVAL.

F. IN ADDITION TO MEETING THE NATIONAL FIRE PROTECTION ASSOCIATION NO. 13 REQUIREMENTS, THE FOLLOWING WILL APPLY TO THE SPRINKLER SYSTEM:

1. THE SPRINKLER SYSTEM SHALL BE ELECTRICALLY INTER–CONNECTED TO THE BUILDING FIRE ALARM SYSTEM.
2. THE SPRINKLER SYSTEM MAIN CONTROL VALVE SHALL BE ELECTRICALLY SUPERVISED SO THAT AT LEAST A LOCAL ALARM WILL SOUND WHEN THE VALVE IS CLOSED.

3.05 DRAWINGS:

A. SHOP DRAWINGS CONSISTING OF THE FOLLOWING SHALL BE FURNISHED BY THE SPRINKLER SUB–CONTRACTOR:

1. LAYOUT DRAWING OF COMPLETE OVERHEAD AUTOMATIC SPRINKLER SYSTEM INDICATING RELATIONSHIP OF ALL OTHER OVERHEAD ITEMS INCLUDING LIGHT FIXTURES. LOCATION OF RISERS, PIPING, ETC. SHALL BE AS INCONSPICUOUS AS POSSIBLE, PROVIDE A PLEASING OVERHEAD APPEARANCE, AND STILL FULFILL ALL FUNCTIONAL REQUIREMENTS.
2. SPRINKLER CONTRACTOR SHALL OBTAIN A COPY OF APPROVED CEILING GRID SYSTEM FROM CEILING SUB–CONTRACTOR AND SHALL WORK TO THIS LAYOUT WHEN PREPARING SHOP DRAWINGS AND INSTALLING WORK. CUTTING OF CEILING RUNNERS WILL NOT BE PERMITTED.
3. PILOT PLAN INDICATING LOCATION OF ALL UNDERGROUND CONNECTIONS, CONTROL VALVES, PIPING AND ALL RELATED ITEMS, AND ANY OTHER ITEMS OF DATA DEEMED NECESSARY BY THE CITY FIRE MARSHAL AND NFPA 13.
4. COMPLETE DETAILS AND SECTIONS AS REQUIRED TO CLEARLY DEFINE AND CLARIFY THE DESIGN INDICATED BY THE AFOREMENTIONED LAYOUT AND PILOT PLAN.
5. ALL SHOP DRAWINGS, PRIOR TO BEING SENT TO THE ARCHITECT, MUST BEAR BOTH THE CITY FIRE ENGINEERING DEPT. STAMP OF ACCEPTANCE AND THE OWNER'S INSURANCE UNDERWRITER STAMP OF ACCEPTANCE.

B. FURNISH AND INSTALL, NEXT TO THE SPRINKLER RISER MAIN, A PRINTED SHEET, PROTECTED BY WOOD FRAMED GLASS COVER, GIVING BRIEF INSTRUCTIONS REGARDING CONTROL, EMERGENCY PROCEDURE AND OTHER DATA AS DEEMED NECESSARY BY THE CITY FIRE MARSHAL AND THE OWNER'S INSURANCE UNDERWRITER.

C. UPON COMPLETION OF THE WORK, ACCURATELY MARK ONE COPY OF SHOP DRAWINGS SHOWING LOCATION OF ALL UNDERGROUND FIRE PREVENTION SYSTEM PIPING, VALVES, ETC., AS FINALLY INSTALLED. SHOW LOCATION OF UNDERGROUND PIPING AND VALVES BY DIMENSION. ALSO, GIVE FLOW LINE ELEVATIONS OF UNDERGROUND PIPING FROM STREET MAIN TO BUILDING. UPON COMPLETION OF THE JOB, FURNISH OWNER ONE (1) NEAT LEGIBLE COPY OF "AS BUILT" DRAWINGS.

3.06 INSTALLATION:

A. SLEEVES SHALL BE PROVIDED FOR PIPING PASSING THROUGH CONCRETE SLABS, CONCRETE OR MASONRY WALLS AND PARTITIONS, THROUGH FLOORS, CEILINGS, WALLS, OR PARTITIONS OF OTHER BUILDING MATERIALS. WATERTIGHT SLEEVES CAULKED WITH MASTIC OR LEAD SHALL BE PROVIDED FOR FLOOR SLABS AND WALLS ON OR BELOW GRADE. STANDARD PIPE OR GALVANIZED SHEET METAL SLEEVES SHALL BE INSTALLED IN ABOVE GRADE CONSTRUCTION AS MAY BE REQUIRED. THE SLEEVES SHALL BE OF SUFFICIENT DIAMETER TO PASS PIPE LINES WITH COUPLINGS OR WITH INSULATION OR ANNULAR AREA FOR CAULKING WHERE REQUIRED. ESCUTCHEONS SHALL BE APPROVED FLOOR AND CEILING PLATES MADE OF STEEL OR BRASS, PLAIN OR CHROMIUM PLATE FINISH AND SHALL BE INSTALLED AROUND ALL EXPOSED PIPING PASSING THROUGH A FINISHED FLOOR, WALL OR CEILING. THE PLATES SHALL BE OF SUFFICIENT OUTSIDE DIAMETER TO COVER THE SLEEVE OPENING AND SHALL BE PROVIDED WITH SPRINGS OR SET SCREWS TO INSURE THEM FITTING SNUGLY AROUND THE PIPE.

B. ALL OPENINGS FOR PIPING SHOULD BE ANTICIPATED AND INDICATED ON THE APPROVED AND ACCEPTED SHOP DRAWINGS. ANY ADDITIONAL CUTTING OF OPENINGS MUST HAVE WRITTEN APPROVAL OF THE ARCHITECT.

C. THIS CONTRACTOR WILL NOT USE AIR CONDITIONING DUCT SUPPORTS, AIR DEVICE OUTLETS OR SUPPORTS, PIPING OR SUPPORTS AS A MEANS OF SUPPORT OF ANY MATERIAL, ACCESSORIES OR WORKMEN IN THE INSTALLATION OF THE SYSTEM.

3.07 GUARANTEE:

A. THE ENTIRE INSTALLATION SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE BUILDING ACCEPTANCE DATE.

3.08 TESTS:

A. PRIOR TO CONNECTING TO THE OVERHEAD SPRINKLER PIPING, THE UNDERGROUND MAIN SHALL BE FLUSHED PER THE REQUIREMENTS OF THE NFPA.

B. AFTER COMPLETION OF THE INSTALLATION, THE ENTIRE SYSTEM SHALL BE TESTED FOR ACCEPTANCE BY THE OWNER'S INSURANCE UNDERWRITER.

3.09 ACCEPTANCE:

A. THE OWNER'S INSURANCE UNDERWRITER, AFTER SATISFYING THEMSELVES THAT THE INSTALLATION IS SATISFACTORY IN ALL RESPECTS, WILL ISSUE A LETTER OF FINAL ACCEPTANCE. LETTER SHALL BE ADDRESSED TO THE SPRINKLER COMPANY RESPONSIBLE FOR THE INSTALLATION, PREPARED IN TRIPLICATE AND GIVEN TO THE OWNER.

B. AFTER COMPLETION OF ALL INSTALLATION, TESTS, ETC. AND PRIOR TO THE OPENING DATE THE SPRINKLER CONTRACTOR SHALL INSTRUCT THE OWNER IN THE OPERATION OF THE SPRINKLER SYSTEM. PROVIDE WRITTEN OPERATING INSTRUCTIONS AND MOUNT ON WALL IN A FRAME WITH GLASS FRONT. INCLUDE THE FOLLOWING SO THAT THE OWNER:

1. WILL IMMEDIATELY RECOGNIZE THE MAIN VALVES ARE IN OPEN OR CLOSED POSITION.
2. WILL KNOW HOW TO DRAIN THE SYSTEM.
3. WILL KNOW HOW TO RESET THE ALARM SYSTEM.
4. WILL KNOW NOW TO MAKE COMPLETE WEEKLY INSPECTION.
5. WILL KNOW HOW TO MAINTAIN THE SYSTEM IN ACCORDANCE WITH NFPA NO. 13.

3.10 PROTECTION DURING CONSTRUCTION:

A. CONTRACTOR SHALL COMPLETE THE AUTOMATIC FIRE SPRINKLER SYSTEM READY FOR OPERATION, IN ALL RESPECTS, AS SOON AS POSSIBLE. WHEN THE SYSTEM IS COMPLETE AND READY FOR CONTINUOUS OPERATION, ACTIVATE THE SYSTEM FOR ITS INTENDED USE.

FIRE PROTECTION NOTES:

1. CONTRACTOR SHALL INSTALL AN AUTOMATIC SPRINKLER SYSTEM FOR THE BUILDING IN ACCORDANCE WITH NFPA 13. "INSTALLATION OF SPRINKLER SYSTEM" AS DESIGNED BY A LICENSED FIRE PROTECTION SPECIALIST, AND AS APPROVED BY THE CITY OF EDINBURG, TX. FIRE MARSHALL AND THE OWNER'S INSURANCE UNDERWRITER.

2. ALL SPRINKLERS LOCATED IN LIGHT HAZARD AND ORDINARY HAZARD GROUP 1 AREA SHALL BE "STANDARD ORIFICE TYPE" WITH 1/2 INCH DIAMETER NOMINAL ORIFICE SIZE, AND ALL SPRINKLERS LOCATED IN ORDINARY HAZARD GROUP 2 AREA SHALL BE "LARGE ORIFICE TYPE" WITH 17/32 INCH DIAMETER NOMINAL ORIFICE SIZE OR OTHER FM APPROVED AND UL LISTED SPRINKLERS AS APPROVED FOR THE PROPOSED APPLICATION.

3. CONTRACTOR SHALL INSTALL 10 POUND DRY CHEMICAL PORTABLE FIRE EXTINGUISHERS AND FIRE EXTINGUISHER CABINETS IN ACCORDANCE WITH NFPA 10. UNLESS OTHERWISE INDICATED BY THE CITY FIRE MARSHAL.

4. CONTRACTOR SHALL INSTALL A FIRE ALARM SYSTEM REQUIRED FOR LIFE SAFETY IN ACCORDANCE WITH NFPA 70, NFPA 72. FACTORY MUTUAL ENGINEERING DESIGN CRITERIA, UNIFORM FIRE CODE, CITY APPLICABLE BUILDING CODE, TEXAS ACCESSIBILITY STANDARDS, AND THE AMERICAN WITH DISABILITIES ACT REQUIREMENTS. CONTRACTOR SHALL SUBMIT FOR ENGINEER'S APPROVAL THE PROPOSED FIRE ALARM SYSTEM DESIGN AND PRODUCT INFORMATION, AS PREPARED BY A REGISTERED QUALIFIED FIRE ALARM SPECIALIST.

5. CONTRACTOR SHALL SUBMIT FOR ENGINEER'S REVIEW AND APPROVAL (BEFORE COMMENCEMENT OF WORK) A PROPOSED FIRE PROTECTION SPRINKLER SYSTEM PREPARED BY A LICENSED AND REGISTERED FIRE SPRINKLER SYSTEM PROFESSIONAL, THE SUBMITTAL SHALL INCLUDE, BUT NOT LIMITED TO THE FOLLOWING ELEMENTS:
   A) CONSTRUCTION DRAWINGS OF THE PROPOSED FIRE PROTECTION SYSTEM. INCLUDING: PIPE LAYOUT, ALARM VALVE, DRAIN VALVES, TEST VALVES, ETC., AND THE CENTERLINE ELEVATIONS OF THE BRANCH LINES, CROSS MAINS AND FEED MAINS.
   B) CONTRACTOR'S WORK PLAN AND SCHEDULING.
   C) METHODS AND MATERIALS OF CONSTRUCTION. THE LICENSED PROFESSIONAL MUST BE KNOWLEDGEABLE WITH AND IN COMPLIANCE WITH ALL APPROPRIATE UL LISTINGS AND FACTORY MUTUAL REQUIREMENTS. SYSTEM DESIGN, MATERIAL, FABRICATION AND INSTALLATION SHALL MEET MOST CURRENT EDITION OF NFPA 13, UNIFORM FIRE CODE, AND FACTORY MUTUAL DESIGN AND INSTALLATION REQUIREMENTS AND SHALL BE SUBMITTED FOR APPROVAL BY CITY FIRE MARSHAL, STATE AND THE OWNER'S INSURANCE UNDERWRITER.

6. 3" AND LARGER PIPING SHALL BE BLACK CARBON STEEL SCH–40 ASTM A53 WITH CUT GROOVED FITTINGS. 2 1/2" AND SMALLER PIPING SHALL BE BLACK CARBON STEEL SCH–40 ASTM A53 WITH THREADED CLASS 125 FITTINGS. ALL PIPE HANGERS SHALL BE BLACK CARBON STEEL. PIPING, FITTINGS AND PIPE HANGERS BE AS MANUFACTURED BY VICTAULIC, ITT GRINNEL, GRUVLOK OR APPROVED EQUAL. OR OTHER FM APPROVED AND UL LISTED PIPING AS APPROVED FOR THE PROPOSED APPLICATION.

7. ALL PIPE HANGER MATERIAL TO BE BLACK IRON.

8. NEW PIPING TO BE HYDROSTATIC ALLY TESTED AT 210 PSI FOR A MINIMUM 2 HOURS, TEST TO BE WITNESSED BY OWNER'S REPRESENTATIVE.

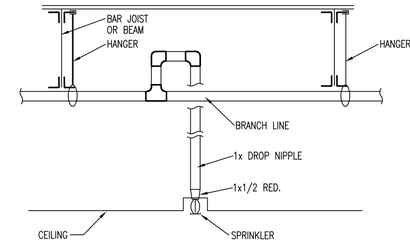
9. CONTRACTOR SHALL INSTALL FIRE PROTECTION SYSTEM PLUMB AND STRAIGHT WITH BUILDING VERTICAL AND HORIZONTAL.

10. ALL VALVES SUCH AS INSPECTOR TEST VALVES TO BE LOCATED AT LEAST 6' FROM FLOOR. INSPECTOR TEST VALVES SHALL BE INSTALLED AS PER NFPA 13 REQUIREMENTS.

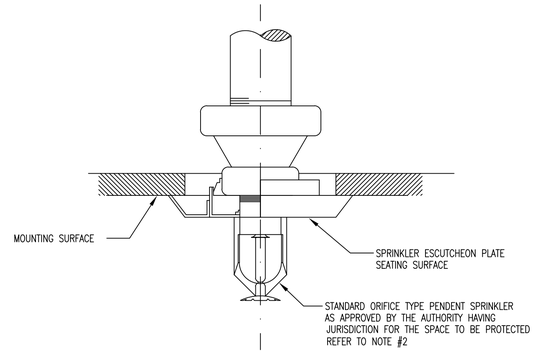
11. CONTRACTOR SHALL PLACE THE SPRINKLER HEADS IN THE CENTERS OF THE CEILING TILES, AND SHALL ALIGN SPRINKLER HEADS.

12. CONTRACTOR SHALL INSTALL HIGH END TEST STATIONS AND LOW END DRAINS AS REQUIRED BY NFPA 13.

13. CONTRACTOR SHALL INSTALL ALL SPRINKLER PIPES AND FITTINGS LEVEL, SO THAT THE SYSTEM CAN BE DRAINED, TRAPPED PIPING SHALL BE DRAINED THROUGH AUXILIARY DRAINS. THESE AUXILIARY DRAINS SHALL BE INSTALLED AT THE LOCATIONS WHERE A CHANGE IN PIPING DIRECTION PREVENTS DRAINAGE OF THE SYSTEM PIPING THROUGH THE MAIN DRAIN VALVE.



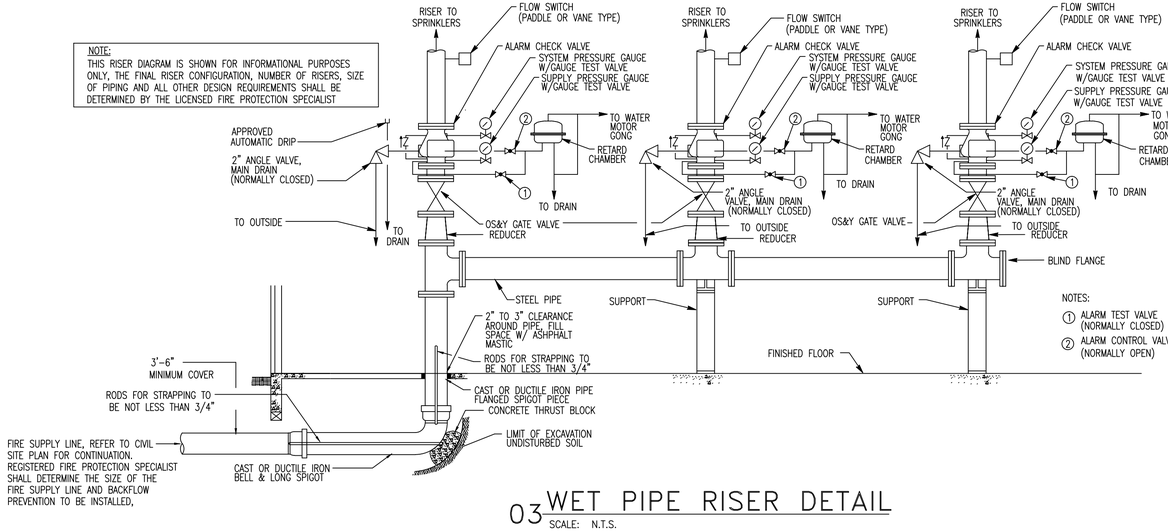
01 TYPICAL PENDENT SPRINKLER DETAIL
SCALE: N.T.S.



02 TWO–PIECE (ADJUSTABLE) FLUSH ESCUTCHEON PLATE
SCALE: N.T.S.

KEY NOTES:

NOTE:
THIS RISER DIAGRAM IS SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE FINAL RISER CONFIGURATION, NUMBER OF RISERS, SIZE OF PIPING AND ALL OTHER DESIGN REQUIREMENTS SHALL BE DETERMINED BY THE LICENSED FIRE PROTECTION SPECIALIST



03 WET PIPE RISER DETAIL
SCALE: N.T.S.

THESE CONCEPTUAL FIRE SPRINKLER PROTECTION PLANS ARE FOR INFORMATION PURPOSES ONLY. ALL CIVIL AND FIRE SPRINKLER PLANS ARE TO BE SUBMITTED SEPARATELY TO THE FIRE DEPARTMENT FOR REVIEW OF COMPLIANCE TO THE RESPECTIVE GOVERNING STANDARDS. (EDINBURG, TEXAS)

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Halff Associates firm registration number is 312

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
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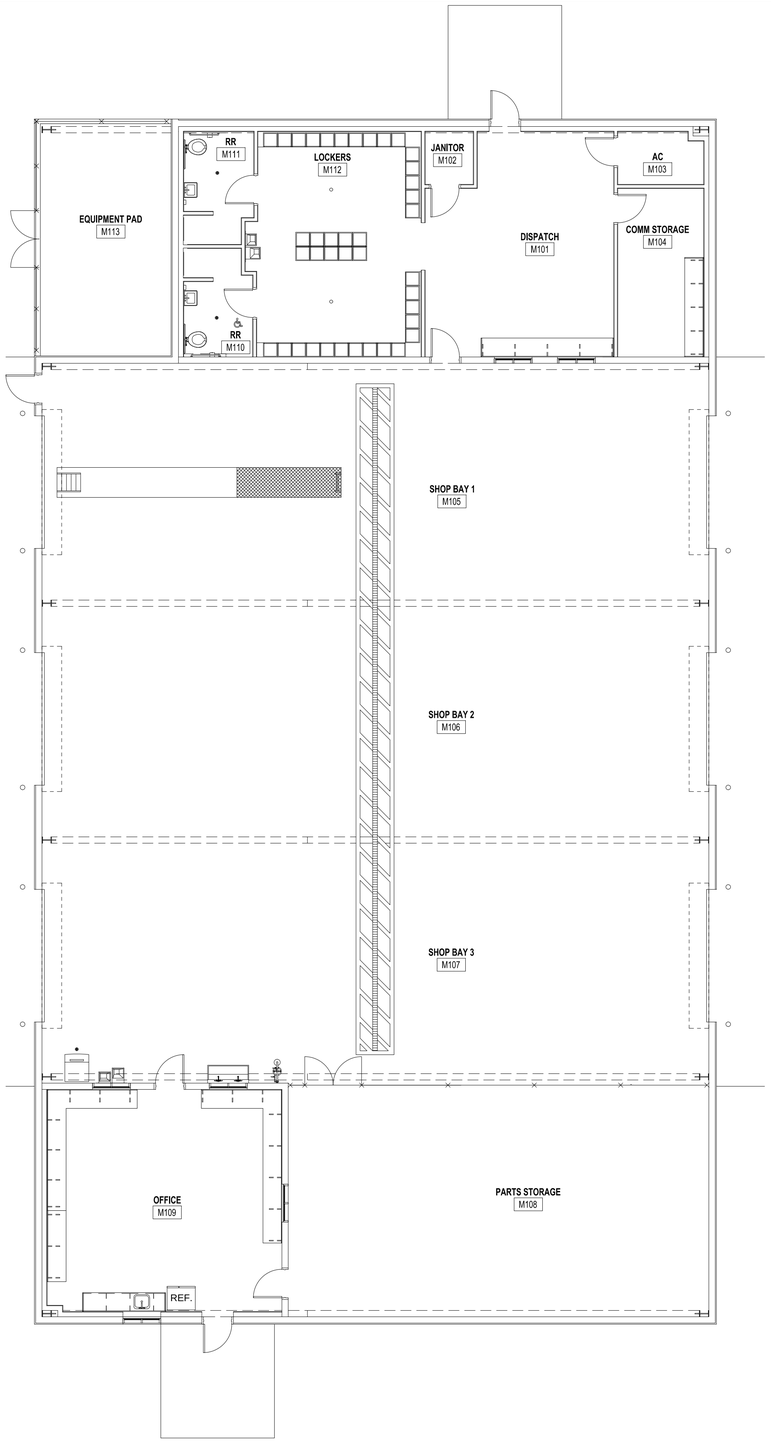
No.	Date	Description

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:
AUTOMATIC SPRINKLER SYSTEM PERFORMANCE SPECIFICATIONS

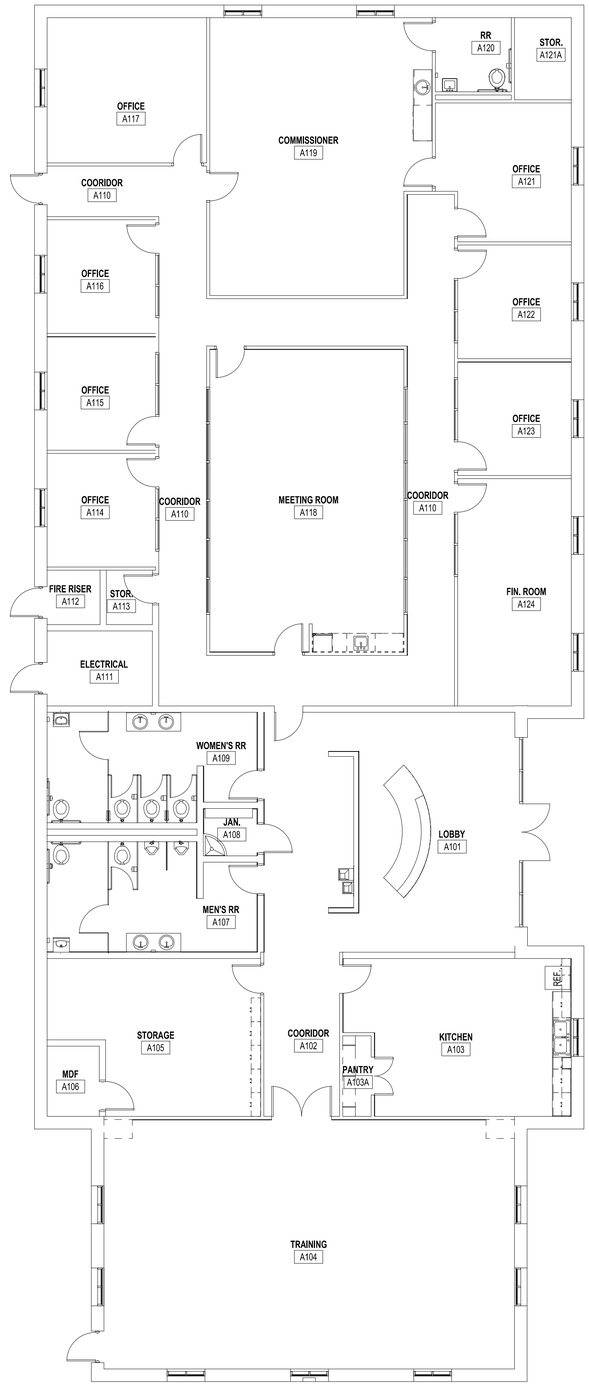
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02 CONCEPTUAL FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"



01 CONCEPTUAL FIRE PROTECTION PLAN

SCALE: 1/8" = 1'-0"

LEGEND

ORDINARY HAZARD GROUP 2
FOR STORAGE ROOMS, MECHANICAL ROOMS, LARGE STACK ROOM AREAS OF THE LIBRARY (IF ANY).
DESIGN DENSITY IS 0.20 GPM/SQ.FT.
250 GPM HOSE ALLOWANCE
DESIGN AREA=1500 SQ. FT.

ORDINARY HAZARD GROUP 1
FOR KITCHEN AREA AND LAUNDRY
DESIGN DENSITY IS 0.15 GPM/SQ.FT.
250 GPM HOSE ALLOWANCE
DESIGN AREA=1500 SQ. FT.

LIGHT HAZARD
FOR CLASS ROOMS, OFFICES, CORRIDORS, GYMNASIUM, CAFETERIA, AUDITORIUM (EXCEPT STORAGE AREA), LIBRARY (EXCEPT LARGE STACK ROOM AREAS).
DESIGN DENSITY IS 0.10 GPM/SQ.FT.
100 GPM HOSE ALLOWANCE
DESIGN AREA=1500 SQ. FT.

HIGH HAZARD
FOR STORAGE OF FLAMMABLE LIQUIDS
DESIGN DENSITY IS 0.60 GPM/SQ.FT.
500 GPM HOSE ALLOWANCE
DESIGN AREA=2000 SQ. FT.

THIS BUILDING SHALL BE SPRINKLERED BY A WET PIPE AUTOMATIC SPRINKLER SYSTEM. CONTRACTOR SHALL INSTALL THE AUTOMATIC FIRE EXTINGUISHING SYSTEM, THE DETECTION SYSTEM, THE FIRE ALARM SYSTEM AND THE PORTABLE EXTINGUISHING SYSTEM, AS REQUIRED FOR LIFE SAFETY IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS AND PROJECT PERFORMANCE SPECIFICATIONS. REFER TO ARCHITECTURAL PLANS FOR PROJECT AREAS INFORMATION.

THESE CONCEPTUAL FIRE SPRINKLER PROTECTION PLANS ARE FOR INFORMATION PURPOSES ONLY. ALL CIVIL AND FIRE SPRINKLER PLANS ARE TO BE SUBMITTED SEPARATELY TO THE FIRE DEPARTMENT FOR REVIEW OF COMPLIANCE TO THE RESPECTIVE GOVERNING STANDARDS.

THE EXACT ROUTING OF PIPING AND PLACEMENT OF SPRINKLER HEADS SHALL BE COORDINATED WITH ARCHITECT. THIS BUILDING INCLUDES INTRICATE CEILING CONFIGURATIONS THAT WILL NECESSITATE APPROVAL OF EACH AND EVERY PIPE RUN AND SPRINKLER HEAD. THIS CONTRACTOR SHALL DESIGN THE FIRE SPRINKLER SYSTEM USING GUIDELINES ESTABLISHED BY THE ARCHITECT. OBTAIN APPROVAL FROM THE ARCHITECT FOR EACH FIRE SPRINKLER HEAD IN EACH ROOM WITHIN THE BUILDING. THE GUIDELINES ESTABLISHED BY THE ARCHITECT SHALL IN NO WAY DEMINISH THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE A FULLY DESIGNED, SIZED, WORKING AND APPROVED AUTOMATIC FIRE SPRINKLER SYSTEM AS REQUIRED BY THE CONTRACT DRAWINGS, PROJECT MANUAL/SPECIFICATIONS, THE LAWS OF THE STATE OF TEXAS. PROVIDE A COMPLETE, WORKING AND APPROVED SYSTEM.

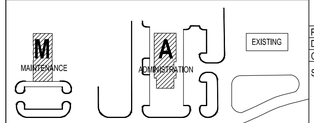
THESE CONCEPTUAL FIRE SPRINKLER PROTECTION PLANS ARE FOR INFORMATION PURPOSES ONLY. ALL CIVIL AND FIRE SPRINKLER PLANS ARE TO BE SUBMITTED SEPARATELY TO THE FIRE DEPARTMENT FOR REVIEW OF COMPLIANCE TO THE RESPECTIVE GOVERNING STANDARDS. (EDINBURG, TEXAS)

GENERAL NOTES:

A. REFER TO SHEET PL101 FOR GENERAL NOTES.

KEY NOTES: (#)

1. PROPOSED FIRE SPRINKLER SUPPLY LINE, REFER TO CIVIL UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE AND BACK FLOW PREVENTION OF LINE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS.
2. PROPOSED FIRE SPRINKLER FIRE DEPARTMENT CONNECTION LINE. REFER TO UTILITY PLAN FOR CONTINUATION OF PIPING. PIPE SHALL BE SIZED BY A LICENSED FIRE SPRINKLER DESIGNER. CIVIL ENGINEER SHALL COORDINATE WITH FIRE SPRINKLER DESIGNER FOR WATER SUPPLY LINE REQUIREMENTS AND FIRE DEPARTMENT CONNECTION TO MEET NFPA 13 INSTALLATION REQUIREMENTS. ALL FIRE PROTECTION PIPE SYSTEMS (INCLUDING ALL UNDERGROUND SERVICE PIPING) SHALL BE INSTALLED BY A LICENSED FIRE PROTECTION CONTRACTOR.



N
PLAN NORTH

KEY PLAN

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300 South 8th Street,
McAllen, Texas 78501
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PRELIMINARY
-NOT FOR CONSTRUCTION-

CONSULTANTS

HALFF
5000 WEST MILITARY, SUITE 100
MCALLEN, TEXAS 78503
TEL (956) 664-0286
FAX (956) 664-0282
Halff Associates firm registration number is 312

No.	Description	Date

PROJECT NO.: 28493
DRAWN BY: E.M.
CHECKED BY: M.J.M.

SHEET TITLE:
CONCEPTUAL FIRE PROTECTION PLAN

PROJECT NAME
HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDING

PROJECT LOCATION
2042 NORTH DOOLITTLE ROAD
EDINBURG, TX. 78542

PROJECT OWNER
HIDALGO COUNTY

PJ702

GENERAL NOTES

CONTRACTOR TO REVIEW ALL GENERAL NOTES PRIOR TO SUBMITTING A BID.

GENERAL NOTES

1. THESE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE INDICATED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING FOR EARTH BANKS, FORMS, SCAFFOLDING, PLANKING, SAFETY NETS, SUPPORT AND BRACING FOR CRANES, POLES, ETC. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE ARCHITECT OR THE ENGINEER DO NOT INCLUDE INSPECTION OF THE ABOVE AND BELOW ITEMS.

2. ALL CONSTRUCTION AND QUALITY OF MATERIALS SHALL COMPLY WITH THE GOVERNING BUILDING CODES AND REGULATIONS.

3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, TOLERANCES AND CONDITIONS AT THE JOB SITE BEFORE COMMENCEMENT OF WORK AND SHALL IMMEDIATELY REPORT ANY DISCREPANCIES OR OMISSIONS TO THE ARCHITECT AND ENGINEER IN WRITING BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. ANY OMISSION OR CONFLICT BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.

4. IN CASE OF CONFLICT, NOTES AND DETAILS ON THE BALANCE OF THE DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS, DRAWINGS TAKE PRECEDENCE OVER SPECIFICATIONS.

5. WHERE CONSTRUCTION DETAILS ARE NOT SPECIFICALLY SHOWN OR NOTED FOR ANY PART OF THE WORK, SUCH DETAILS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN FOR SIMILAR CONDITIONS AND MATERIALS. WHERE SUFFICIENTLY SIMILAR WORK IS NOT SHOWN, THE ENGINEER SHALL BE CONSULTED FOR CLARIFICATION.

6. EACH SUBCONTRACTOR IS CONSIDERED AN EXPERT IN HIS/HER RESPECTIVE FIELD AND SHALL, PRIOR TO THE SUBMISSION OF A BID OR PERFORMANCE OF WORK, NOTIFY THE GENERAL CONTRACTOR, ARCHITECT, ENGINEER OR OWNER, IN WRITING OF ANY WORK CALLED OUT ON THE DRAWINGS IN HIS/HER TRADE THAT CANNOT BE GUARANTEED OR PERFORMED AS INDICATED.

7. THE CONTRACTOR SHALL COORDINATE ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AS TO WEIGHTS AND EXACT LOCATIONS, WITH STRUCTURAL SUPPORTS. IN THE EVENT THAT THE PURCHASED EQUIPMENT DEVIATES IN WEIGHT AND LOCATION FROM THOSE INDICATED ON THE PLANS, THE ARCHITECT AND ENGINEER MUST BE NOTIFIED AND APPROVAL OBTAINED PRIOR TO INSTALLATION.

8. THIS STRUCTURE IS DESIGNED AS A STABLE UNIT AFTER ALL COMPONENTS ARE IN PLACE. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TEMPORARY BRACING AS REQUIRED TO INSURE THE VERTICAL AND LATERAL STABILITY OF THE ENTIRE STRUCTURE, OR ANY PORTION THEREOF, DURING CONSTRUCTION.

9. NEITHER THE OWNER NOR THE ARCHITECT NOR THE ENGINEER WILL ENFORCE SAFETY MEASURES OR REGULATIONS. THE CONTRACTOR SHALL DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING AND BRACING, AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS.

10. TRADE NAMES AND MANUFACTURERS REFERRED TO ARE FOR QUALITY STANDARDS ONLY. SUBSTITUTIONS WILL BE PERMITTED AS APPROVED BY THE ENGINEER.

11. ANY OPTIONS OR APPROVED SUBSTITUTIONS ARE FOR CONTRACTORS CONVENIENCE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CHANGES, ADDITIONAL COSTS (INCLUDING REDESIGN BY THE ENGINEER), AND COORDINATION WITH ALL ITEMS THAT THE SUBSTITUTIONS MAY IMPACT.

12. THE ARCHITECT AND ENGINEER ARE TO BE NOTIFIED IN WRITING WHEN CONSTRUCTION AT THE SITE BEGINS.

13. ANY QUESTIONS RELATED TO INTERPRETATION OR INTENT OF THESE DRAWINGS SHALL BE REFERRED TO THE ENGINEER.

14. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO LOCATE AND PROTECT ANY EXISTING UNDERGROUND OR CONCEALED CONDUIT, PLUMBING, OR OTHER UTILITIES PRIOR TO BEGINNING ANY WORK.

15. PIPES, DUCTS, SLEEVES, CHASES, ETC. SHALL NOT BE PLACED IN BEAMS OR WALLS UNLESS SPECIFICALLY SHOWN OR NOTED. NOR SHALL ANY STRUCTURAL MEMBER BE CUT FOR PIPES, DUCTS, ETC. UNLESS NOTED CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FOR INSTALLATION OF ANY ADDITIONAL PIPES, DUCTS, ETC.

DESIGN CRITERIA

DESIGN LOADS, STRUCTURAL ANALYSIS AND PREPARATIONS OF STRUCTURAL MEMBERS ARE BASED UPON THE FOLLOWING CRITERIA:

1. CODE: IBC 2006
2. LATERAL LOADS
   - A. WIND SPEED ($V_{3\,S}$): 105 MPH
   - B. EXPOSURE CATEGORY: C
   - C. IMPORTANCE FACTOR: 1.15
   - D. BUILDING CATEGORY III
   - E. SEISMIC DESIGN CATEGORY A
   - F. SITE CLASS D
3. VERTICAL LOADS
   - ROOF:
     - A. DEAD LOAD: PRE-ENGINEERED: SELF WEIGHT
     - DEAD LOAD: CONVENTIONAL STEEL: 25 PSF
     - B. LIVE LOAD: (REDUCIBLE): 20 PSF
     - C. GROUND SNOW LOAD: 0 PSF
     - D. CRANE LOADS: NONE
     - E. MECHANICAL UNITS: SEE PLANS
     - F. METAL BUILDING SYSTEM:
     - COLLATERAL LOAD: 5 PSF
     - BUILDING DRIFT:
     - WITH METAL SIDING: H/240
     - WITH MASONRY VENEER: H/600
     - GIRT DEFLECTION
     - METAL SIDING: H/240
     - MASONRY VENEER: H/600
4. GEOTECHNICAL ENGINEERING STUDY
   - A. PREPARED BY: L & G ENGINEERING LABORATORY
   - PROJECT NO.: GL11029
   - DATE: DEC. 13, 2011
   - B. SHALLOW FOUNDATION
   - MINIMUM FOOTING DEPTH BELOW THE FINISH GRADE: 24 INCHES
   - MINIMUM FOOTING WIDTH: 12 INCHES
   - ALLOWABLE BEARING PRESSURE (CONTINUOUS FOOTINGS):
   - IN NATIVE OR SELECT FILL MATERIAL: 2500 PSF
   - ALLOWABLE BEARING PRESSURE (ISOLATED FOOTINGS):
   - IN NATIVE OR SELECT FILL MATERIAL: 3000 PSF
   - WIRE REINFORCEMENT INSTITUTE (WRI) CRITERIA
   - CLIMATIC RATING (Cw): 15
   - EFFECTIVE PLASTICITY INDEX: 29
   - PVR: 1 INCH

SPECIAL NOTES TO OWNER

1. UNDER NORMAL CONDITIONS, AND FOR CONVENTIONAL BUILDINGS SUCH AS THE SUBJECT MATTER, REINFORCED CONCRETE AND MASONRY DEVELOP CRACKS. THE CRACKS ARE DUE TO INHERENT SHRINKAGE OF CONCRETE, CREEP AND RESTRAINING EFFECTS OF VERTICAL AND OTHER STRUCTURAL ELEMENTS TO WHICH THE BEAMS/SLABS ARE TIED.
2. THE CRACKS FORMED ARE NORMALLY COSMETIC. THE SLAB MAINTAINS ITS SERVICEABILITY AND STRENGTH REQUIREMENTS. IT IS EMPHASIZED THAT ALTHOUGH SPECIAL EFFORT IS MADE TO REDUCE THE POTENTIAL CAUSES AND NUMBER OF SUCH CRACKS, IT IS NOT PRACTICAL TO PROVIDE TOTAL ARTICULATION BETWEEN THE FLOOR SYSTEM AND ITS SUPPORTS AND THEREBY ACHIEVE COMPLETE INHIBITION OF ALL CRACKS.
3. MOST SUCH CRACKS DEVELOP OVER THE FIRST THREE YEARS OF THE LIFE OF THE FLOOR SYSTEM. CRACKS WHICH ARE WIDER THAN 0.01 INCH MAY NEED TO BE PRESSURE EPOXIED. REFER TO THE NOTES UNDER "ALLOWANCES".
4. THE OBJECT OF THE JOINTS PROVIDED IS TO ALLOW MOVEMENT. MOVEMENTS DUE TO CREEP AND SHRINKAGE MAY BE NOTICEABLE AT JOINTS UP TO TWO YEARS AFTER CONSTRUCTION, BEYOND WHICH MOVEMENTS DUE TO VARIATIONS IN TEMPERATURE WILL PERSIST.

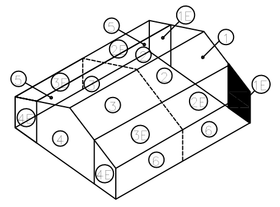
DESIGN WIND PRESSURE

MAIN WIND FORCE RESISTING SYSTEM

DESIGN WIND PRESSURE (WIND=105 mph) (EXPOSURE C & I=1.15) a=10ft a=8ft ADMIN. MAINT.

ROOF ANGLE = 1,19°

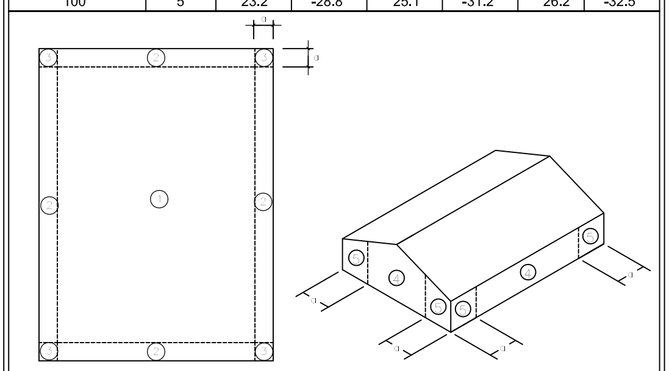
MEAN ROOF HEIGHT		H= 15'-0"		H= 22'-0"		H= 26'-6"	
SURFACE	G C	NET PRESSURE with $(+GC_{pi})$	NET PRESSURE with $(-GC_{pi})$	NET PRESSURE with $(+GC_{pi})$	NET PRESSURE with $(-GC_{pi})$	NET PRESSURE with $(+GC_{pi})$	NET PRESSURE with $(-GC_{pi})$
1	0,40	5,5	14,4	5,6	14,7	5,8	15,3
2	-0,69	-21,6	-12,7	-22,1	-12,9	-23,0	-13,5
3	-0,37	-13,7	-4,7	-14,0	-4,8	-14,5	-5,0
4	-0,29	-11,7	-2,7	-11,9	-2,8	-12,4	-2,9
1E	0,61	10,7	19,7	10,9	20,1	11,4	20,9
2E	-1,07	-31,1	-22,1	-31,7	-22,6	-33,0	-23,5
3E	-0,53	-17,7	-8,7	-18,0	-8,9	-18,8	-9,3
4E	-0,43	-15,2	-6,2	-15,5	-6,3	-16,1	-6,6
5	-0,45	-15,7	-6,7	-16,0	-6,9	-16,7	-7,1
6	-0,45	-15,7	-6,7	-16,0	-6,9	-16,7	-7,1



COMPONENTS & CLADDING

DESIGN WIND PRESSURE (WIND=105 mph) (EXPOSURE C AT I=1,15) a=10ft a=8ft ADMIN. MAINT.

MEAN ROOF HEIGHT		15'-0"		22'-0"		26'-8"	
EFFECTIVE WIND AREA (sf)	ZONE	ROOF 0 TO 7 DEGREES (psf)		ROOF 0 TO 7 DEGREES (psf)		ROOF 0 TO 7 DEGREES (psf)	
10	1	11.3	-27.7	12.2	-36.0	12.7	-31.2
20	1	10.1	-27.2	10.9	-35.4	11.4	-30.7
50	1	9.4	-26.0	10.2	-33.9	10.6	-29.3
100	1	8.9	-25.3	9.6	-33.0	10.0	-28.6
10	2	11.3	-46.4	12.2	-60.5	12.7	-52.3
20	2	10.1	-41.7	10.9	-54.4	11.4	-47.1
50	2	9.4	-34.7	10.2	-45.2	10.6	-39.1
100	2	8.9	-30.0	9.6	-39.1	10.0	-33.8
10	3	11.3	-69.9	12.2	-91.0	12.7	-78.8
20	3	10.1	-58.2	10.9	-75.7	11.4	-65.6
50	3	9.4	-41.7	10.2	-54.4	10.6	-47.1
100	3	8.9	-30.0	9.6	-39.1	10.0	-33.8
10	4	27.7	-30.0	30.0	-32.5	31.2	-33.8
20	4	26.5	-28.8	28.7	-31.2	29.9	-32.5
50	4	25.3	-27.4	27.4	-29.7	28.6	-30.9
100	4	23.2	-25.3	25.1	-27.4	26.2	-28.6
10	5	27.7	-37.1	30.0	-40.1	31.2	-41.8
20	5	26.5	-34.7	28.7	-37.6	29.9	-39.1
50	5	25.3	-31.2	27.4	-33.8	28.6	-35.2
100	5	23.2	-28.8	25.1	-31.2	26.2	-32.5



GENERAL NOTES FOR STRUCTURAL OBSERVATIONS

1. JOB SITE OBSERVATIONS BY THE PROFESSIONAL ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL CONSIST OF VISUAL OBSERVATION OF MATERIALS, EQUIPMENT OR CONSTRUCTION WORK FOR THE PURPOSE OF ASCERTAINING THAT THE WORK IS IN SUBSTANTIAL CONFORMANCE WITH THE CONTRACT DOCUMENTS AND WITH THE DESIGN INTENT.
2. SUCH OBSERVATIONS SHALL NOT BE RELIED UPON BY OTHERS AS ACCEPTANCE OF THE WORK, NOR SHALL IT BE CONSTRUED TO RELIEVE THE CONTRACTOR IN ANY WAY FROM HIS OBLIGATIONS AND RESPONSIBILITIES UNDER THE CONSTRUCTION CONTRACT.
3. SPECIFICALLY BUT WITHOUT LIMITATION, OBSERVATIONS BY THE DESIGN PROFESSIONAL SHALL NOT REQUIRE THE DESIGN PROFESSIONAL TO ASSUME RESPONSIBILITY FOR THE MEANS AND METHODS OF CONSTRUCTION, NOR FOR SAFETY ON THE JOB SITE, NOR FOR ITEMS NOT INSTALLED OR IMPROPERLY INSTALLED BY THE CONTRACTOR OR HIS/HER SUBCONTRACTORS.
4. NOTIFY ENGINEER 48 HOURS IN ADVANCE WHEN A STRUCTURAL OBSERVATION IS REQUIRED.
5.

CONSTRUCTION STAGE	REQUIRED
BEFORE PLACEMENT OF CONCRETE FOR SLAB/FOUNDATION	X
BEFORE PLACEMENT OF FOUR (4) FEET OF GROUT IN CMU & BMU WALL	X
AFTER FRAMING OF ROOF STRUCTURE BUT BEFORE PLACEMENT OF ROOFING MATERIAL.	X

SHOP DRAWINGS AND SUBMITTALS

1. SHOP DRAWINGS SHALL BE PREPARED AND SUBMITTED FOR REVIEW TO THE STRUCTURAL ENGINEER FOR EACH STRUCTURAL BUILDING MATERIAL AS INDICATED IN THE STRUCTURAL GENERAL NOTES AND THE CONTRACT SPECIFICATIONS. SEE THE CONTRACT SPECIFICATIONS FOR SUBMITTAL PROCEDURES AND ADDITIONAL INFORMATION.
2. SHOP DRAWINGS SHALL USE DRAFTING LINE WORK AND LETTERING THAT IS CLEARLY LEGIBLE. SHOP DRAWINGS SHALL NOT CONTAIN REPRODUCTIONS OF THE CONTRACT DRAWING PLANS OR DETAILS.
3. SUBMIT ONE REPRODUCIBLE VELLUM AND ONE COPY OF EACH SHOP DRAWING.
4. SHOP DRAWINGS SHALL NOT SHOW MATERIALS FOR MORE THAN ONE LEVEL OF THE SAME PLAN.
5. SHOP DRAWINGS SHALL SHOW CLEAR AND COMPLETE INFORMATION FOR THE FABRICATION (DETAIL SHEETS AND/OR MATERIAL LISTS) AND INSTALLATION.
6. ALLOW A MINIMUM OF (2) WEEKS FOR REVIEW OF EACH SET OF SHOP DRAWINGS.
7. CONTRACTOR SHALL REVIEW THE SHOP DRAWINGS SUBMITTED BY THE SUB-CONTRACTOR AND COORDINATE SHOP DRAWINGS WITH ALL OTHER TRADES PRIOR TO SUBMITTING THEM FOR ENGINEER REVIEW.
8. CONTRACTOR SHALL ANSWER ALL QUESTIONS OR CLARIFICATIONS BY THE SUB-CONTRACTOR BEFORE SUBMITTING TO ENGINEER FOR REVIEW. ANY QUESTIONS THAT THE CONTRACTOR CANNOT ANSWER WITH THE INFORMATION ON THE DRAWINGS SHALL CLEARLY BE MARKED FOR THE ENGINEER FOR REVIEW.
9. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS, SEE NOTE NUMBER 3 UNDER GENERAL NOTES.
10. REVIEW OF SHOP DRAWINGS BY THE ENGINEER IS FOR GENERAL CONFORMANCE TO THE STRUCTURAL DRAWINGS. APPROVAL OF THE SHOP DRAWINGS BY THE ENGINEER DOES NOT RELIEF THE CONTRACTOR FOR ANY ERRORS IN DIMENSIONS OR MATERIALS INDICATED ON THE SHOP DRAWINGS.
11. IF THERE IS ANY DISCREPANCY BETWEEN THE STRUCTURAL DRAWINGS AND SHOP DRAWINGS, THE INFORMATION SHOWN ON THE STRUCTURAL DRAWINGS GOVERN. INFORMATION THAT IS NOT INDICATED ON THE SHOP DRAWINGS SHALL BE OBTAINED FROM THE STRUCTURAL DRAWINGS.
12. PROVIDE SUBMITTALS FOR THE FOLLOWING ITEMS:

ITEM	REQUIRED
A. CONCRETE MIX DESIGN	X
B. CURING COMPOUND FOR CONCRETE	X
C. REINFORCING STEEL	X
D. STRUCTURAL STEEL	X
E. STEEL JOIST	X
F. METAL DECKING (INDICATE LAYOUT AND TYPES OF DECK PANELS, ANCHORAGE DETAILS, REINFORCING CHANNELS, PANS, DECK OPENINGS, SPECIAL JOINTING, ACCESSORIES, AND ATTACHMENTS TO OTHER CONSTRUCTION.)	X
G. MORTAR MIX DESIGN	X
H. GROUT MIX DESIGN	X
I. MASONRY ASSEMBLAGE	X
J. PRE-MANUFACTURED METAL BUILDING (INCLUDING CALC'S & REACTIONS)	X

REINFORCING STEEL

1. BAR REINFORCEMENT SHALL CONFORM TO THE FOLLOWING GRADES OF ASTM A615, INCLUDING SUPPLEMENT S1. GRADE 40 - #3 AND SMALLER, GRADE 60 - #4 AND LARGER
2. DETAILS OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH CHAPTER 7 OF THE AMERICAN CONCRETE INSTITUTE (ACI) 318, UNLESS OTHERWISE NOTED.
3. VERTICAL REINFORCEMENT SHALL BE TIED AND FIXED IN POSITION AT THE TOP AND BOTTOM AND AT INTERMEDIATE LOCATIONS, SPACED NOT GREATER THAN 48 INCHES O.C.
4. WELDED STEEL WIRE FABRIC REINFORCEMENT SHALL CONFORM TO ASTM A185
5. LAPS OF WELDED STEEL WIRE FABRIC AT SPLICES SHALL BE NOT LESS THAN 12 INCHES.
6. WALLS, PILASTERS, COLUMNS SHALL BE DOWELED TO THE SUPPORTING FOOTINGS WITH REINFORCEMENT OF THE SAME SIZE, GRADE AND AT THE SAME SPACING AS THE VERTICAL REINFORCEMENT IN THE WALLS, PILASTERS, OR COLUMNS.
7. BAR SUPPORTS SHALL BE PROVIDED IN ACCORDANCE WITH THE PROVISIONS OF "BAR SUPPORT SPECIFICATIONS" AS CONTAINED IN THE LATEST EDITION OF THE "MANUAL OF STANDARD PRACTICE" BY THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI), EXCEPT AT SLABS: THE REINFORCING SHALL BE SUPPORTED BY CHAIRS SPACED AT 36 INCHES O.C. FOR #3 REBARS AND 48 INCHES ON CENTER FOR LARGER REBARS. CHAIRS FOR SLAB ON GRADE SHALL BE CONCRETE BLOCKS.
8. REINFORCING STEEL DETAILING, BENDING AND PLACING SHALL BE IN ACCORDANCE WITH THE CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE", LATEST EDITION.
9. ALL REINFORCEMENT SHALL BE SECURELY TIED IN PLACE BEFORE PLACING CONCRETE OR GROUT.
10. PROVIDE CORNER BARS TOP AND BOTTOM AT ALL BEAM CORNERS AND DEAD END BEAM INTERSECTIONS. BARS TO EQUAL SIZE AND QUANTITY OF THE NOTED BEAM STEEL. BARS SHALL LAP BEAM REINFORCEMENTS.
11. BARS DETAILED AS CONTINUOUS SHALL BE LAPPED AT SPLICES.
12. EXTEND THE SLAB REINFORCING STEEL, PERPENDICULAR TO BEAM, TO THE TOP OUTSIDE REINFORCING BAR OF PERIMETER BEAMS. START THE SLAB REINFORCING STEEL, PARALLEL TO BEAM, NOT MORE THAN 6" FROM THE TOP INSIDE REINFORCING BAR OF PERIMETER BEAMS
13. PROVIDE #4 "Z" BARS AT 12" ON CENTER WHERE THE SLAB STEPS DOWN MORE THAN 3". THE "Z" BARS SHALL LAP THE MAIN SLAB REINFORCING STEEL.
14. ALL CONDUIT OR PLUMBING LINES IN SLAB SHALL BE PLACED BELOW SLAB THICKNESS AREA.
15. WELDING OF CROSSING BARS AND TACK WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED.
16. WELDING OF REINFORCING STEEL IS NOT PERMITTED.
17. CONTRACTOR SHALL SUBMIT REINFORCING STEEL SHOP DRAWINGS FOR REVIEW BEFORE FABRICATION AND INSTALLATION.
18. LAPS AT BAR SPLICES, UNLESS NOTED OTHERWISE, SHALL BE AS FOLLOWS:

MASONRY - GRADE 60: LAP 50 DIA. (30" MIN.)
GRADE 40: LAP 48 DIA. (24" MIN.)

CONCRETE - LAP PER SCHEDULE BELOW

BAR SPLICE LAP LENGTH IN CONCRETE

BAR SIZE	f'c = 2000 PSI	f'c = 3000 PSI	f'c = 4000 PSI	f'c = 5000 PSI
#3	22	22	22	22
#4	29	29	29	29
#5	40	40	40	40
#6	57	57	57	57
#7	77	63	54	54
#8	100	82	71	71

FOR WELDED WIRE FABRIC: SPACING OF WIRE PLUS 12".

19. CONCRETE COVER FOR REINFORCING AS FOLLOWS:

EXPOSURE CONDITION	MINIMUM COVER	TOLERANCE
DRILLED PIERS, FOOTINGS AND OTHER PRINCIPAL STRUCTURAL MEMBERS IN WHICH CONCRETE IS DEPOSITED AGAINST GROUND:	3"	3/8"
WHERE CONCRETE SURFACES, AFTER REMOVAL OF FORMS, ARE EXPOSED TO WEATHER OR GROUND:		
FOR BARS 5/8" IN DIAMETER	2"	1/4"
FOR BARS 5/8" OR LESS IN DIAMETER	1 1/2"	1/4"
WHERE SURFACES ARE NOT DIRECTLY EXPOSED TO WEATHER OR GROUND:		
FOR SLAB ON GRADE (FROM TOP OF SLAB)	1 1/2"	1/4"
FOR BEAMS, COLUMNS	1 1/2"	1/4"
FOR JOISTS AND SLABS	1"	1/8"

ABBREVIATIONS

AMSL	ABOVE MEAN SEA LEVEL	MANUF.	MANUFACTURER
ARCHL	ARCHITECTURAL	MAX.	MAXIMUM
BOT.	BOTTOM	MIN.	MINIMUM
BRG.	BEARING	N.G.E.	NATURAL GRADE ELEVATION
C.L.C.	CENTERLINE COLUMN	O.C.	ON CENTER
CLR.	CLEARANCE	LBS.	POUNDS
CMU	CONCRETE MASONRY UNIT	REINF'G	REINFORCING
CONC.	CONCRETE	SIM.	SIMILAR
CONT.	CONTINUOUS	THK.	THICK
DIA.	DIAMETER	(T) & (B)	TOP AND BOTTOM
E.W.	EACH WAY	T.O.P.	TOP OF PARAPET
EMBED.	EMBEDMENT	T.O.S.	TOP OF STEEL
F.F.E.	FINISH FLOOR ELEVATION	T.O.W.	TOP OF WALK
F.O.W.	FACE OF WALL	TYP.	TYPICAL
F.O.C.	FACE OF COLUMN	U.N.O.	UNLESS NOTED OTHERWISE
(H)	HORIZONTAL	(V)	VERTICAL
(LLH)	LONG LENGTH HORIZONTAL		
(LLV)	LONG LENGTH VERTICAL		

STRUCTURAL STEEL

1. MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.
2. STRUCTURAL STEEL SHALL COMPLY WITH THE FOLLOWING ASTM DESIGNATIONS:

MATERIAL	DESIGNATION	STRENGTH
ANCHOR RODS	F1554	Fy=36 ksi
PLATES	A36	Fy=36 ksi
ANGLES	A36	Fy=36 ksi
CHANNELS	A36	Fy=36 ksi
WIDE FLANGE SHAPES	A992	Fy=50 ksi
STEEL PIPE	A53 GRADE B	Fy=35 ksi
SQUARE & RECT. STEEL TUBES (HSS)	A500 GRADE B	Fy=46 ksi
ROUND TUBES (HSS)	A500 GRADE B	Fy=42 ksi

3. ALL STRUCTURAL STEEL SHALL BE FABRICATED, ERECTED, AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS AS AMENDED TO DATE AND THE CODE OF STANDARD PRACTICE, LATEST EDITION AS ADOPTED BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AMENDED AS FOLLOWS:
   - SECTION 4.2.1, DELETE FIRST TWO SENTENCES.
   - SECTION 7., ALL REFERENCE TO OWNER SHALL BE CHANGED TO GENERAL CONTRACTOR.
   - SECTION 7.9.3, THE CONTRACTOR SHALL PROVIDE THE SEQUENCE AND SCHEDULE OF PLACEMENT OF NON-SELF SUPPORTING STEEL FRAMES.
   - SECTION 7.9.4, THE CONTRACTOR TO DESIGN SHORES, JACKS OR LOADS.
4. WELDING SHALL BE DONE IN ACCORDANCE WITH THE STANDARD CODE FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION AS PUBLISHED BY THE AMERICAN WELDING SOCIETY, EXCEPT THAT ALL WELDING SHALL BE DONE BY THE ELECTRIC ARC PROCESS, ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS AND SHALL CONFORM TO ANSI/AWS D1.1-04
5. DETAILED AND OR SCHEDULED CONNECTIONS HAVE BEEN DESIGNED BY STRUCTURAL ENGINEER. ANY CONNECTION NOT DETAILED OR SCHEDULED OR ALTERED FOR FABRICATION PURPOSES SHALL BE SIZED AND DETAILED BY FABRICATOR AND SHALL BE MARKED FOR ENGINEER'S VERIFICATION. FABRICATOR SIZED AND DETAILED CONNECTIONS SHALL SUPPORT ONE HALF THE TOTAL UNIFORM LOAD CAPACITY SHOWN IN THE TABLES OF UNIFORM CONSTANTS, PART 2 OF THE AISC MANUAL OF STEEL CONSTRUCTION FOR THE GIVEN BEAM, SPAN AND GRADE OF STEEL SPECIFIED. THE EFFECT OF ANY CONCENTRATION LOADS MUST BE TAKEN INTO ACCOUNT.
6. SEE ARCHITECTURAL PLANS FOR MISCELLANEOUS STEEL ITEMS NOT INDICATED ON STRUCTURAL DRAWINGS. STEEL ITEMS SHOWN ON ARCHITECTURAL DRAWINGS AND NOT SPECIFIED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGN BY THE STEEL FABRICATOR, SEE DESIGN CRITERIA FOR LOADING.
7. ALL WELDED CONNECTIONS SHALL BE MADE USING 1/4" FILLET WELD, U.N.O.
8. ALL BOLTED CONNECTIONS SHALL BE MADE USING 3/4" DIAMETER HIGH STRENGTH BOLTS, ASTM A325, BEARING TYPE CONNECTION w/ WASHERS ASTM F436, U.N.O. ON DESIGN DRAWINGS. SPECIAL INSPECTION REQUIRED FOR ALL HIGH STRENGTH BOLTING. ALL NUTS SHALL BE PER ASTM A563
9. ALL CONNECTION PLATES AND STIFFENERS SHALL BE MADE WITH 1/4" THICK PLATES, UNLESS OTHERWISE NOTED ON PLANS.
10. ALL STEEL (INCLUDING BOLTS) EXPOSED TO THE WEATHER SHALL BE HOT DIPPED GALVANIZED. (INCLUDES STEEL THAT IS ONLY COVERED WITH PLASTER OR STUCCO). SEE ARCHITECTURAL PLANS IF STRICTER REQUIREMENTS ARE REQUIRED.
11. ALL EXPOSED STEEL SHALL FOLLOW SECTION 10 OF THE CODE OF STANDARD PRACTICE OF AISC. SECTION 10 OF THE CODE ADDRESSES ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS)
12. CONNECTIONS SHALL BE PER HOLLOW STRUCTURAL SECTIONS CONNECTION MANUAL BY AISC
13. WHERE STEEL MEMBER PASS THROUGH CMU WALLS, PROVIDE HALF INCH GAP BETWEEN THE CMU AND THE STEEL MEMBER. PROVIDE ELASTOMERIC MATERIAL BETWEEN THE THE STEEL MEMBER AND CMU WALL. PROVIDE FIRE PROOF ELASTOMERIC MATERIAL WHERE REQUIRED.
14. ALL BEAMS NOT SHOWN SHALL BE W18x35. ALL COLUMNS NOT SHOWN SHALL BE HSS5x5x5/16.
15. STEEL SHOP SHALL BE AISC CERTIFIED OR IAS CERTIFIED.
16. HOLES FOR BOLTS IN STRUCTURAL STEEL SHALL BE DRILLED OR PUNCHED. BURNING OF HOLES SHALL NOT BE PERMITTED, UNLESS NOTED OTHERWISE, HOLES SHALL BE STANDARD SIZE 1/16 INCH LARGER THAN THE BOLT.
17. ALL STRUCTURAL STEEL SHAPES SHALL BE PRIMED WITH A RUST RESISTANT PRIMER BEFORE SHIPMENT TO THE PROJECT SITE. PRIMER SHALL NOT BE APPLIED TO THE IMMEDIATE AREA OF STEEL INTENDED TO RECEIVE SLIP CRITICAL BOLTED CONNECTIONS
18. HIGH STRENGTH BOLTS INSTALLATION SHALL BE CONTINUOUSLY INSPECTED BY A SPECIAL INSPECTOR, FOLLOWING ARE REQUIREMENTS OF THE SPECIAL INSPECTOR:
   - A. HE SHALL VERIFY THE MILL CERTIFICATES FOR MATERIAL.
   - B. HE SHALL VERIFY THAT THE MATERIAL USED ARE PROPERLY STORED AND PREPARED FOR USE.
   - C. HE SHALL VERIFY THAT CONSTRUCTION DETAILS, PROCEDURES, TOOL CALIBRATIONS WORKMANSHIP ARE IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND AND BUILDING CODE.
   - D. FOR SNUG-TIGHT CONNECTIONS, HE SHALL VERIFY THAT THE PLIES OF THE CONNECTED ELEMENTS HAVE BEEN BROUGHT INTO SNUG CONTACT WITH EACH OTHER.
   - E. FOR SLIP-TIGHT CONNECTIONS, HE SHALL VERIFY THE PRETENSION METHOD SELECTED BY THE CONTRACTOR HAS INDUCED THE REQUIRED MINIMUM TENSION IN THE BOLT.
   - F. A CERTIFICATE OF INSPECTION SHALL BE FURNISHED BY THE SPECIAL INSPECTOR TO THE BUILDING OFFICIAL PRIOR TO HIS INSPECTION AND TO THE ARCHITECT AND ENGINEER.
19. WELDING IN THE FIELD SHALL BE CONTINUOUSLY INSPECTED, BY A SPECIAL INSPECTOR FOLLOWING ARE REQUIREMENTS OF THE SPECIAL INSPECTOR:
   - A. HE SHALL VERIFY THAT THE MATERIAL USED ARE PROPERLY STORED AND PREPARED FOR USE.
   - B. HE SHALL VERIFY THE WELDER'S QUALIFICATIONS.
   - C. HE SHALL VERIFY THAT CONSTRUCTION DETAILS, PROCEDURES AND WORKMANSHIP ARE IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND BUILDING CODE.
   - D. A CERTIFICATE OF INSPECTION SHALL BE FURNISHED BY THE SPECIAL INSPECTOR TO THE BUILDING OFFICIAL PRIOR TO HIS INSPECTION AND TO THE ARCHITECT AND ENGINEER.

STRUCTURAL MASONRY (SPECIAL INSPECTION)

INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED
1. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:		
A. PROPORTIONS OF SITE PREPARED MORTAR.		X
B. CONSTRUCTION OF MORTAR JOINTS.		X
C. LOCATION OF REINFORCEMENT AND CONNECTORS.		X
2. THE INSPECTION PROGRAM SHALL VERIFY:		
A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS.		X
B. TYPE, SIZE AND LOCATION OF DOWELS, ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES AND OTHER CONSTRUCTION		X
C. CHECK GROUT MIX FOR COMPLIANCE WITH CODE AND SPECIFICATIONS.		X
D. WELDING OF REINFORCING BARS.	X	
E. PROTECTION OF MASONRY DURING COLD WEATHER (TEMP. BELOW 40 °F) OR HOT WEATHER (TEMP. ABOVE 90 °F).		X
F. CUTTING OF CLEAN OUT HOLES, KNOCKING DOWN OF FINS AND REMORAL OF DEBRIS.		X
3. PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:		
A. GROUT SPACE IS CLEAN.	X	
B. PLACEMENT OF REINFORCEMENT AND CONNECTOR.	X	
C. CHECK GROUT MIX FOR COMPLIANCE WITH CODE AND SPECIFICATIONS.	X	
D. CONSTRUCTION OF MORTAR JOINTS.	X	
E. CHECK INSTALLATION OF CLEAN OUT CLOSURE.	X	
4. GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE WITH CODE AND CONSTRUCTION DOCUMENT PROVISIONS. (SUCH AS MECHANICAL VIBRATION DURING PLACEMENT AND LATER DURING RECONSOLIDATION.)	X	
5. PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS SHALL BE OBSERVED.	X	
6. COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE PROVISIONS OF THE CONSTRUCTON DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.		X
7. CHECK THAT CURING REQUIREMENTS ARE BEING FOLLOWED		X
8. VERIFY PLACEMENT OF ANCHORS INTO CONCRETE MASONRY UNITS.	X	
9. FREQUENCY OF TESTS:		
A. CONCRETE MASONRY UNIT TEST- FOR EACH TYPE, CLASS, AND GRADE OF CONCRETE MASONRY UNIT INDICATED, TEST UNITS BY METHOD OF SAMPLING AND TESTING OF ASTM C140. ONE SET OF CMU STANDARD PRISM TEST SHALL BE CONDUCTED FOR EVERY 5,000 SQ. FT. OF WALL DURING CONSTRUCTION IN ACCORDANCE TO ASTM C1314, BUT NOT LESS THAN ONE SET OF 3 MASONRY PRISMS FOR THE PROJECT.		X
B. MORTAR TEST: FOR EACH TYPE INDICATED, TEST MORTAR BY METHODS OF SAMPLING AND TESTING OF ASTM C780. CONDUCT TESTS NO LESS FREQUENTLY THAN THAT REQUIRED TO EVALUATE MORTAR USED TO INSTALL EACH INCREMENT OF MASONRY UNITS INDICATED ABOVE FROM WHICH SAMPLES ARE TAKEN FOR TESTING. TEST MORTAR FOR EVERY 1,500 SQ. FT. OF WALL CONSTRUCTION.		X
C. GROUT TEST: AT START OF GROUTNG OPERATION, TAKE ONE TEST PER DAY FOR FIRST 3 DAYS. EACH GROUT TEST CONSISTS OF THREE SPECIMENS MADE IN ACCORDANCE WITH ASTM C1019. AFTER FIRST THREE TESTS, SPECIMENS FOR CONTINUING QUALITY CONTROL SHOULD BE TAKEN ONCE A WEEK FOR EVERY 25 CUBIC YARDS OF GROUT OR FOR EVERY 2,500 SQ. FT. OF WALL, WHICHEVER COMES FIRST.		X
10. MASONRY TESTING REQUIREMENTS		X

TESTING METHOD OPTIONS	PRIOR TO CONSTRUCTION	DURING CONSTRUCTION
METHOD 1:		
MASONRY PRISM TESTING	5 PRISMS	3 PRISMS FOR EVERY 5,000 S.F. OF WALL
METHOD 2:		
MASONRY PRISM TEST RECORD	APPROVED 30 PRISM RECORD	3 PRISMS FOR EVERY 5,000 S.F. OF WALL
METHOD 3:		
UNIT STRENGTH METHOD	UNITS AND GROUT OR 5 PRISM	UNITS AND GROUT OR 3 PRISMS FOR EVERY 5,000 S.F. OF WALL

PERIODIC INSPECTIONS SHALL BE PERFOMED AT LEAST TWICE A DAY FOR A MINIMUM
OF 1 HOUR EACH VISIT.

ALL TESTS AND INSPECTIONS SHALL BE PERFORMED BY AN INDEPENDENT INSPECTION AGENCY. INSPECTION REPORTS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS. JOB SITE VISITS BY STRUCTURAL ENGINEER DO NOT CONSTITUTE ANY NEC TY SUBSTITUTION FOR INSPECTION UNLESS THE STRUCTURAL ENGINEER IS CONTRACTED TO DO SO.
NOTE: IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SEE THAT THESE TESTS AND INSPECTIONS ARE PERFORMED.

CAST–IN–PLACE CONCRETE

1. VERIFY ALL DIMENSIONS. COORDINATE WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION AND NOTIFY ARCHITECT AND/OR ENGINEER OF ANY DISCREPANCIES.
2. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE SPECIFICATIONS, ACI #301-05, OR LATEST EDITION. DRILLED PIERS SHALL COMPLY WITH ACI 336.1-01 AND ACI 336.3R-05
3. ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS, AND ALL ACCESSORIES UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH THE ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE", ACI #315 LATEST EDITION
4. THE MINIMUM 28 DAYS CYLINDER STRENGTH SHALL BE AS FOLLOWS:

LOCATION	STRENGTH AT 28 DAYS	MAXIMUM SLUMP	MAXIMUM AGGREGATE	WATER/CEMENT RATIO
FOUNDATIONS	3000 PSI	5"	1"	0.50
SLAB ON GRADE	3000 PSI	5"	1"	0.50
GRADE BEAMS	3000 PSI	5"	1"	0.50
WALL AND BEAMS	3000 PSI	6"	3/4"	0.50

*ALL MIXES SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENTITIOUS MATERIAL PER CUBIC YARD REGARDLESS OF STRENGTH OBTAINED.

5. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED IN SLABS OR BEAMS.
6. VERTICAL CONSTRUCTION JOINTS IN SLABS ARE TO BE AS SHOWN ON PLANS OR AS APPROVED BY ENGINEER.
7. ALL OPENINGS IN SLAB (FOR PIPING, DRAINS, ETC.) SHALL BE SEALED WITH 1/2 SEALANT '2A' (SELF-LEVELING 2-PART POLYURETHANE).
8. UTILITIES THAT PROJECT THROUGH SLAB FLOORS SHOULD BE DESIGNED WITH EITHER SOME DEGREE OF FLEXIBILITY OR WITH SLEEVES IN ORDER TO PREVENT DAMAGE TO THESE LINES SHOULD VERTICAL MOVEMENT OCCUR.
9. BACKFILL AROUND PERIMETER TO PROVIDE POSITIVE DRAINAGE AWAY FROM SLAB.
10. FLOOR TOLERANCES

F-NUMBER SYSTEM	COMPOSITE	MINIMUM LOCAL VALUE
FLATNESS $(F_F)F$	30	23
LEVELNESS $(F_L)_L$	25	19

IN ALL INSTANCES MINIMUM SLAB THICKNESS SHALL BE OBTAINED. COORDINATE SLAB FINISHES WITH ARCHITECTURAL PLANS.

11. ANCHOR BOLTS, DOWELS, INSERTS, ETC. SHALL BE SECURELY TIED IN PLACE PRIOR TO PLACING CONCRETE.

CAST–IN–PLACE CONCRETE (CONT.)

12. REFER TO ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR ALL MOLDS. GROOVES, REGLETS, ORNAMENTAL CLIPS, PIPES, CONDUITS, INSERTS, ETC. TO BE CAST IN CONCRETE. PROVIDE OVERSIZED SLEEVES FOR PLUMBING AND ELECTRICAL CONDUITS AND PIPES. NO PIPES OR DUCTS SHALL BE PLACED IN CONCRETE, FOOTINGS, OR SLAB UNLESS SPECIFICALLY DETAILED IN THESE PLANS, OR AS DIRECTED BY THE ENGINEER.
13. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED.
14. CONCRETE TESTING SHALL BE ONE SET OF CYLINDERS FOR EVERY 50 CUBIC YARDS OR PORTION THEREOF FOR EACH TYPE OF CONCRETE PLACED ON A GIVEN DAY. ONE SET CONSISTS OF 2 CYLINDERS TESTED FOR COMPRESSION AT 7 DAYS AND 2 CYLINDERS AT 28 DAYS. A MINIMUM OF THREE SETS PER DAY OR TYPE OF CONCRETE SHALL BE TAKEN.
15. NO CONCRETE PLACEMENT IS PERMITTED WHEN AMBIENT TEMPERATURE IS BELOW 50°F.
16. NO CONCRETE PLACEMENT IS PERMITTED DURING RAIN FALL.
17. ALL EXPOSED CONCRETE BEAMS AND COLUMNS SHALL BE FREE OF HONEYCOMBS AND DISCOLORATION. CONCRETE SHALL HAVE A SMOOTH SURFACE.
18. VAPOR BARRIER

A. VAPOR BARRIER (UNDER SLAB): SHALL CONFORM TO ASTM E1745, CLASS A OR BETTER AND SHALL HAVE A MINIMUM WATER VAPOR PERMEANCE OF 0.01 PERMS WHEN TESTED IN ACCORDANCE WITH ASTM E96. VAPOR BARRIER SHALL BE NOT LESS THAN 15 MILS THICK.

APPROVED PRODUCTS
A. STEGO WRAP (15 MIL). BY STEGO INDUSTIES LLC. (887) 464-7834.

INSTALLATION
A. LAY SHEETS SMOOTHLY, STRETCH AND WEIGHT EDGES, LAP JOINTS TWELVE (12) INCHES AND SEAL WITH TAPE AS SPECIFIED BY VAPOR RETARDANT MANUFACTURER. TURN BARRIER UP SIX 6 INCHES AT WALLS AND AT ALL PIPES, ABUTMENTS, ETC. TAPE AND SEAL AT PENETRATIONS AND AT EDGES.
B. AT GRADE BEAMS, EXTEND VAPOR RETARDANT DOWN SIDES OF BEAM TRENCHES (AND FOOTING EXCAVATIONS) TO WITHIN 4" OF TRENCH BOTTOM AND SECURE TO SIDES OF TRENCH. DO NOT EXTEND RETARDANT ACROSS BOTTOM OF BEAM TRENCH.

PATCHING:
A. PATCH ALL PUNCTURES WITH A MINIMUM OVERLAP OF 6" IN ALL DIRECTIONS AND TAPE AROUND ENTIRE PERIMETER OF REPAIR.

A. PREINSTALLATION CONFERENCE:
1. AT LEAST 30 DAYS PRIOR TO THE START OF THE CONCRETE SLAB CONSTRUCTION SCHEDULE, THE CONTRACTOR SHALL CONDUCT A MEETING TO REVIEW THE PROPOSED MIX DESIGNS AND TO DISCUSS THE REQUIRED METHODS AND PROCEDURES TO ACHIEVE THE REQUIRED CONCRETE CONSTRUCTION, THE CONTRACTOR SHALL SEND A PRE-CONCRETE CONFERENCE AGENDA TO ALL ATTENDEES 20 DAYS PRIOR TO THE SCHEDULED DATE OF THE CONFERENCE.
2. THE CONTRACTOR SHALL REQUIRE RESPONSIBLE REPRESENTATIVES OF EVERY PARTY CONCERNED WITH THE CONCRETE WORK TO ATTEND THE CONFERENCE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A) CONTRACTOR'S SUPERINTENDENT
   B) LABORATORY RESPONSIBLE FOR CONCRETE MIXES AND/ OR FIELD QUALITY CONTROL
   C) READY-MIX CONCRETE PRODUCER
   D) CONCRETE SUBCONTRACTOR
   E) ADMIXTURE MANUFACTURER(S)
   F) LIQUID DENSIFIER AND SEALER MANUFACTURER
   G) LIQUID DENSIFIER AND SEALER APPLICATOR
   H) JOINT FILLING APPLICATOR
3. MINUTES OF THE MEETING SHALL BE RECORDED, TYPED AND PRINTED BY THE CONTRACTOR AND DISTRIBUTED BY HIM TO ALL CONCERNED PARTIES, INCLUDING THE OWNER'S REPRESENTATIVE, THE ARCHITECT, AND THE STRUCTURAL ENGINEER WITHIN FIVE DAYS OF THE MEETING.

B. CONCRETE SUBCONTRACTOR QUALIFICATION:
1. THE CONCRETE SUBCONTRACTOR SHALL INCLUDE IN THEIR BID PACKAGE TO THE CONTRACTOR, SUFFICIENT DATA THAT CLEARLY INDICATES THE CONCRETE CONTRACTOR'S ABILITY TO SUCCESSFULLY PERFORM THE WORK AND TO ACHIEVE THE FLOOR SLAB TOLERANCES SPECIFIED IN THIS SECTION. THE CONCRETE SUBCONTRACTOR'S TEAM SHALL HAVE PARTICIPATED IN THE MAJORITY OF THESE PROJECTS, AND THAT TEAM SHALL REMAIN THE SAME THROUGH THE DURATION OF THIS PROJECT.

C. CONCRETE MATERIAL:
1. PORTLAND CEMENT: ASTM C 150, TYPE I. USE ONE BRAND OF CEMENT THROUGHOUT THE PROJECT.
2. COARSE AND FINE AGGREGATES: ASTM C33. COMBINED AGGREGATE GRADATION FOR SLABS ON GRADE AND OTHER DESIGNATED CONCRETE SHALL BE 8% - 18% FOR LARGE TOP AGGREGATES (1 1/2") OR 8% - 22% FOR SMALLER TOP SIZE AGGREGATES (1" OR 3/4") RETAINED ON EACH SIEVE BELOW THE TOP SIZE AND ABOVE THE NO. 100 SIEVE. SLABS ON GRADE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 1-1/2" FOOTINGS AND PIERS 1" AND BEAMS 3/4".
3. WATER: COMPLYING WITH ASTM C 94.
4. ALL CONCRETE SHALL CONTAIN "POZZOLITH" ADMIX AS PER MANUFACTURER'S SPECIFICATIONS, IN ACCORDANCE WITH ASTM C494.

D. ADMIXTURES:
1. AIR-ENTRAINING ADMIXTURES: SHALL CONFORM TO ASTM C-260. ADMIXTURE MANUFACTURER SHALL PROVIDE WRITTEN CERTIFICATION THAT THE AIR-ENTRAINING ADMIXTURE IS COMPATIBLE WITH OTHER REQUIRED ADMIXTURES. ALL EXTERIOR SLABS SHALL BE AIR-ENTRAINED (4% - 6%). ACCEPTABLE PRODUCTS: EUCLID CHEMICAL AEA-92 AND AIRMIX 200, MASTER BUILDERS MICROAIR, W.R. GRACE DARAVAIR 1000 AND DAREX-11.
   NOTE: AIR-ENTRAINING ADMIXTURE SHALL NOT BE USED ON INTERIOR CONCRETE.
2. WATER-REDUCING ADMIXTURE: SHALL CONFORM TO ASTM C494, TYPE A AND CONTAIN NOT MORE THAN 0.05% CHLORIDE IONS. ACCEPTABLE PRODUCTS: EUCLID CHEMICAL WR-89 AND WR-91, MASTER BUILDERS 200N AND 322N, W.R. GRACE WRDA 36 AND WRDA 64.
3. WATER REDUCING, RETARDING ADMIXTURE: SHALL CONFORM TO ASTM C494, TYPE D, AND CONTAIN NOT MORE THAN 0.05% CHLORIDE IONS. ACCEPTABLE PRODUCTS: EUCLID CHEMICAL RETARDER 75, MASTER BUILDERS POZZOLITH R, W.R. GRACE DARATARD 17.
4. HIGH RANGE WATER-REDUCING ADMIXTURE (SUPERPLASTICIZER): SHALL CONFORM TO ASTM C494, TYPE F OR TYPE G AND CONTAIN NOT MORE THAN 0.05% CHLORIDE IONS, ACCEPTABLE PRODUCTS : EUCLID CHEMICAL EUCON 37, MASTER BUILDERS REOBUILD 1000 W.R. GRACE DARACEM - 1000.
5. WATER-REDUCING, NON-CORROSIVE ACCELERATING ADMIXTURE: SHALL CONFORM TO ASTM C494, TYPE C OR E, AND CONTAIN NOT MORE CHLORIDE IONS THAN ARE PRESENT IN MUNICIPAL DRINKING WATER. THE ADMIXTURE MANUFACTURER MUST HAVE LONG-TERM, NON-CORROSIVE TEST DATA FROM AN INDEPENDENT TESTING LABORATORY (OF AT LEAST A YEAR'S DURATION) USING AN ACCEPTABLE ACCELERATED CORROSION TEST METHOD SUCH AS THAT USING ELECTRICAL POTENTIAL MEASURES. ACCEPTABLE PRODUCTS: EUCLID CHEMICAL ACCELGUARD 80/90 AND ACCELGUARD NCA, MASTER BUILDERS NC534 AND POZZUTEC 20, W.R. GRACE POLARSET.
6. PROHIBITED ADMIXTURES:
   a.) CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 0.05% CHLORIDE IONS ARE NOT PERMITTED.
   b.) FLYASH; NO FLYASH ALLOWED

E. EVAPORATION RETARDER:
1. WATERBORNE, MONOMOLECULAR FILM FORMING, MANUFACTURED FOR APPLICATION TO FRESH CONCRETE.
   a.) ACCEPTABLE PRODUCTS:
   "EUCOBAR" BY THE EUCLID CHEMICAL COMPANY - CONTACT: PHIL BRANDT (877) 438-3826

F. CURING MATERIALS:
1. EXTERIOR CURING: ALL EXTERIOR CONCRETE SLABS SHALL BE CURED USING A LIQUID MEMBRANE-FORMING CURING COMPOUND. THE LIQUID MEMBRANE-FORMING CURING COMPOUND SHALL MEET THE REQUIREMENTS OF ASTM C 1315 WITH A MAXIMUM V.O.C. CONTENT OF 700 G/L.
   a.) ACCEPTABLE PRODUCTS:
   "SUPER RE2 SEAL" BY EUCLID CHEMICAL COMPANY - CONTACT PHIL BRANDT (877) 438-3826
2. INTERIOR CURING: ALL INTERIOR CONCRETE SLABS SHALL BE CURED USING A REDUCED ODOR, DISSIPATING LIQUID MEMBRANE FORMING CURING COMPOUND THAT IS FORMULATED FROM HYDROCARBON RESINS. THE DISSIPATING LIQUID MEMBRANE FORMING CURING COMPOUND SHALL MEET THE REQUIREMENTS OF ASTM C-309 AND V.O.C. CONTENTS IN ACCORDANCE TO EPA 40 CFR, PART 59, TABLE I, SUBPART D FOR CONCRETE CURING COMPOUNDS WITH A MAXIMUM V.O.C. CONTENT OF 350 G/L. APPLY AT 400 S.F./GALLON.
   a.) ACCEPTABLE PRODUCTS:
   "KUREZ DR VOX" BY THE EUCLID CHEMICAL COMPANY - CONTACT PHIL BRANDT (877) 438-3826
   ALL CONCRETE SLABS SHALL ALSO BE MAINTAINED MOIST FOR 7 DAYS

CAST–IN–PLACE CONCRETE (CONT.)

G. CONCRETE MIXES
1. COMPLY WITH ACI 301 REQUIREMENTS FOR CONCRETE MIXTURE, U.N.O..
2. PREPARE DESIGN MIXES SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, PROPORTIONED ACCORING TO ACI 301, FOR NORMAL WEIGHT CONCRETE DETERMINED BY EITHER LABORATORY TRIAL MIX OR FIELD TEST DATA AS FOLLOWS:
   CONCRETE MATERIALS INCLUDED IN THE MIX DESIGN SHALL BE THE SAME MATERIALS PROVIDED TO THE PROJECT, AND SHALL BE PREPARED BY AN INDEPENDENT TESTING LABORATORY APPROVED BY THE OWNER. THE LABORATORY MIX DESIGN SHALL NOT EXCEED THE HIGHEST JOB STRENGTH OF CONCRETE BY 1,200 PSI. FOUR COPIES OF THE MIX DESIGN SHALL BE SUBMITTED TO THE OWNER BEFORE CONCRETE WORK BEGINS.
3. SLUMP: CONCRETE CONTAINING HRWR SHALL HAVE A MAXIMUM SLUMP OF 8" (200MM). ALL OTHER CONCRETE SHALL NOT EXCEED 4 INCHES (100 MM) UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
4. ADJUSTMENT TO CONCRETE MIXES: MIX DESIGN ADJUSTMENTS MAY BE REQUESTED BY CONTRACTOR WHEN CHARACTERISTICS OF MATERIALS, JOB CONDITIONS, WEATHER, TEST RESULTS OR OTHER CIRCUMSTANCES WARRANT, AT NO ADDITIONAL COST TO OWNER AND AS ACCEPTED BY OWNER. LABORATORY TEST DATA FOR REVISED MIX DESIGN AND STRENGTH RESULTS MUST BE SUBMITTED TO AND ACCEPTED BY OWNER BEFORE USING IN WORK. BOTH THE CONCRETE TESTING AND INSPECTION AGENCY AND THE CONCRETE CONTRACTOR SHALL SATISFY THEMSELVES THAT THE CONCRETE MIX DESIGN WILL PRODUCE A CONCRETE WHICH WILL MEET THE SPECIFICATIONS FOR THIS PROJECT. IN ADDITION, THE CONTRACTOR AND CONCRETE FINISHER SHALL VERIFY THAT THE WORKABILITY, FINISHABILITY AND SETTING TIMES ARE APPROPRIATE FOR SLAB INSTALLATIONS. PLACEMENT SHALL BE MADE BY CHUTE DIRECTLY FROM THE CONCRETE TRUCKS. IF PUMPING OF THE CONCRETE IS CONTEMPLATED FOR ANY SPECIAL LOCATIONS, THE PROPORTIONS ESTABLISHED ABOVE SHALL NOT BE ALTERED TO SUIT THE CAPABILITIES OF THE PUMPING EQUIPMENT.
5. READY MIX CONCRETE SHALL COMPLY WITH REQUIREMENTS OF ASTM C94, WHEN AIR TEMPERATURE IS BETWEEN 85° AND 90° F, REDUCE MIXING AND DELIVERY TIME FROM 90 MINUTES TO 75 MINUTES; WHEN AIR TEMPERATURE IS ABOVE 90° F, REDUCE MIXING AND DELIVERY TIME TO 60 MINUTES.
6. WATER CEMENT RATIO SHALL BE BASED ON SURFACE DRY MATERIAL.

H. CONTRACTION JOINTS IN SLABS-ON-GRADE:
FORM WEAKENED-PLANE CONTRACTION JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. CONSTRUCT CONTRACTION JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF THE CONCRETE THICKNESS, AS FOLLOWS:
   SAWED JOINTS: ALL SAW CUTTING SHALL BE ACCOMPLISHED WITH A SOFT-CUT SAW AS SOON AS THE SLAB WILL SUPPORT THE WEIGHT OF THE SAW AND OPERATOR. NOTE: CONCRETE DUST SHALL BE REMOVED COMPLETELY AND IMMEDIATELY. IF CHALK LINES ARE USED FOR SAW CUTS, ALL CHALK REMAINING ON SURFACE SHALL BE REMOVED COMPLETELY AND IMMEDIATELY AFTER SAWING.

I. FLOOR SLAB TOLERANCES:
COMPLY WITH ACI 117, "SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS." ALL INTERIOR FLOOR SLABS SHALL MEET THE REQUIREMENTS OF A TYPE 5, SINGLE COURSE, HARD STEEL - TROWELED FINISH AS DESCRIBED IN ACI 302.1R- LATEST EDITION.

J. CONCRETE CURING AND PROTECTION:
1. EXTERIOR SLAB - CURING:
   a) FIRST, ALL EXTERIOR CONCRETE SLABS SHALL BE CURED USING A LIQUID MEMBRANE-FORMING CURING COMPOUND TO BE APPLIED EVENLY AND UNIFORMLY PER MANUFACTURER'S INSTRUCTIONS AS SOON AS POSSIBLE AFTER FINAL FINISHING. SURFACE SHALL BE DAMP, BUT NOT WET AND CAN NO LONGER BE MARRED BY A WALKING WORKMAN. ALL APPLICATIONS SHALL BE MADE BY AN APPLICATOR CERTIFIED BY THE MANUFACTURER, AND WHEN SURFACE AND AIR TEMPERATURE IS ABOVE 50° F. BEGIN CURING AFTER FINISHING CONCRETE, BUT NOT BEFORE FREE WATER HAS DISAPPEARED FROM CONCRETE SURFACE. CURING COMPOUND SHALL BE PLACED WITHIN FOUR (4) HOURS AFTER CONCRETE HAS BEEN PLACED.

   b) SECOND, CONCRETE SHALL BE MAINTAINED ABOVE 50 DEGREES F AND IN A MOIST CONDITION FOR AT LEAST THE FIRST SEVEN (7) DAYS AFTER PLACEMENT.

2. INTERIOR SLABS - CURING:

   a) FIRST, ALL INTERIOR CONCRETE SLABS SHALL BE CURED USING A LIQUID MEMBRANE-FORMING CURING COMPOUND TO BE APPLIED EVENLY AND UNIFORMLY PER MANUFACTURER'S INSTRUCTIONS AS SOON AS POSSIBLE AFTER FINAL FINISHING. SURFACE SHALL BE DAMP, BUT NOT WET AND CAN NO LONGER BE MARRED BY A WALKING WORKMAN, ALL APPLICATIONS SHALL BE MADE BY AN APPLICATOR CERTIFIED BY THE MANUFACTURER, AND WHEN SURFACE AND AIR TEMPERATURE IS ABOVE 50° F. BEGIN CURING AFTER FINISHING CONCRETE, BUT NOT BEFORE FREE WATER HAS DISAPPEARED FROM CONCRETE SURFACE. CURING COMPOUND SHALL BE PLACED WITHIN FOUR (4) HOURS AFTER CONCRETE HAS BEEN PLACED.

   b) SECOND, CONCRETE SHALL BE MAINTAINED ABOVE 50 DEGREES F AND IN A MOIST CONDITION FOR AT LEAST SEVEN (7) DAYS AFTER PLACEMENT.

   c) THIRD, CONCRETE SLABS SHALL BE CURED USING A LIQUID MEMBRANE- FORMING CURING COMPOUND TO BE APPLIED EVENLY AND UNIFORMLY PER MANUFACTURER'S INSTRUCTIONS. SURFACE SHALL BE DAMP, BUT NOT WET AND CAN NO LONGER BE MARRED BY A WALKING WORKMAN, ALL APPLICATIONS SHALL BE MADE BY AN APPLICATOR CERTIFIED BY THE MANUFACTURER, AND WHEN SURFACE AND AIR TEMPERATURE IS ABOVE 50° F.

   d) AT CONCRETE WHERE FINISH OF SLAB IS TO BE POLISHED; PROVIDE BURLAP MEMBRANE DURING ENTIRE CONSTRUCTION OF THE BUILDING. (DO NOT PROVIDE CURING COMPOUND)

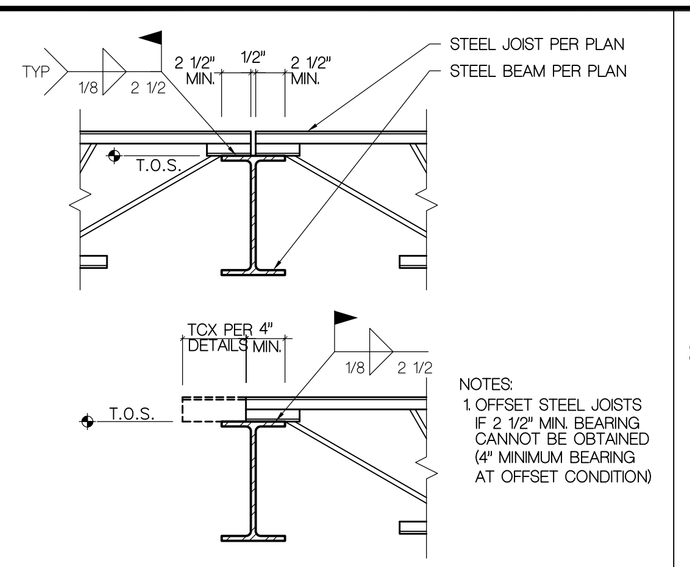
3. INTERIOR SLAB PROTECTION:
   TAKE THE FOLLOWING MEASURES TO PROTECT FLOOR SLAB:
   A. WRAP OR "DIAPER" ALL MOTORIZED AND HYDRAULIC EQUIPMENT TO PREVENT FLUID LEAKS.
   B. PROVIDE NON-MARKING TIRES ON RUBBER TIRED VEHICLES OR EQUIP RUBBER TIRES WITH TIRE BOOTS MADE OF NYLON FABRIC.
   C. SOURCE FOR DIAPERS AND BOOTS: R&R TIRE SURFACE PROTECTORS, INC., FORT COLLINS CO 80526, (970) 266-4082
   D. PROVIDE MATS AT ALL ENTRANCES TO PREVENT MUD STAINS.
   E. COVER SLAB PRIOR TO PAINTING. ALL SPILLS TO BE CLEANED WITH SOAP AND WATER. LACQUER THINNER WILL NOT BE ACCEPTABLE.

SPECIAL INSPECTION, MATERIALS TESTING.

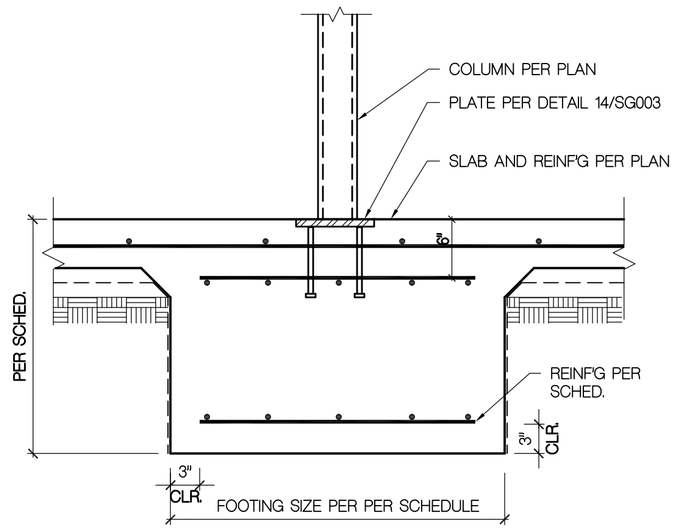
1. RESPONSIBILITIES OF THE OWNER
   A. EMPLOY AND PAY THE SPECIAL INSPECTION AGENCY TO PERFORM INSPECTIONS SPECIFIED IN THIS SECTION AND THOSE REQUIRED BY AUTHORITIES HAVING JURISDICTION.
   B. EMPLOY AND PAY THE MATERIALS TESTING LABORATORY TO PERFORM TESTS SPECIFIED IN THIS SECTION AND THOSE REQUIRED BY AUTHORITIES HAVING JURISDICTION.
      1) RETESTING - THE CONTRACTOR SHALL REIMBURSE THE OWNER FOR RE-TESTING WHERE RESULTS OF INSPECTIONS AND TESTS PROVE UNSATISFACTORY AND INDICATE NONCOMPLIANCE WITH REQUIREMENTS.
   C. EMPLOY THE DESIGN PROFESSIONAL RESPONSIBLE FOR THE STRUCTURAL DESIGN OR ANOTHER ENGINEER OR ARCHITECT DESIGNATED BY THE (DPR) TO PERFORM STRUCTURAL OBSERVATION. (REF 1702 OF IBC)
2. DEFINITIONS
   A. APPROVED FABRICATOR: AN AISC OR IAS CERTIFIED FABRICATOR REGISTERED AND APPROVED BY THE BUILDING OFFICIAL AND ENGINEER OF RECORD, TO PERFORM WORK, OFF SITE, REQUIRING SPECIAL INSPECTION WITHOUT SPECIAL INSPECTION.
   B. SPECIAL INSPECTION AGENCY: THE ACCREDITED INSPECTION BODIES DESIGNATED HEREIN AND APPROVED BY THE ENGINEER OF RECORD TO PERFORM SPECIAL INSPECTION AS REQUIRED BY THE BUILDING CODE AND THE PROJECT SPECIFICATIONS AND AS DESCRIBED IN CHAPTER 17 OF THE IBC.
   C. SPECIAL INSPECTOR: A QUALIFIED PERSON, EMPLOYED BY THE SPECIFIED SPECIAL INSPECTION AGENCY, WHO HAS DEMONSTRATED COMPETENCE TO THE SATISFACTION OF THE BUILDING OFFICIAL FOR INSPECTION OF THE PARTICULAR TYPE OF OR OPERATION REQUIRING SPECIAL INSPECTION. DUTIES INCLUDE VISUAL OBSERVATIONS AND FIELD MEASUREMENTS OF MATERIALS, OBTAINING SPECIMENS FOR TESTS AND RELATED ACTIONS INCLUDING PREPARATION OF REPORTS.
   D. TESTING LABORATORY: AN ACCREDITED MATERIALS TESTING LABORATORY, APPROVED BY THE ENGINEER OF RECORD, TO MEASURE, EXAMINE, TEST, CALIBRATE OR OTHERWISE DETERMINE THE CHARACTERISTICS OR PERFORMANCE OF CONSTRUCTION MATERIALS.
   E. CONTINUOUS INSPECTION: ON SITE INSPECTION BY THE SPECIAL INSPECTOR ON A CONTINUOUS BASIS OBSERVING ALL WORK REQUIRING SPECIAL INSPECTION.
   F. PERIODIC INSPECTION: INTERMITTENT INSPECTION AS PERMITTED BY THE PLAN SPECIFICATIONS AT PREDETERMINED INTERVALS OR MORE FREQUENTLY AS WORK PROGRESSES. NO SIGNIFICANT ELEMENTS OR AREAS SHALL BE COVERED BY ADDITIONAL WORK UNTIL APPROVED BY THE MUNICIPAL BUILDING INSPECTOR AND/OR THE SPECIAL INSPECTOR.

SPECIAL INSPECTION, MATERIALS TESTING. (CONT.)

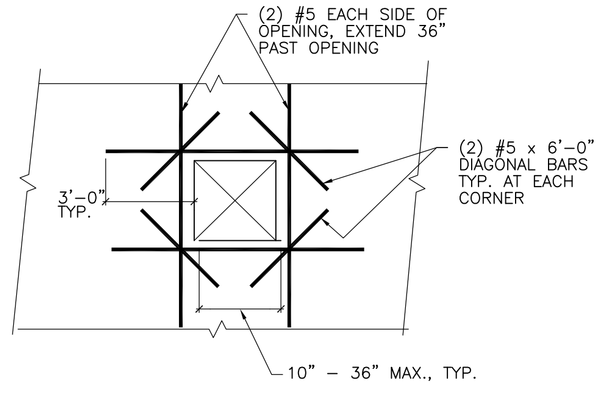
   G. STRUCTURAL OBSERVATION: THE VISUAL OBSERVATION, BY THE ENGINEER OF RECORD OR HIS DESIGNEE, INCLUDING BUT NOT LIMITED TO THE ELEMENTS AND CONNECTIONS, OF THE STRUCTURAL SYSTEM, FOR GENERAL CONFORMANCE TO THE APPROVED PLANS AND SPECIFICATION, AT SIGNIFICANT CONSTRUCTION STAGES AND AT COMPLETION OF THE STRUCTURAL SYSTEM. STRUCTURAL OBSERVATION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR THE SPECIAL AND MUNICIPAL INSPECTIONS REQUIRED BY CODES AND SPECIFICATIONS.
   H. EOR: ENGINEER OF RECORD
   I. DPR: DESIGN PROFESSIONAL OF RECORD/DESIGN PROFESSIONAL OF RECORD
   J. SPECIAL INSPECTION AND MATERIALS TESTING
      THIS SECTION APPLIES TO THE STRUCTURAL PORTIONS OF THE PROJECT REQUIRING SPECIAL INSPECTION. THE SPECIAL INSPECTORS DUTIES ARE DESCRIBED IN IBC. DOCUMENTED METHODS AND PROCEDURES SHALL BE USED FOR INSPECTION AND TESTING REQUIRED OF CONTRACTUAL DOCUMENTS, AND FOR ESTABLISHING ACCEPTANCE CRITERIA, ALL INSTRUCTIONS, STANDARDS, PROCEDURES, CHECKLISTS RELEVANT TO THE WORK WILL BE KEPT UP TO DATE AND READILY AVAILABLE FOR USE. NO INSPECTION OR TEST WILL BE PERFORMED IF THE SAFETY OF THE TESTING PERSONNEL IS IN QUESTION DUE TO JOB SITE CONDITIONS. PRIOR TO PROJECT COMMENCEMENT, THE TESTING AGENCY WILL CONFER WITH AND OBTAIN THE APPROVAL FROM THE APPROPRIATE DESIGN PROFESSIONAL OF RECORD REGARDING THE INSPECTION AND TESTING PROCEDURES OR SPECIFICATIONS INCLUDING ANY APPROPRIATE ASTM METHODS, CODE REQUIREMENTS OR PROJECT SPECIFICATION REQUIREMENTS. AT THE START OF AND DURING EACH INSPECTION OF THE PROJECT TO ASCERTAIN PROPOSED CONFORMITY OF MATERIALS, PERSONNEL QUALIFICATIONS, AS REQUIRED, AND PROCEDURS WITH APPLICABLE CODES, PLANS, AND SPECIFICATIONS.
      1. ALL INSPECTIONS SHALL BE PERFORMED BY AN ACCREDITED, APPROVED SPECIAL INSPECTION AGENCY EMPLOYED BY THE OWNER OR OWNER'S AGENT, NOT THE CONTRACTOR OR SUBCONTRACTOR, PER IBC 1704 THE FOLLOWING FIRM SHALL PROVIDE THE SPECIAL INSPECTION DUTIES. THE SPECIAL INSPETOR SHALL BE RESPONSIBLE TO THE ENGINEER OF RECORD.
         *RABA-KISTNER CONSULTANTS, INC.
         *TERRACON CONSULTANTS, INC.
         *APPROVED EQUAL
         ALTERNATE FIRMS ARE ALLOWED, BUT ONLY WITH PRIOR, WRITTEN APPROVAL BY THE ENGINEER OF RECORD. ACCREDITATION TO ASTM E-329-95



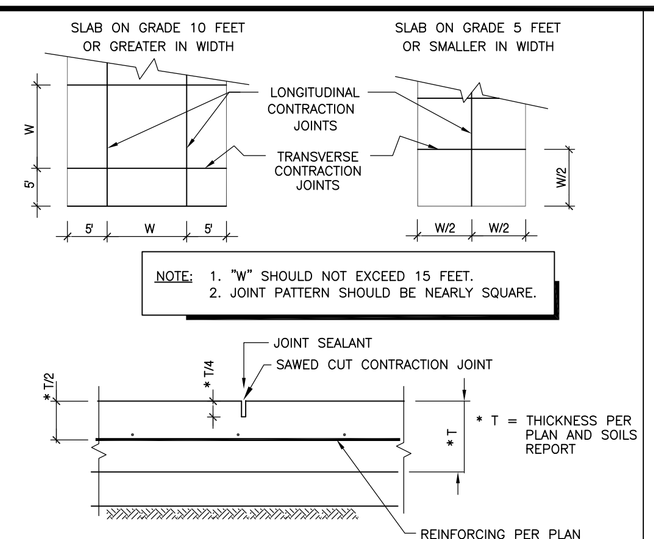
TYPICAL STEEL JOIST TO STEEL BEAM | 17



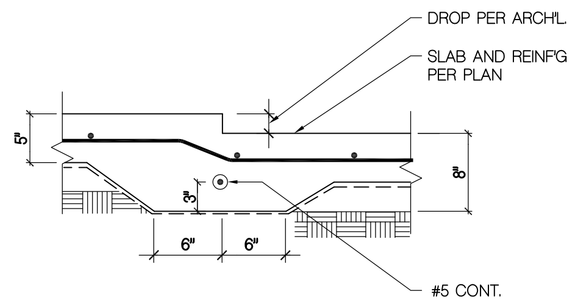
FOOTING AT STEEL COLUMN | 13



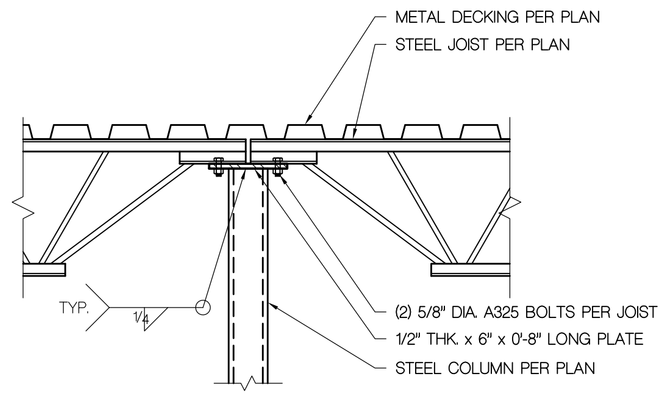
REINFORCING AT CONCRETE OPENINGS | 9



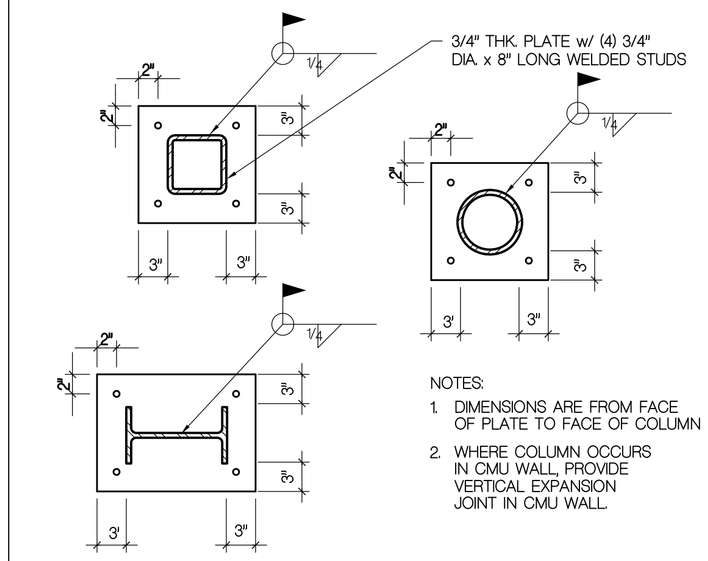
SLAB CONTRACTION JOINT | 5



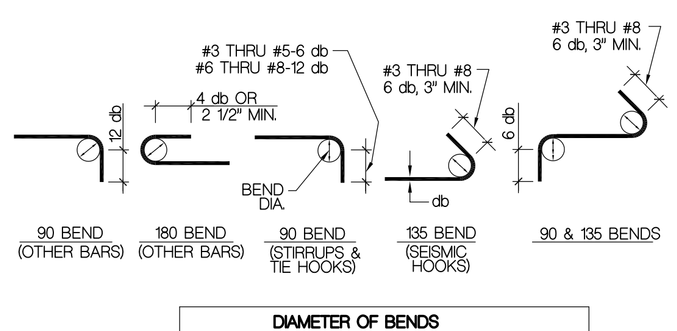
TYPICAL DROP AT SLAB ON GRADE | 1



TYPICAL STEEL JOIST TO STEEL COLUMN | 18

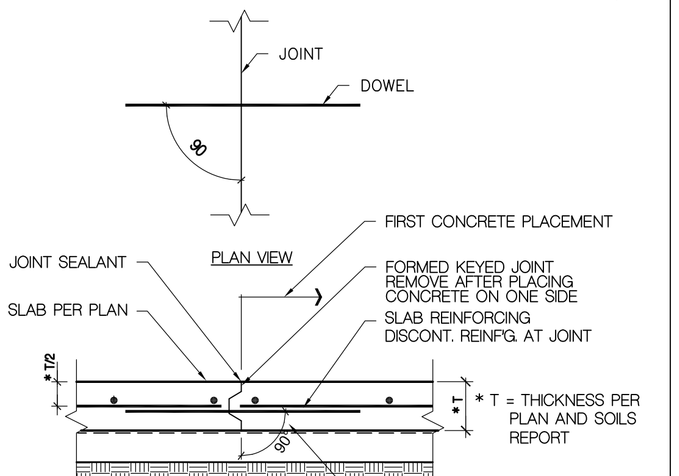


TYPICAL BASE PLATE DETAIL | 14

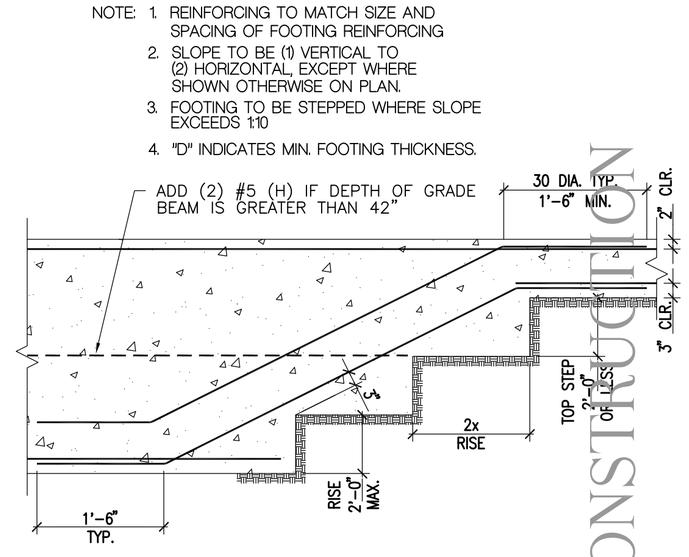


DIAMETER OF BENDS	
STIRRUPS AND TIES	4 db FOR #3 THRU #5 BARS
	6 db FOR #6 THRU #8 BARS
ALL OTHERS	6 db FOR #3 THRU #8 BARS
	8 db FOR #9 THRU #11 BARS
	10 db FOR #14 THRU #18 BARS

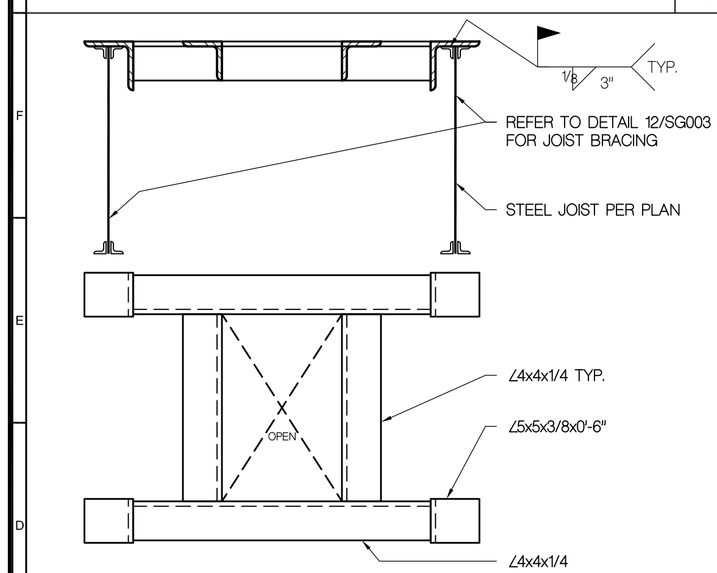
STANDARD HOOKS | 10



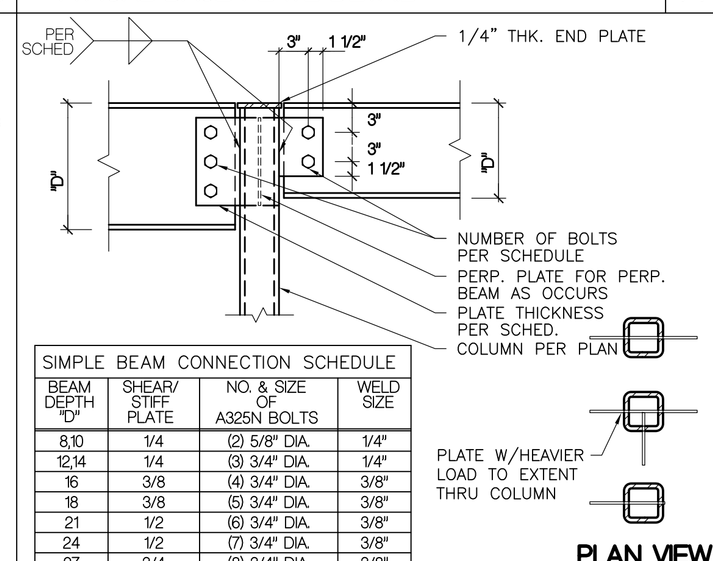
SLAB CONSTRUCTION JOINT | 6



TYPICAL STEPPED WALL FOOTING | 2

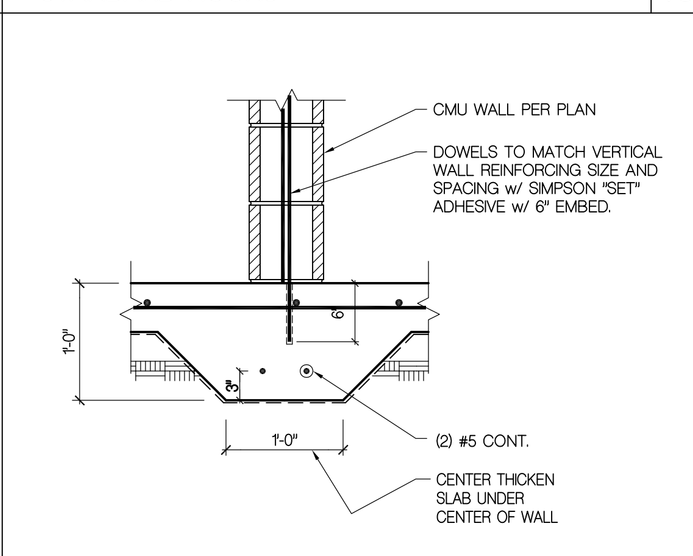


TYP. FRM'G. AT ROOF OPENING | 19

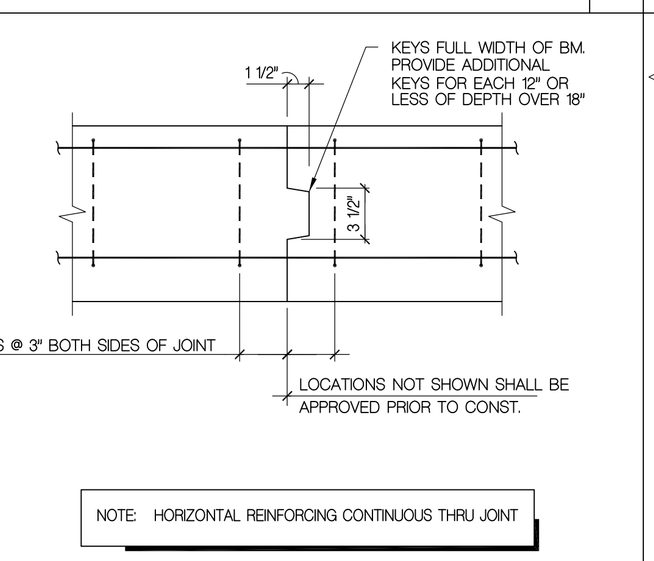


SIMPLE BEAM CONNECTION SCHEDULE			
BEAM DEPTH "D"	SHEAR/ STIFF PLATE	NO. & SIZE OF A325N BOLTS	WELD SIZE
8,10	1/4	(2) 5/8" DIA.	1/4"
12,14	1/4	(3) 3/4" DIA.	1/4"
16	3/8	(4) 3/4" DIA.	3/8"
18	3/8	(5) 3/4" DIA.	3/8"
21	1/2	(6) 3/4" DIA.	3/8"
24	1/2	(7) 3/4" DIA.	3/8"
27	3/4	(8) 3/4" DIA.	3/8"

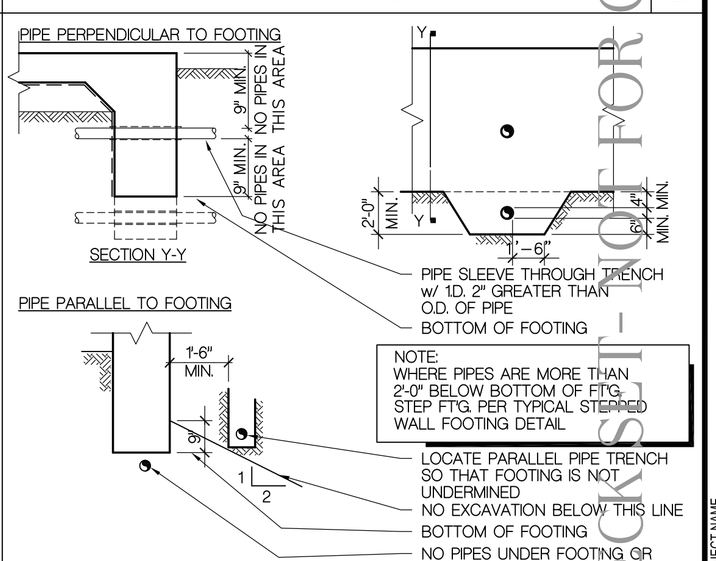
TYPICAL STEEL BEAM CONNECTION SCHEDULE | 15



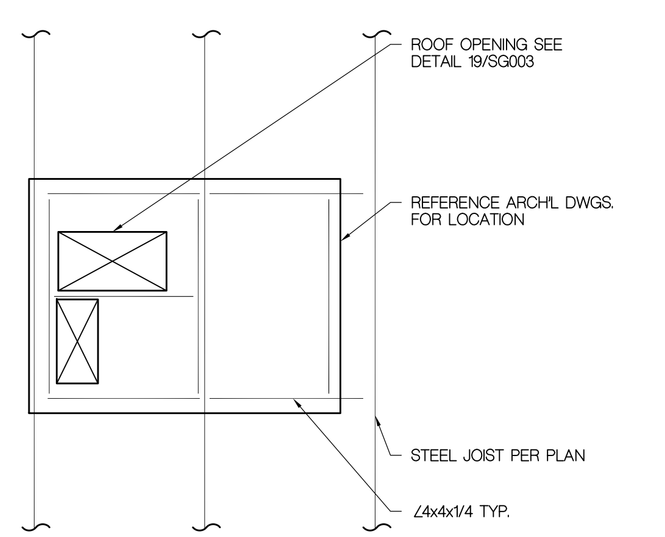
TYP. THICKENED SLAB AT NON BEARING CMU WALL | 11



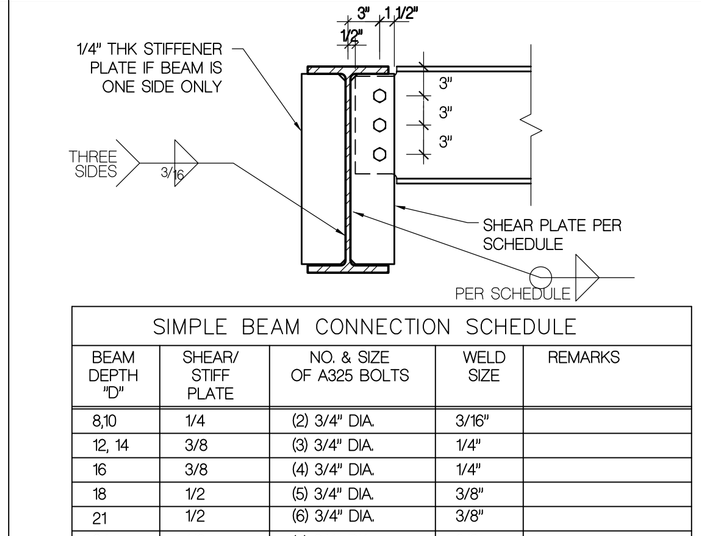
GRADE BEAM CONSTRUCTION JOINT | 7



TYPICAL PIPING AT FOOTING | 3

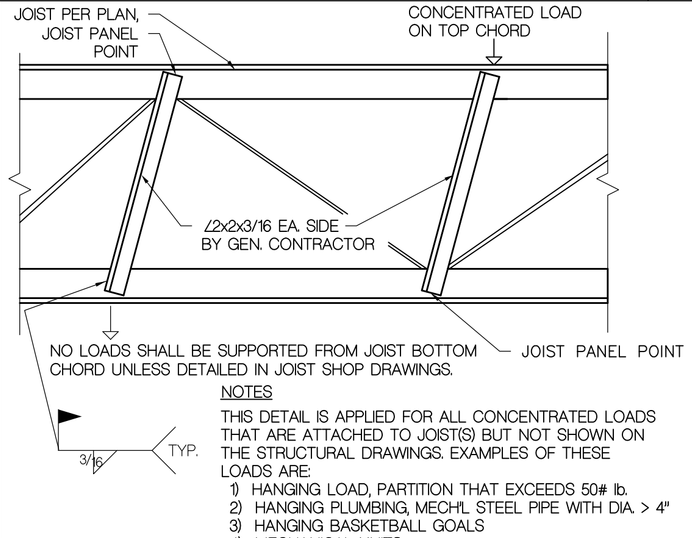


OPENING FRAMING | 20

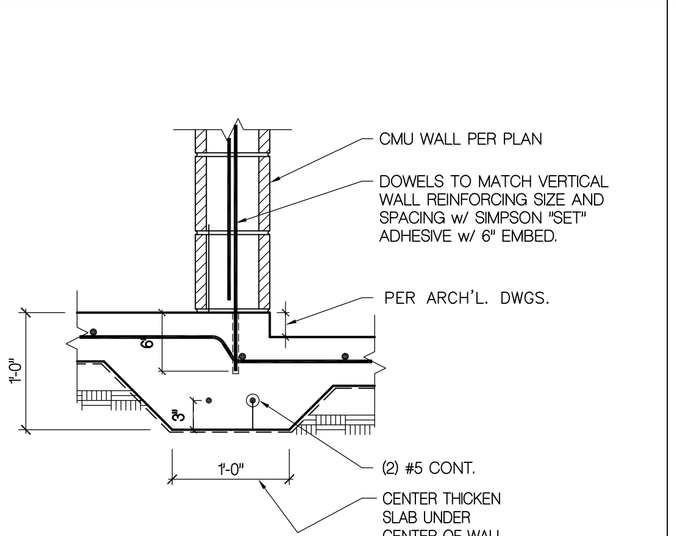


SIMPLE BEAM CONNECTION SCHEDULE				
BEAM DEPTH "D"	SHEAR/ STIFF PLATE	NO. & SIZE OF A325 BOLTS	WELD SIZE	REMARKS
8,10	1/4	(2) 3/4" DIA.	3/16"	
12, 14	3/8	(3) 3/4" DIA.	1/4"	
16	3/8	(4) 3/4" DIA.	1/4"	
18	1/2	(5) 3/4" DIA.	3/8"	
21	1/2	(6) 3/4" DIA.	3/8"	
24	1/2	(7) 3/4" DIA.	3/8"	

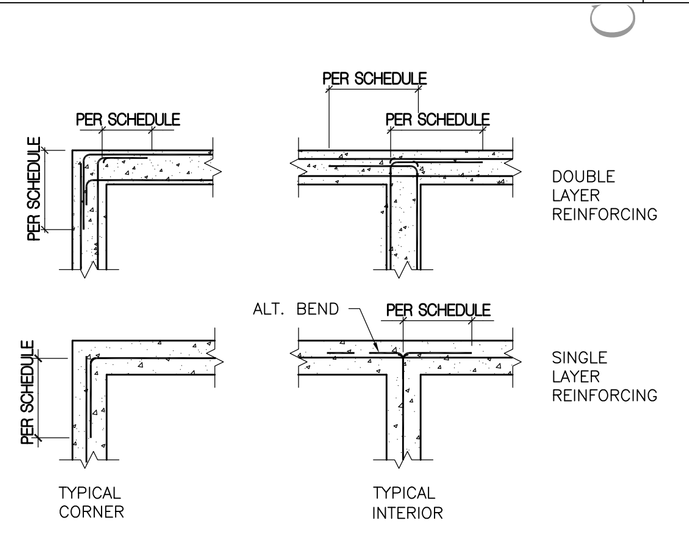
TYPICAL BEAM TO BEAM CONNECTION | 16



TYPICAL JOIST BRACING DETAIL | 12



TYPICAL THICKENED SLAB AT CMU WALL AT DROP | 8



TYPICAL REINF. AT INT. OF CONC. FT'GS. | 4

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(956) 424-3567 FAX (956) 424-3570
E-MAIL: Hino.pasd.ngin@aol.com
REGISTRATION NUMBER: F-9189
EXPIRATION DATE: 06/30/2012

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

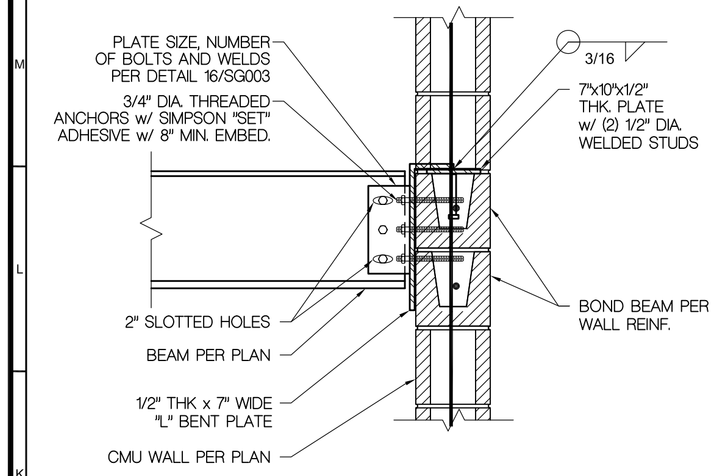
No.	Description	Date

PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH
SHEET TITLE: STRUCTURAL TYPICAL DETAILS

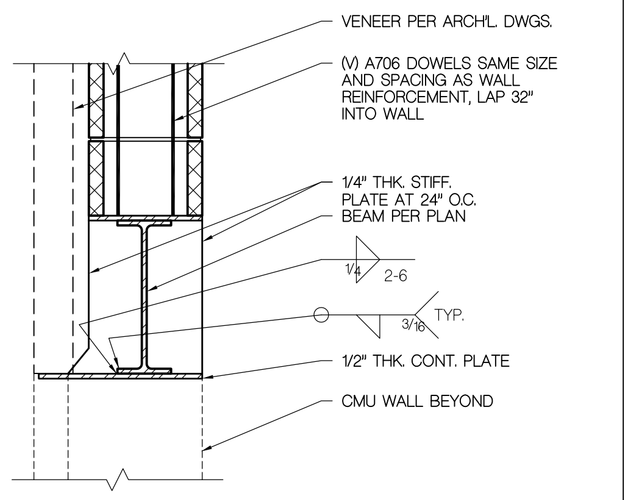
SG003

CHECK SET - NOT FOR CONSTRUCTION

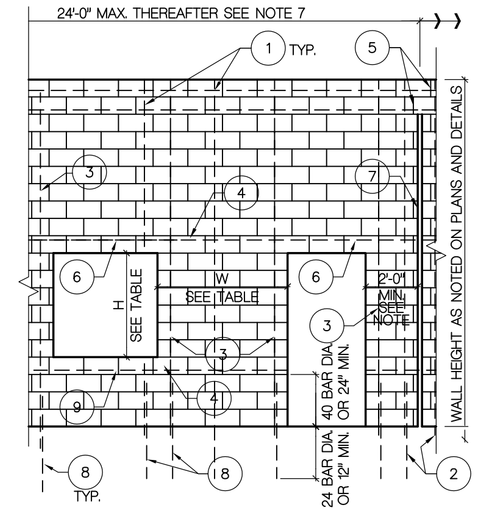
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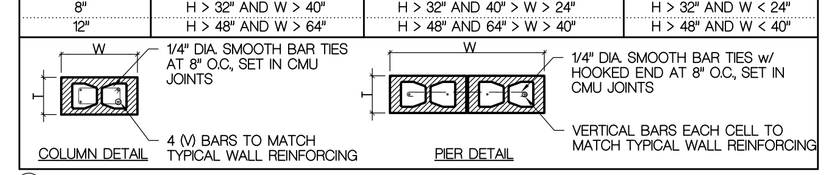
STEEL BEAM TO CMU WALL | 17



STEEL BEAM LINTEL DETAIL | 13

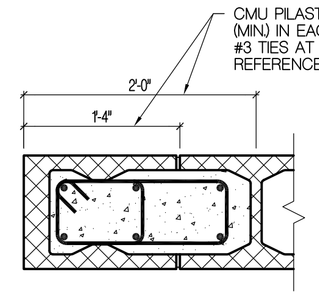


WALL THICKNESS (T)	DIMENSIONAL LIMITS		
	CLEAR	PIER	COLUMN
6"	H > 24" AND W > 32"	H > 24" AND 32" > W > 24"	H > 24" AND W < 24"
8"	H > 32" AND W > 40"	H > 32" AND 40" > W > 24"	H > 32" AND W < 24"
12"	H > 48" AND W > 64"	H > 48" AND 64" > W > 40"	H > 48" AND W < 40"

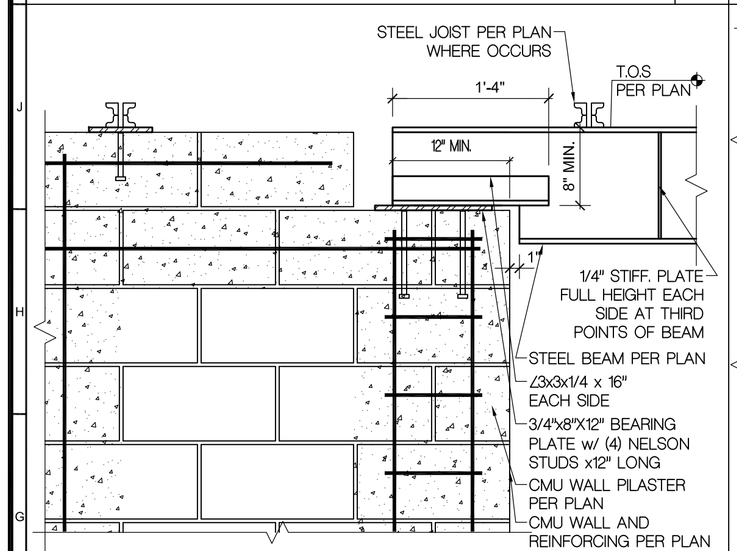


1. NORMAL WALL REINFORCING AS NOTED ON DETAILS AND DESCRIBED IN GENERAL NOTES.
2. ADDITIONAL VERTICAL REINFORCING AT CONTROL JOINTS - SEE TYPICAL CONTROL JOINT DETAIL.
3. ADDITIONAL VERTICAL REINFORCING AT JAMBS OF ALL WALL OPENINGS.
4. INTERMEDIATE BOND BEAM REINFORCED AND SPACED AS REQUIRED ON DRAWINGS. ONE INTERMEDIATE BOND BEAM SHALL BE PLACED AT WINDOW LINTEL ELEVATION AND AT 8'-0" O.C.
5. ROOF LEVEL BOND BEAM REINFORCED AS NOTED ON DETAILS- CONTINUE ALL REINFORCING UNCUT THROUGH CONTROL JOINTS.
6. LINTEL REINFORCING AS DETAILED AND/OR SCHEDULED.
7. CONTROL JOINTS (C.J): UNLESS NOTED OTHERWISE ON THE ARCHITECTURAL DRAWINGS. THE CJ SPACING NOTED IS THE MAXIMUM PERMITTED. THE SPACING OF CJ'S SHALL BE COORDINATED WITH THE WALL OPENING LOCATIONS AND IN NO CASE SHALL A CJ BE LOCATED CLOSER THAN 24" TO THE JAMB OF ANY WALL OPENING.
8. FOUNDATION DOWELS TO MATCH VERTICAL WALL REINFORCING SIZE AND SPACING.
9. SILL LEVEL BOND BEAM REINFORCED AS NOTED IN MASONRY GENERAL NOTES.

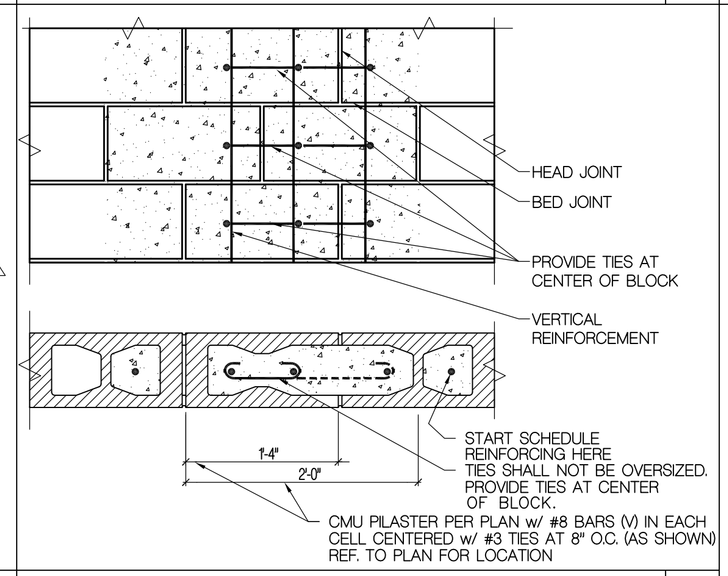
ELEVATION OF TYPICAL MASONRY WALL REINFORCING | 5



12" CMU PILASTER PLAN VIEW | 1

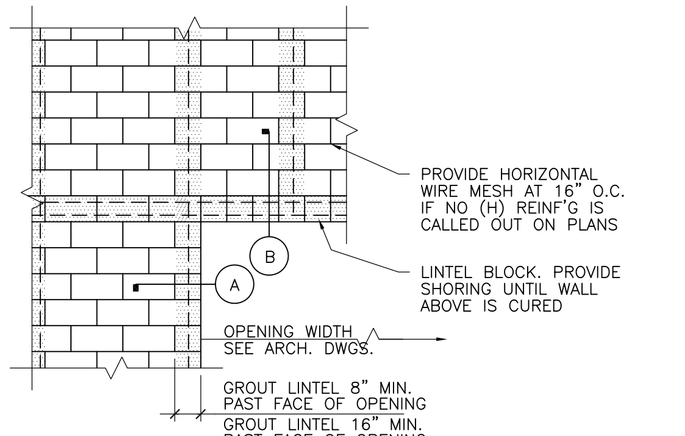


STL. BM. TO CMU PILASTER CONNX | 18

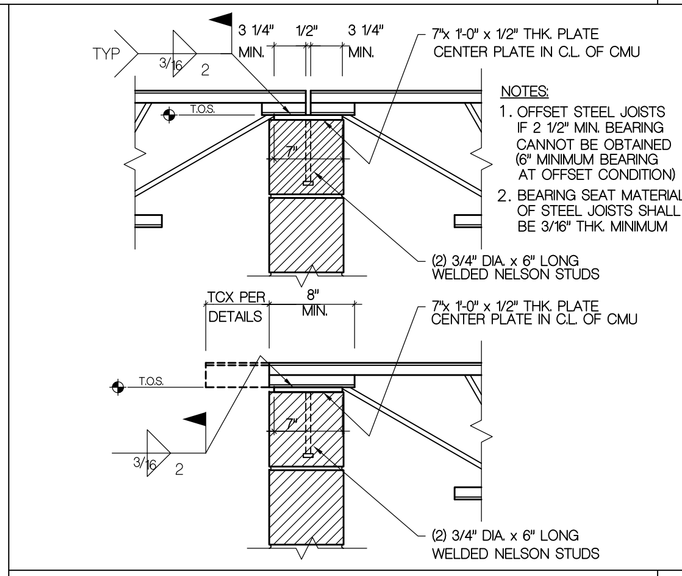


TYPICAL FLUSH WALL PILASTER | 14

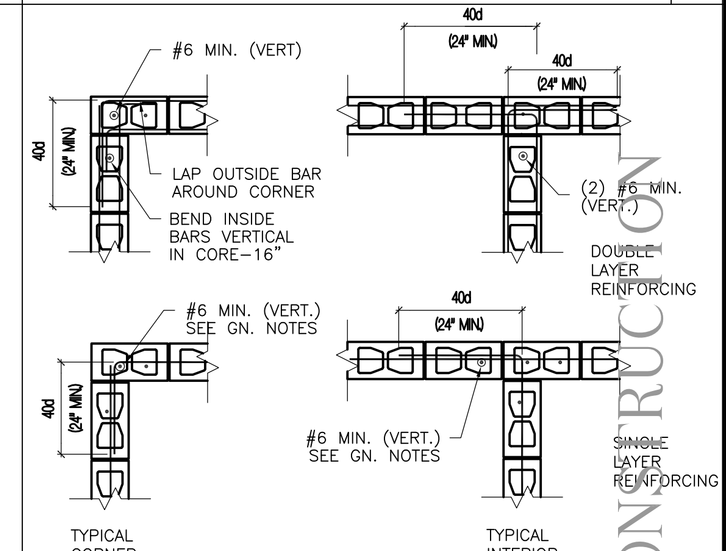
CLEAR SPAN	WIDTH	DEPTH	REINFORCING	#3 TIES AT:	REMARKS
<3'-4"	8"	8"	(1) #6		
<4'-8"	8"	16"	(1) #6 (T) & (B)	8"	
<6'-8"	8"	24"	(1) #7 (T) & (B)	8"	
<10'-0"	8"	32"	(1) #7 (T) & (B)	8"	
<3'-4"	12"	8"	(2) #5		
<4'-6"	12"	16"	(2) #5 (T) & (B)	8"	
<6'-8"	12"	24"	(2) #7 (T) & (B)	8"	
<12'-0"	12"	32"	(2) #7 (T) & (B)	8"	
>12'-0"	12"	48"	(2) #7 (T) & (B)	8"	



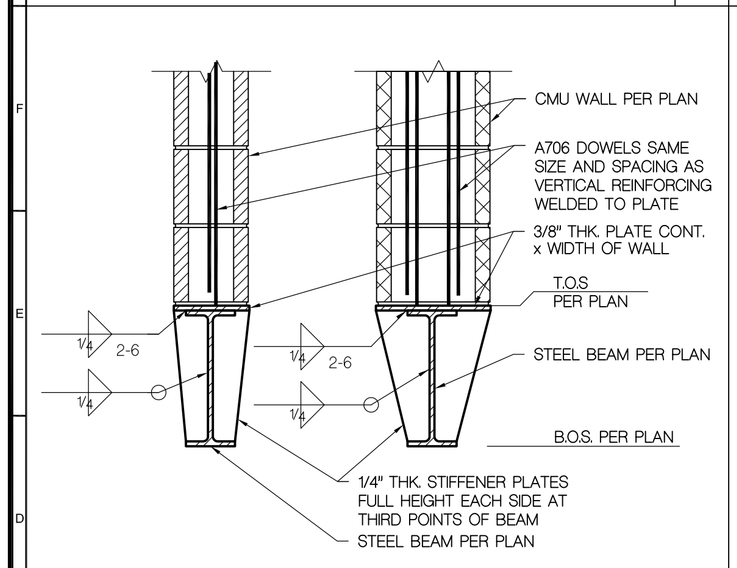
TYPICAL CMU LINTEL SCHEDULE AND DETAILS | 11



TYP. STEEL JOIST TO CMU WALL DETAIL | 6



TYPICAL REINF'G. AT INT. OF CMU WALLS | 2

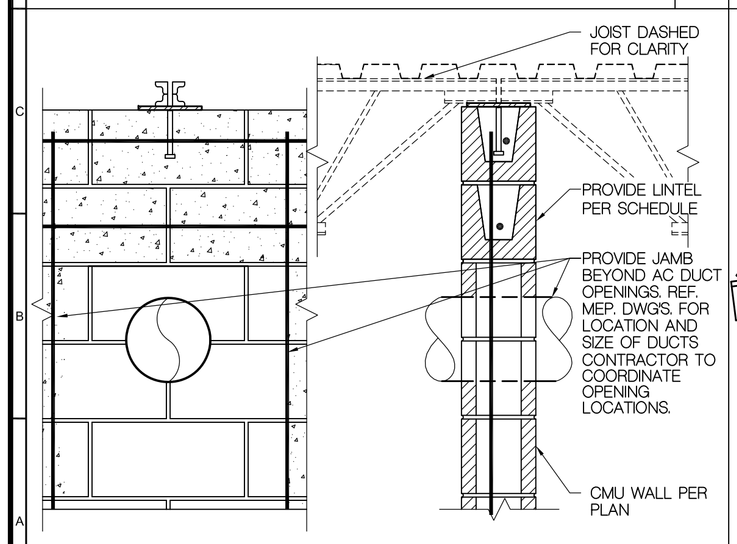


CMU WALL TO STEEL BEAM | 19

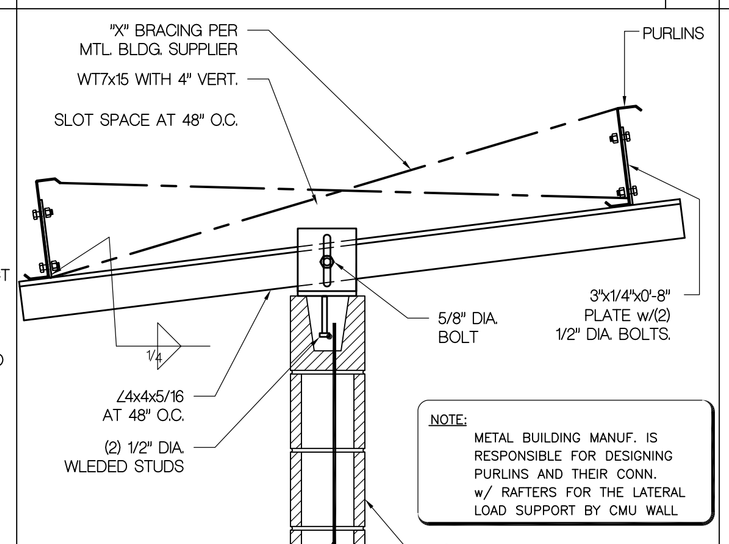
* ANGLE SIZE (LLV)	CLEAR OPENING		REMARKS
	GREATER THAN	UP TO	
8" x 8" x 1/2"	---	3'-0"	8" MIN. BRG. EA. END
8" x 8" x 1/2"	3'-1"	6'-0"	12" MIN. BRG. EA. END
8" x 8" x 1/2"	6'-1"	8'-0"	12" MIN. BRG. EA. END
8" x 8" x 1/2"	8'-1"	9'-0"	16" MIN. BRG. EA. END
8" x 8" x 1/2"	9'-1"	10'-0"	16" MIN. BRG. EA. END
8" x 8" x 1/2"	10'-1"	11'-0"	16" MIN. BRG. EA. END
8" x 8" x 1/2"	11'-1"	12'-0"	16" MIN. BRG. EA. END

*FOR EACH 4" WIDTH OF MASONRY
SEE ARCHITECTURAL PLANS FOR MASONRY OPENING DIMENSIONS, LOCATION, AND QUANTITIES.
1 CUT HORIZONTAL LEG 1/4" FROM OUTSIDE FACE OF VENEER
NOTE: ALL STEEL SHALL BE HOT DIP GALVANIZED

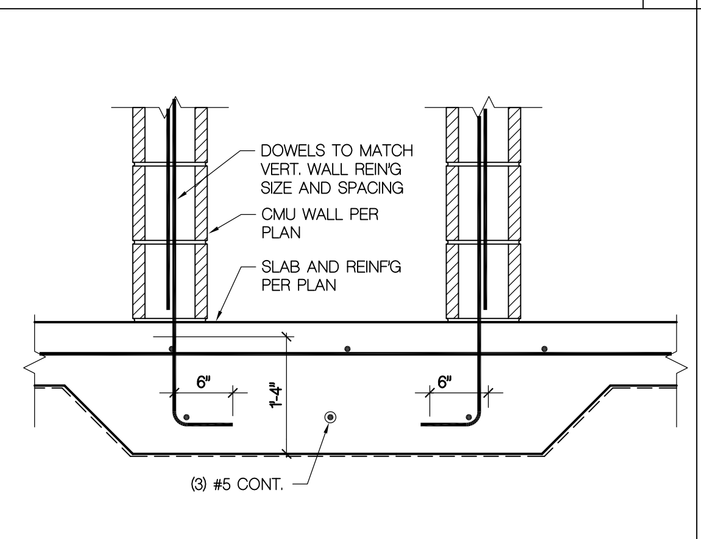
LOOSE ANGLE LINTEL SCHEDULE | 15



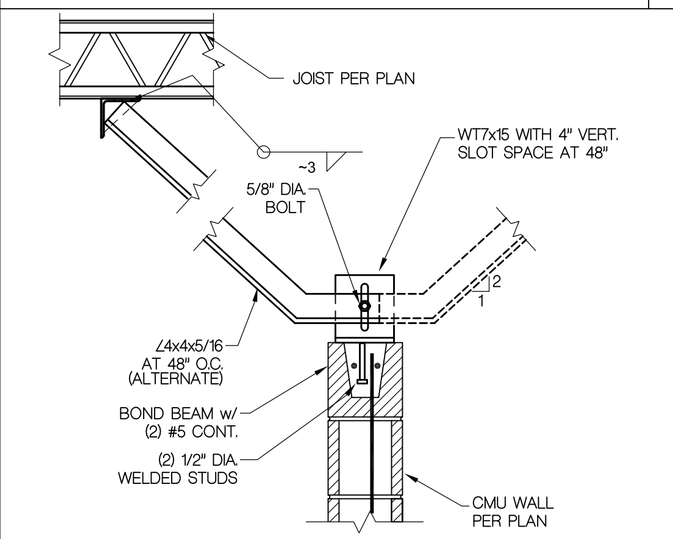
TYP. MASONRY OPENING AT AIR DUCT | 20



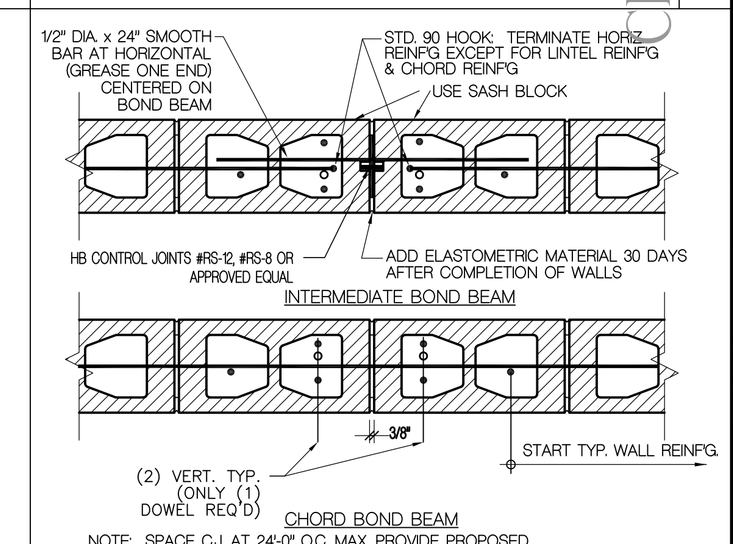
TYP. ATTACHMENT OF CMU TO ROOF. STRUCT. | 16



TYPICAL INTERIOR FOOTING AT CHASE | 12



TYP. ATTACHMENT OF CMU TO ROOF. STRUCT. | 8



TYPICAL REINF'G. PLACEMENT AND CLEARANCE | 3

TYPICAL CMU CONTROL JOINT (C.J.) | 4

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E-MAIL: Hinojosaeng@aol.com
EXPIRATION DATE: 09/30/2012
REGISTRATION NUMBER: F-969

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

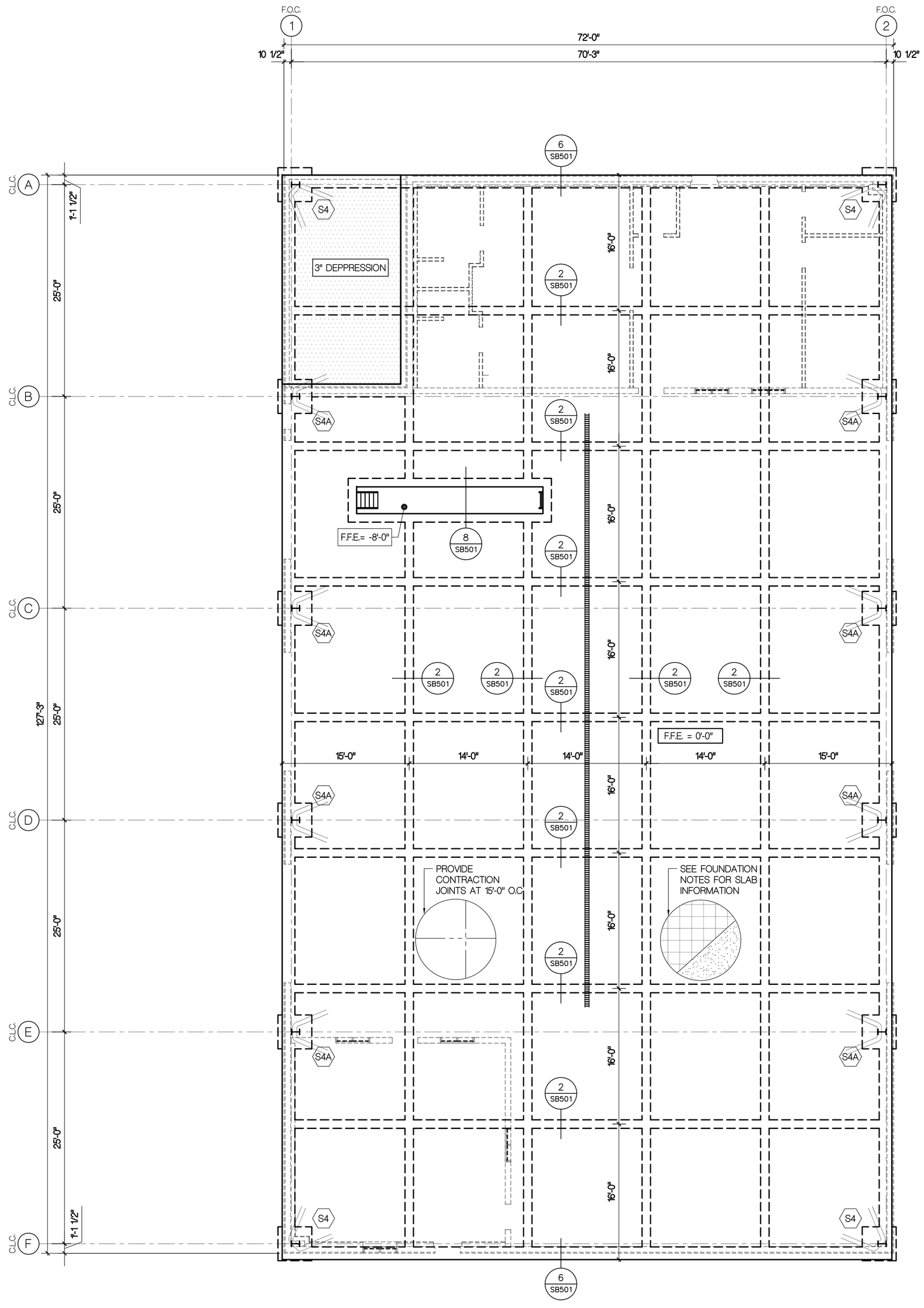
No.	Description	Date

PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE: STRUCTURAL TYPICAL DETAILS

SG004

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1 COMPOSITE FOUNDATION PLAN- MAINTENACE BLDG.
SCALE : 1/8"-1'-0"

FOUNDATION SUBGRADE–MAINT. BLD'G

1. PREPARATION OF EXISTING GROUND
   ALL AREAS TO SUPPORT SELECT FILL SHALL BE STRIPPED OF ALL VEGETATION AND/OR ORGANIC TOPSOIL.
   MINIMUM DEPTH OF REMOVAL: 8"
   EXTEND BEYOND BUILDING FOOT PRINT: 2 FEET
   REMOVE THE EXISTING SUBGRADE
   SOILS DOWN TO A MINIMUM ELEVATION OF: 910' AMSL
   EXTEND BEYOND BUILDING FOOT PRINT 2 FEET
   THE EXPOSED SUBGRADE SHALL BE SCARIFIED TO A DEPTH OF 8 INCHES AND MOISTURE CONDITIONED FROM 0 TO 3% ABOVE OPTIMUM. THE SUBGRADE SHALL BE COMPACTED TO 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE STANDARD MOISTURE-DENSITY RELATION (ASTM D-698). FOLLOWING COMPLETE CLEARING AND PREPARATION OF THE SITE FOR CONSTRUCTION, THE GEOTECHNICAL ENGINEER SHALL OBSERVE THE SITE TO DETERMINE THAT SATISFACTORY PREPARATION HAS BEEN ACCOMPLISHED.
2. SELECT FILL MATERIAL
   FILL MATERIAL: REFER TO GEOTECHNICAL REPORT
   PLASTICITY INDEX: BETWEEN 8 AND 20
   MAXIMUM LIQUID LIMIT: LESS THAN 40
   NO ORGANIC OR OTHER PERISHABLE MATERIAL
   NO STONES LARGER THAN REFER TO GEOTECHNICAL REPORT
   * FINISH FLOOR SHALL BE 18" MINIMUM ABOVE TOP OF CURB ELEVATION OR 18" MINIMUM ABOVE CROWN OF STREET, OR AS INDICATED ON CIVIL DRAWINGS, INCREASE INDICATED AMOUNT OF FILL AS REQUIRED TO ACHIEVE MOST STRINGENT REQUIREMENTS
3. PLACING SELECT FILL
   FILL LIFTS: NOT EXCEEDING 6 INCHES, COMPACTED LIFTS
   MINIMUM AMOUNT OF SELECT FILL: 31 INCHES
4. COMPACTION OF SELECT FILL
   MOISTURE: WITHIN (0) PERCENT TO (3) PERCENT ABOVE OPTIMUM MOISTURE CONTENT.
   COMPACTION: 95 PERCENT MAXIMUM DENSITY, IN ACCORDANCE WITH ASTM D1557
5. COMPACTION TESTING
   ATTERBERG LIMITS: ONE AT A RATE OF 5,000 CUBIC YARDS.
   COMPACTION: ONE TEST PER 3,000 SQUARE FEET PER LIFT (MINIMUM OF 3 PER LIFT)
6. THE SOILS ENGINEER SHALL BE THE OWNERS REPRESENTATIVE TO CONTROL THE PLACEMENT OF COMPACTED FILL. THE SOILS ENGINEER SHALL APPROVE THE SUB-GRADE PREPARATION. THE FILL MATERIALS, THE METHOD OF PLACEMENT AND COMPACTION, SHALL GIVE WRITTEN APPROVAL OF THE COMPLETED FILL.
7. THE SOILS REPORT/FOUNDATION INVESTIGATION IS TO BE CONSIDERED A PART OF THESE PLANS AND SHALL BE COMPLIED WITH BY THE CONTRACTOR. ALL EARTHWORK AND GRADING SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FOUNDATION INVESTIGATION OR PER NOTES 1 THRU 4 ABOVE WHICHEVER HAS THE MOST STRINGENT REQUIREMENTS.
8. IN THE EVENT FOUNDATION EXCAVATIONS ARE CARRIED TO A DEPTH GREATER THAN REQUIRED, THE ADDITIONAL DEPTH SHALL BE FILLED WITH THE SAME CONCRETE AS THAT USED FOR FOOTING AT NO ADDITIONAL EXPENSE TO THE OWNER. NO UNCONTROLLED FILL WILL BE PERMITTED.
9. THE FOOTING EXCAVATIONS SHALL BE KEPT FREE FROM LOOSE MATERIAL AND STANDING WATER.
10. THE FOUNDATION EXCAVATIONS SHOULD BE OBSERVED BY THE SOILS ENGINEER PRIOR TO STEEL OR CONCRETE PLACEMENT TO ASSESS THAT THE FOUNDATION MATERIALS ARE CAPABLE OF SUPPORTING THE DESIGN LOADS AND ARE CONSISTENT WITH THE MATERIALS DISCUSSED IN THE REPORT. THIS IS ESPECIALLY IMPORTANT TO IDENTIFY THE ACCEPTABILITY OF THE SUBGRADE OR FILL MATERIAL UNDER THE FOOTING. SOFT OR LOOSE SOIL ZONES ENCOUNTERED AT THE BOTTOM OF THE FOOTING OR BEAM EXCAVATIONS SHOULD BE REMOVED TO THE LEVEL OF COMPETENT SOIL AS DIRECTED BY THE GEOTECHNICAL ENGINEER. CAVITIES FORMED AS A RESULT OF EXCAVATION OF SOFT OR LOOSE SOIL ZONES SHOULD BE BACKFILLED WITH LEAN CONCRETE OR SELECT FILL AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
11. CARE SHOULD BE TAKEN TO SHAPE THE BUILDING AREAS SUCH THAT WATER WILL NOT POND AROUND THE STRUCTURE DURING CONSTRUCTION AND CAUSE THE NEAR SURFACE CLAYS TO SWELL. THE PROPOSED STRUCTURE SHALL BE ISOLATED FROM ANY MOISTURE SOURCE WHICH MIGHT ALSO CAUSE SWELLING OF THE CLAYS AFTER COMPLETION OF THE CONSTRUCTION.
12. WHEN THE STRUCTURE IS COMPLETE, THE GROUND SURFACE SHOULD SLOPE AWAY FROM THE STRUCTURE AND DOWN SPOUTS SHOULD CARRY RUNOFF WATER SEVERAL FEET FROM THE BUILDING, PREFERABLY INTO PAVED AREAS OR BEWERS, BEFORE DISCHARGING.
13. DO NOT PLANT OR LEAVE IN PLACE DEEP ROOTED TREES WITHIN PROXIMITY TO THE PERIMETER OF THE STRUCTURE. DEEP ROOTED TREES HAVE POTENTIAL TO REMOVE MOISTURE FROM BENEATH THE BUILDING IF PLANTED CLOSE ENOUGH TO ALLOW THE ROOT BULB EXTEND NEAR OR BENEATH THE BUILDING.
14. AIR CONDITIONING CONDENSER DRAIN LINES TO DISCHARGE WATER A MINIMUM OF 5 FEET FROM THE PERIMETER OF THE STRUCTURE. THE DISCHARGE AREA SHALL HAVE SUFFICIENT SLOPE AWAY FROM THE STRUCTURE TO PREVENT STANDING WATER.

FOR CONSTRUCTION

FOUNDATION NOTES

	DETAIL
1. FOR GENERAL NOTES SEE SHEET SG001 & SG002	
2. FOR TYPICAL DETAILS NOT REFERENCE IN PLAN SEE SHEET SG003 & SG004	
3. CONTRACTOR/SUBCONCRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS WITH ARCHITECTURAL PLANS BEFORE COMMENCING ANY WORK. THE CONTRACTOR/SUBCONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER BEFORE THE WORK HAS BEGUN.	
4. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL DIMENSIONS.	
5. REFER TO ARCHITECTURAL PLANS FOR FLOOR DRAINS.	
6. 5"THK SLAB ON GRADE w/ #4 AT 12" O.C. EACH WAY AT MID-DEPTH OF SLAB OVER 15 MIL STEGO WRAP OVER APPROVED COMPACTED FILL	
7. SLAB CONTRACTION JOINT, SEE DETAIL	5 SG003
8. FOOTING SCHEDULE, SEE DETAIL	20 SB501
9. REFER TO ARCHITECTURAL FOR ALL RECESSED AREAS NOT SHOWN.	
10. FOR DROP IN SLAB ON GRADE, REFER TO DETAIL	1 SG003
11. REFER TO FRAMING PLAN FOR VERTICAL REINFORCEMENT OF WALL.	11 SG003
12. FOR TYPICAL THICKEN SLAB UNDER NON BEARING CMU WALL, REFER TO DETAIL	
13. FOR TYPICAL THICKEN SLAB UNDER NON BEARING CMU WALL WITH DEPRESSED SLAB.	8 SG003
14. FOR 8" CMU PILASTER, SEE DETAIL	14 SG004
15. ALL AREAS OF CONT. AND/OR SPREAD FOOTINGS EXTENDING BEYOND THE BUILDING FOOTPRINT SHALL BE DEPRESSED TO AN ELEVATION OF 6" BELOW GRADE. OR BELOW FLATWORK WHERE APPLICABLE.	

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E-MAIL: Hinojosa@rgvinternet.com
REGISTRATION NUMBER: F-699
EXPIRATION DATE: 08/30/2013

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

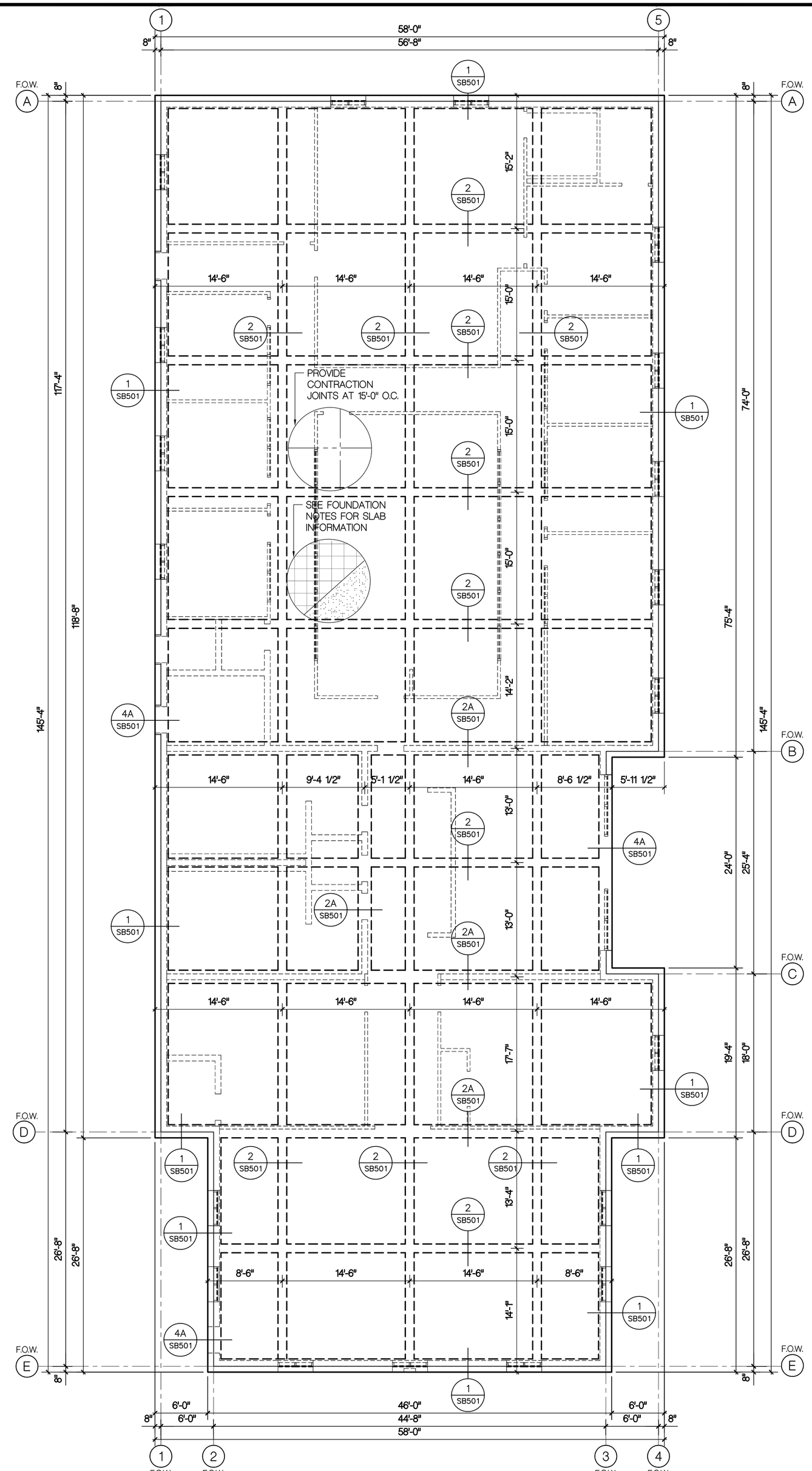
No.	Date	Description
M		

PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE: COMPOSITE FOUNDATION PLAN - MAINTENANCE BLDG.

SB101

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1 PARTIAL FOUNDATION PLAN- ADMINISTRATION BLDG.

SCALE : 1/8"=1'-0" AREA "A"

FOUNDATION NOTES

1. FOR GENERAL NOTES SEE SHEET SG001 & SG002
2. FOR TYPICAL DETAILS NOT REFERENCE IN PLAN SEE SHEET SG003 & SG004
3. CONTRACTOR/SUBCONCRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS WITH ARCHITECTURAL PLANS BEFORE COMMENCING ANY WORK. THE CONTRACTOR/SUBCONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER BEFORE THE WORK HAS BEGUN.
4. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL DIMENSIONS.
5. REFER TO ARCHITECTURAL PLANS FOR FLOOR DRAINS.
6. 5" THK. SLAB ON GRADE w/ #4 AT 12" O.C. EACH WAY AT MID-DEPTH OF SLAB OVER 15 MIL STEGO WRAP OVER APPROVED COMPACTED FILL.
7. SLAB CONTRACTION JOINT, SEE DETAIL.
8. FOOTING SCHEDULE, SEE DETAIL.
9. REFER TO ARCHITECTURAL FOR ALL RECESSED AREAS NOT SHOWN.
10. FOR DROP IN SLAB ON GRADE, REFER TO DETAIL.
11. REFER TO FRAMING PLAN FOR VERTICAL REINFORCEMENT OF WALL.
12. FOR TYPICAL THICKEN SLAB UNDER NON BEARING CMU WALL, REFER TO DETAIL
13. FOR TYPICAL THICKEN SLAB UNDER NON BEARING CMU WALL WITH DEPRESSED SLAB.
14. FOR 8" CMU PILASTER, SEE DETAIL.
15. ALL AREAS OF CONT. AND/OR SPREAD FOOTINGS EXTENDING BEYOND THE BUILDING FOOTPRINT SHALL BE DEPRESSED TO AN ELEVATION OF 6" BELOW GRADE. OR BELOW FLATWORK WHERE APPLICABLE.

DETAIL
5 SG003
20 SB501
1 SG003
11 SG003
8 SG003
14 SG004

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E-MAIL: Hino.jose@gmail.com
REGISTRATION NUMBER: F-699
EXPIRATION DATE: 06/30/2013

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS

PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542

PROJECT OWNER: HIDALGO COUNTY

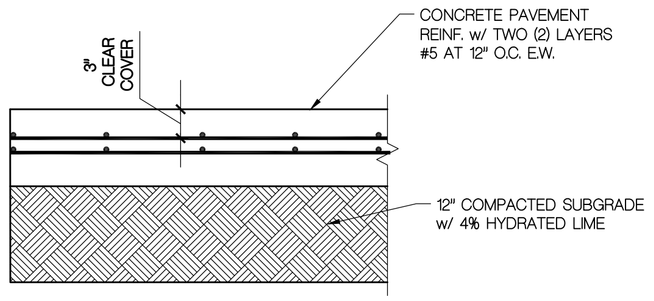
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PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE: FOUNDATION PLAN AREA "A"

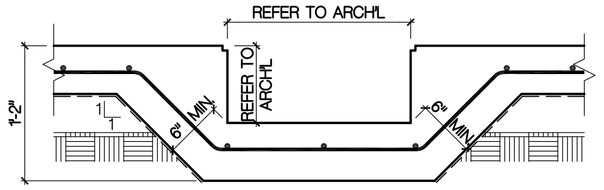
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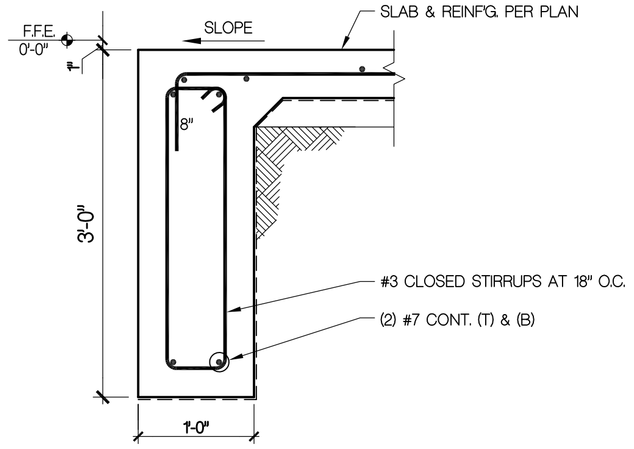


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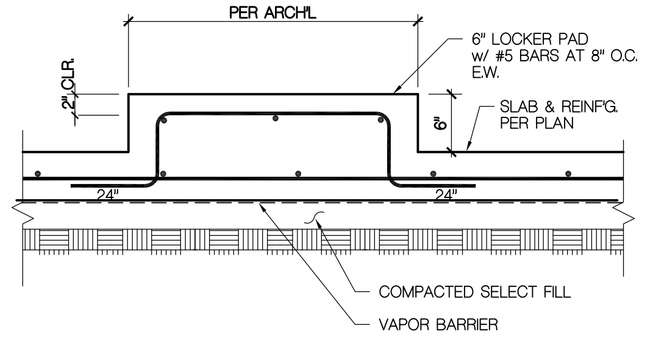
CONCRETE PAVEMENT SECTION 1



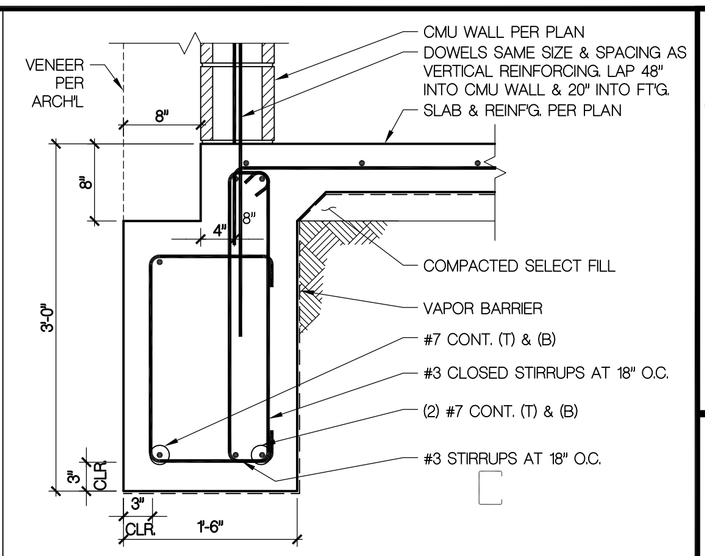
TRENCH DETAIL 13



EXTERIOR GRADE BEAM 9

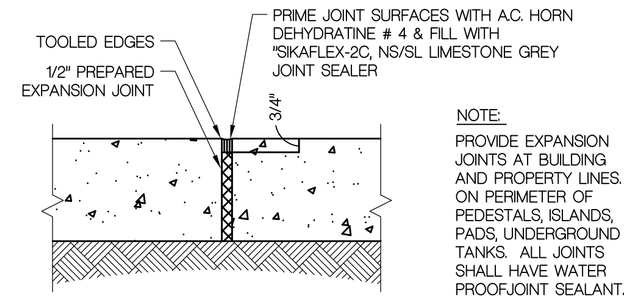


LOCKER PAD 5



EXTERIOR GRADE BEAM 1

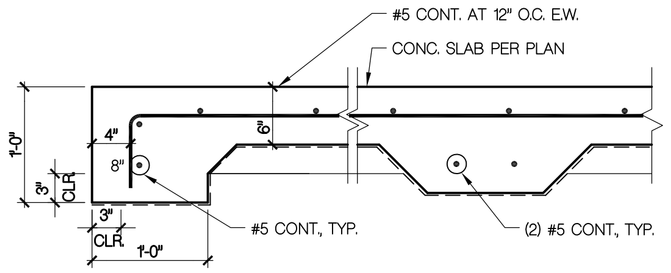
18



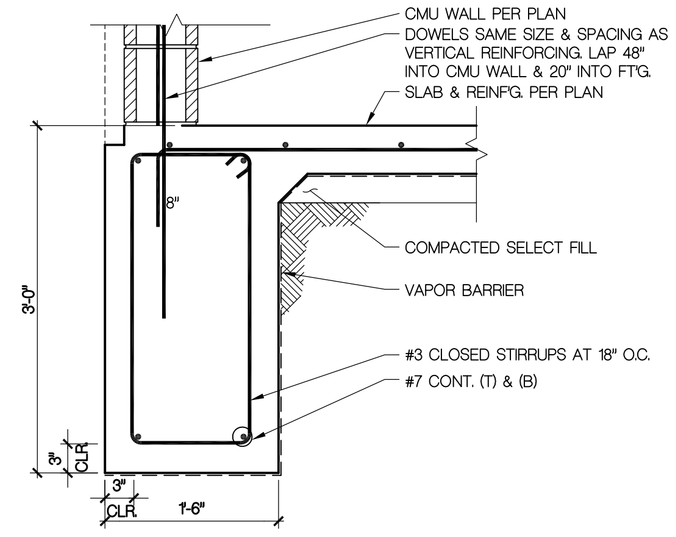
NOTE:

PROVIDE EXPANSION JOINTS AT BUILDING AND PROPERTY LINES. ON PERIMETER OF PEDESTALS, ISLANDS, PADS, UNDERGROUND TANKS. ALL JOINTS SHALL HAVE WATER PROOFJOINT SEALANT.

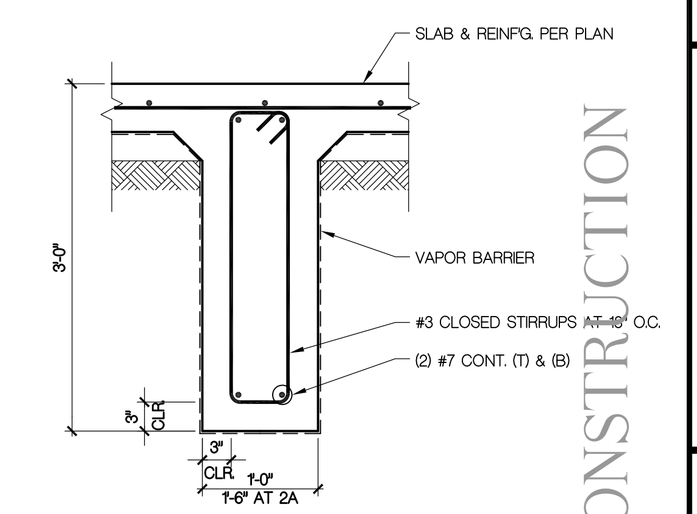
PAVEMENTE EXPANSION JOINT "EJ" 14



EMERGENCY GENERATOR PAD 10



EXTERIOR GRADE BEAM 6



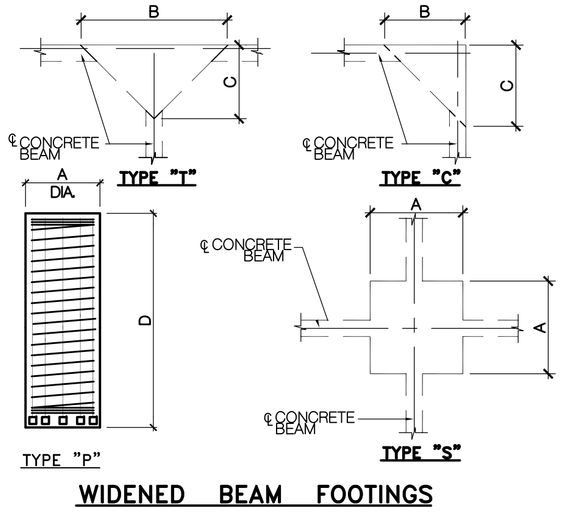
INTERIOR GRADE BEAM 2A

FOR ADDITIONAL INFO SEE DETAIL 1 / SB501

2

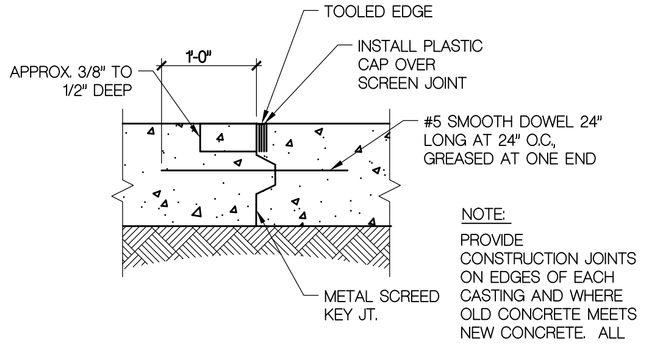
FOOTING SCHEDULE					
TYPE	A	B	C	D	REINFORCING
S2	2'-0"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S2A	2'-6"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S3	3'-0"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S3A	3'-6"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S4	4'-0"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S4A	4'-6"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
S5	5'-0"			3'-0"	#5S @ 10" O.C. E.W. TOP & BOTT.
P1	1'-6"			9'-6"	(6) #6 w/ #3 SPIRAL w/ 6" PITCH
P2	2'-0"			10'-6"	(6) #8 w/ #3 SPIRAL w/ 6" PITCH
P3	2'-0"			12'-6"	(6) #8 w/ #3 SPIRAL w/ 6" PITCH

NOTES: 1. D = FOOTING DEPTH BELOW FINISH FLOOR
2. FOOTING DIMENSIONS ARE FOR BIDDING PURPOSES ONLY. ACTUAL DIMENSION MAY VARY.
3. PROVIDE UNIT PRICES (ON A CUBIC YARD BASIS) FOR REINFORCED (#5S @ 12" O.C. E.W. TOP & BOTT.) WIDENED BEAM CONCRETE FOOTINGS



WIDENED BEAM FOOTINGS

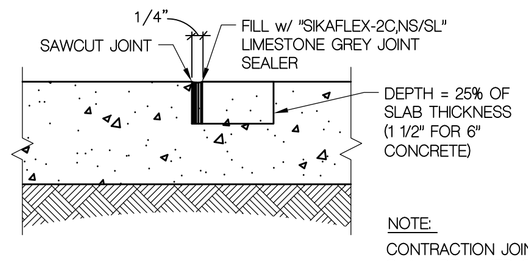
FOOTING SCHEDULE 20



NOTE:

PROVIDE CONSTRUCTION JOINTS ON EDGES OF EACH CASTING AND WHERE OLD CONCRETE MEETS NEW CONCRETE. ALL JOINTS SHALL HAVE WATER PROOFJOINT SEALANT.

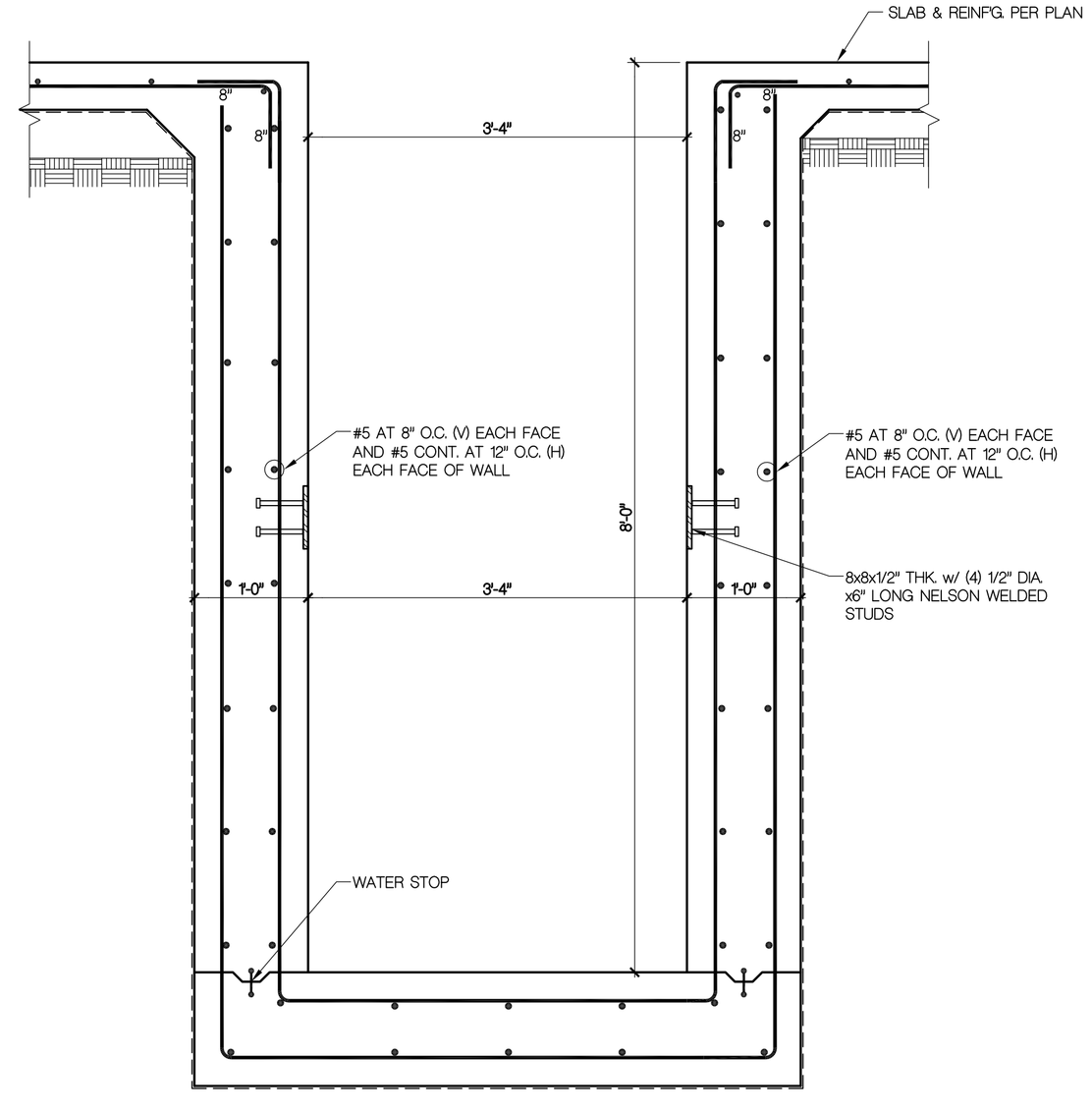
PAVEMENT CONSTRUCTION JOINT 15



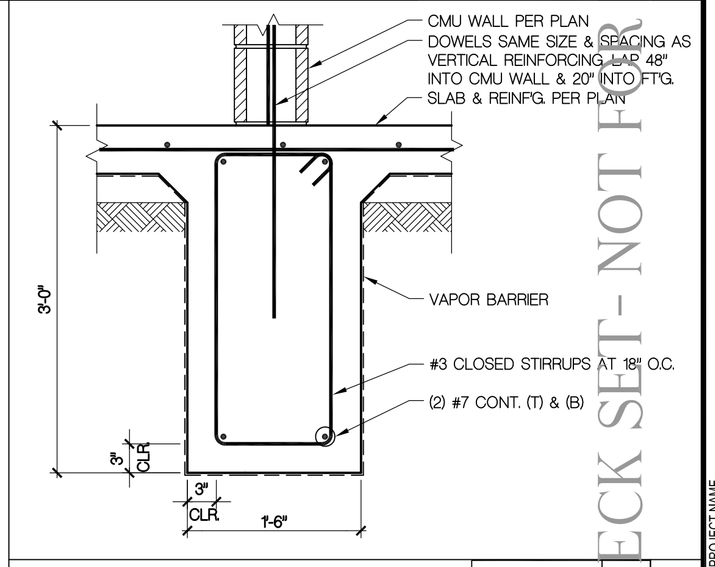
NOTE:

CONTRACTION JOINTS SHALL BE LAYED OUT WITH 12' NOMINAL, 15' MAX. SPACING BOTH WAYS UNLESS OTHERWISE SHOWN. ALL JOINTS SHALL HAVE JOINT SEALANT.

PAVEMENT CONTRACTION JOINT "SC" 16

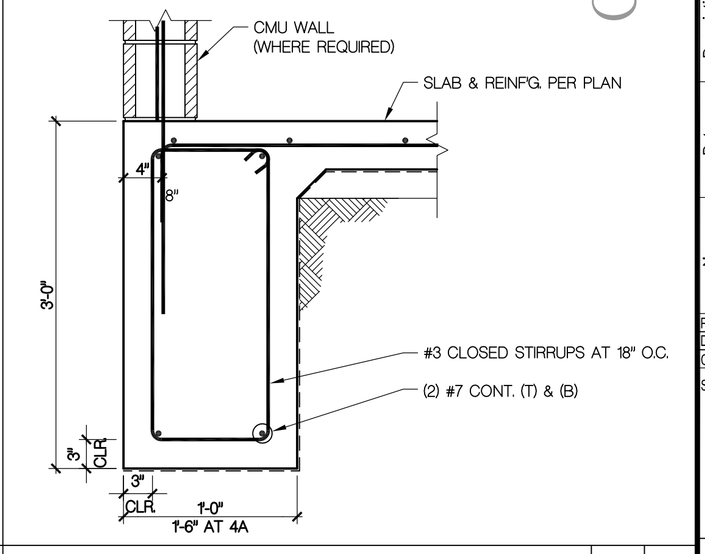


OIL PIT SECTION 8



INTERIOR GRADE BEAM 3

FOR ADDITIONAL INFO SEE DETAIL SB501



EXTERIOR GRADE BEAM 4A 4

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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(956) 584-0555 FAX
E-MAIL: Hinojosaengineering@aol.com
REGISTRATION NUMBER: F-699
EXPIRATION DATE: 06/30/2013

PROJECT NAME: HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS
PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

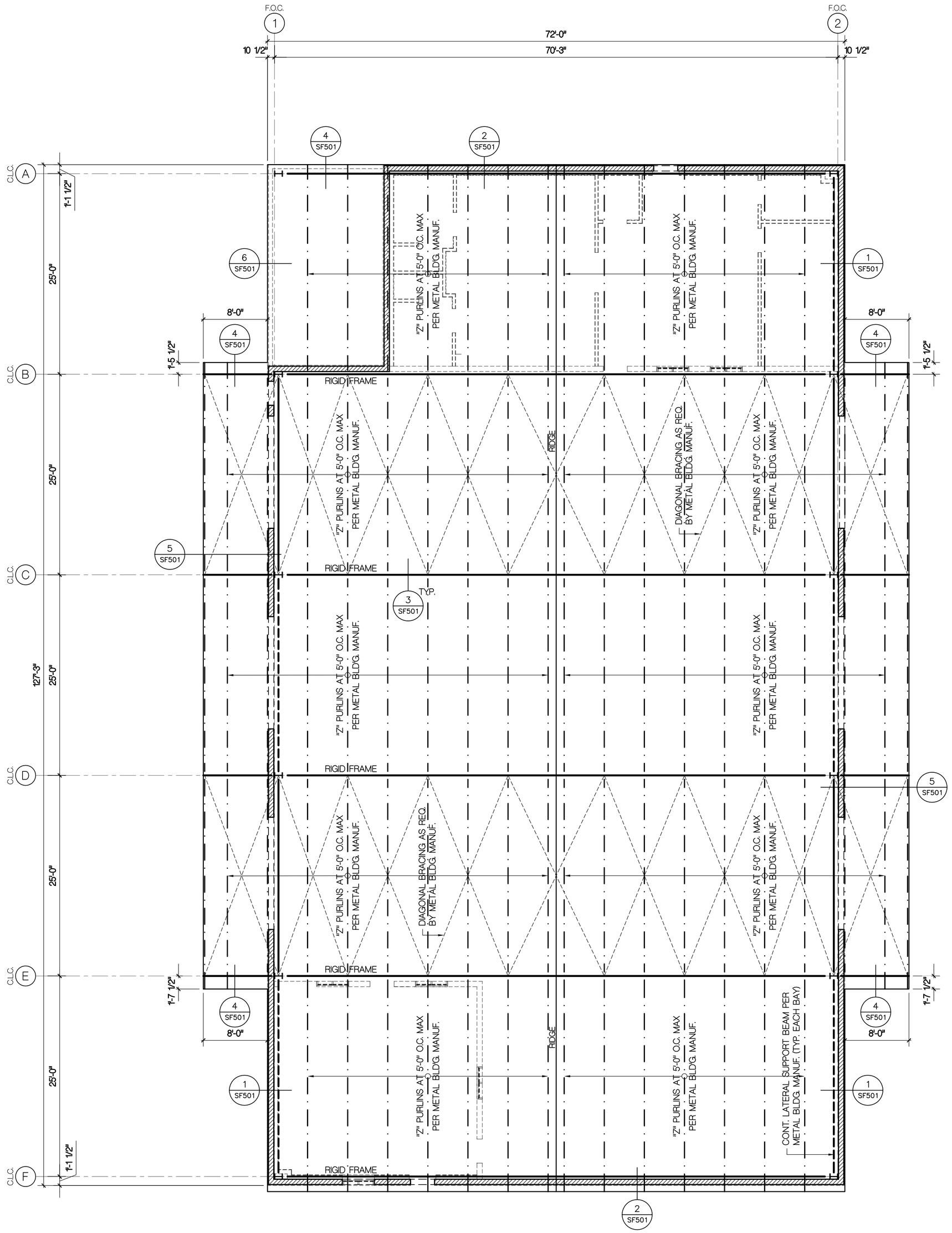
No.	Description	Date

PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE: FOUNDATION DETAILS

SB501

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1 HIGH ROOF FRAMING PLAN- MAINTENANCE BLDG.

SCALE : 1/8"= 1'-0"

FRAMING NOTES

1. FOR GENERAL NOTES SEE SHEET SG001 AND SG002
2. FOR TYPICAL DETAILS SEE SHEET SG003 AND SG004
3. DIMENSIONS SHOWN ARE FOR GENERAL INFORMATION. COORDINATE WITH ARCHITECTURAL PLANS.
4. SEE ARCHITECTURAL ROOF PLAN FOR ROOF HATCHES.
5. JOIST MANUFACTURER TO VERIFY THE MINIMUM ROW OF BRIDGING AND BRIDGING SIZE, AS REQUIRED BY SJI.
6. STEEL BEAM TO STEEL COLUMN CONNECTION PER DETAIL 15/SG003
7. STEEL BEAM TO STEEL BEAM CONNECTION PER DETAIL 16/SG003
8. ALL STEEL COLUMN SHALL BE HSS 5x5x5/16 U.N.O. ON PLANS.
9. WHERE STEEL JOIST IS SUPPORTED BY A STEEL COLUMN, SEE DETAIL 18/SG003
10. FOR OPENING IN ROOF AND AT MECHANICAL UNITS, SEE DETAIL 20/SG003
11. ▨ INDICATES 8" CMU WALL WITH #6 (V) AT 24" O.C. AND (1) #5 (H) AT 48" O.C. U.N.O. VERIFY CMU WALLS THICKNESS WITH ARCHITECTURAL PLANS, 8" CMU WALLS SHOWN ON STRUCTURAL PLANS ARE MIN. THICKNESS AND GOVERN OVER ARCHITECTURAL DRAWINGS.
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15. ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIP GALVANIZED.
16. FOR CMU WALLS EXTENDING TO THE UNDERSIDE OF ROOF DECK, SEE DETAIL 19/SG004
17. PROVIDE CMU LINTEL WHERE MECH'L. DUCT PENETRATES CMU WALL, SEE DETAIL 16/SG004
18. ALL LOOSE LINTEL ANGLES & SHELF ANGLES SHALL BE ⌊6x6x5/16" HOT DIPPED GALV.
19. FOR 8" CMU PILASTER, SEE DETAIL 14/SG004

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(956) 584-0609 FAX (956) 584-0611
E-MAIL: Hino.jose@rgvinfinet.com
REGISTRATION NUMBER: F-999
EXPIRATION DATE: 06/30/2013

PROJECT NAME
HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS

PROJECT LOCATION
2042 NORTH DOOLITTLE ROAD
EDINBURG, TX 78542

PROJECT OWNER
HIDALGO COUNTY

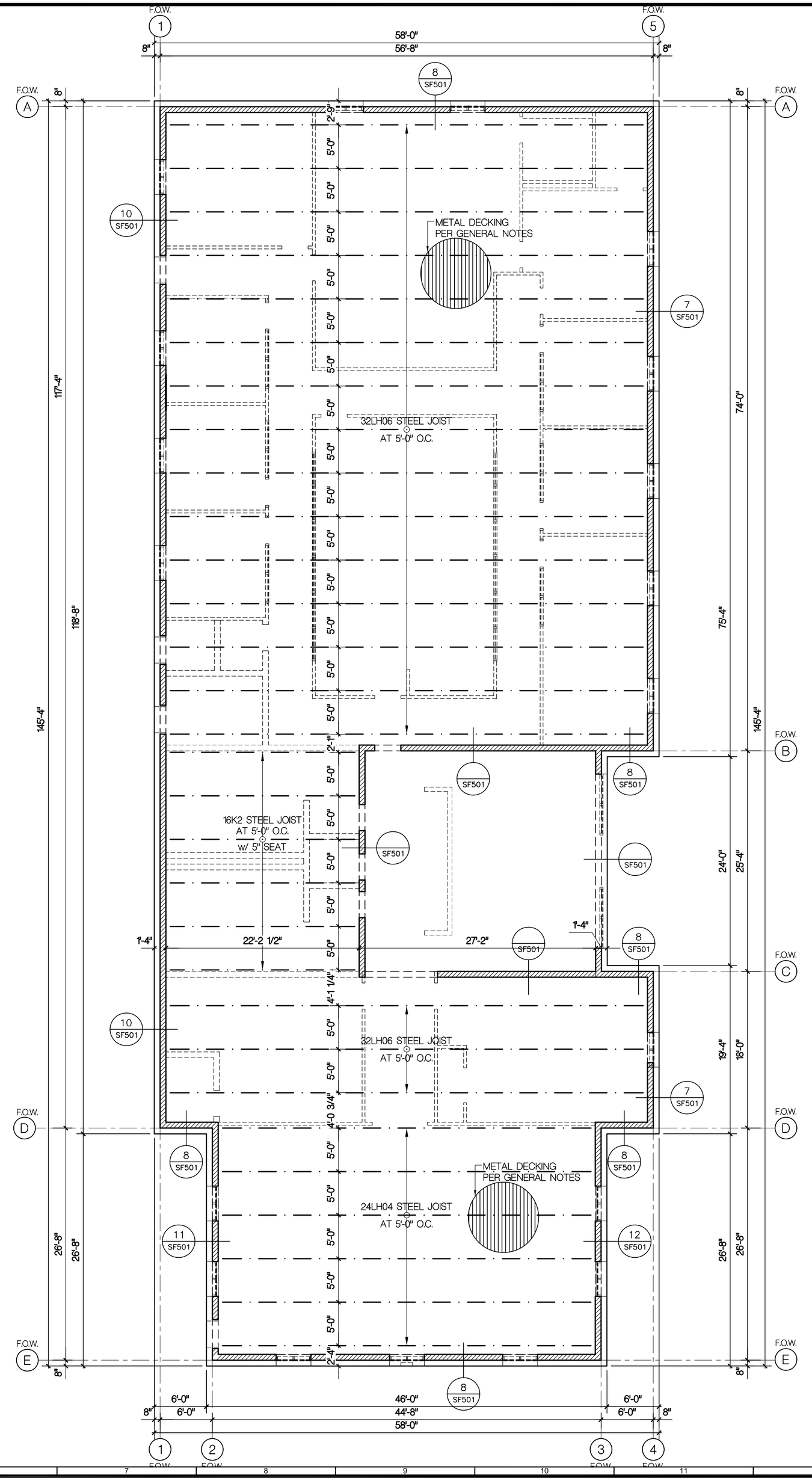
No.	Description	Date

PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE:
STRUCTURAL ROOF FRAMING PLAN

SF101

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1 PARTIAL FRAMING PLAN- ADMINISTRATION BLDG.

SCALE : 1/8"= 1'-0" AREA "A"

FRAMING NOTES

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19. FOR 8" CMU PILASTER, SEE DETAIL 14/SG004

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E-MAIL: Hino.jose@sbcglobal.com
REGISTRATION NUMBER: F-699
EXPIRATION DATE: 06/30/2013

PROJECT NAME
HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS

PROJECT LOCATION
2042 NORTH DOOLITTLE ROAD
EDINBURG, TX 78542

PROJECT OWNER
HIDALGO COUNTY

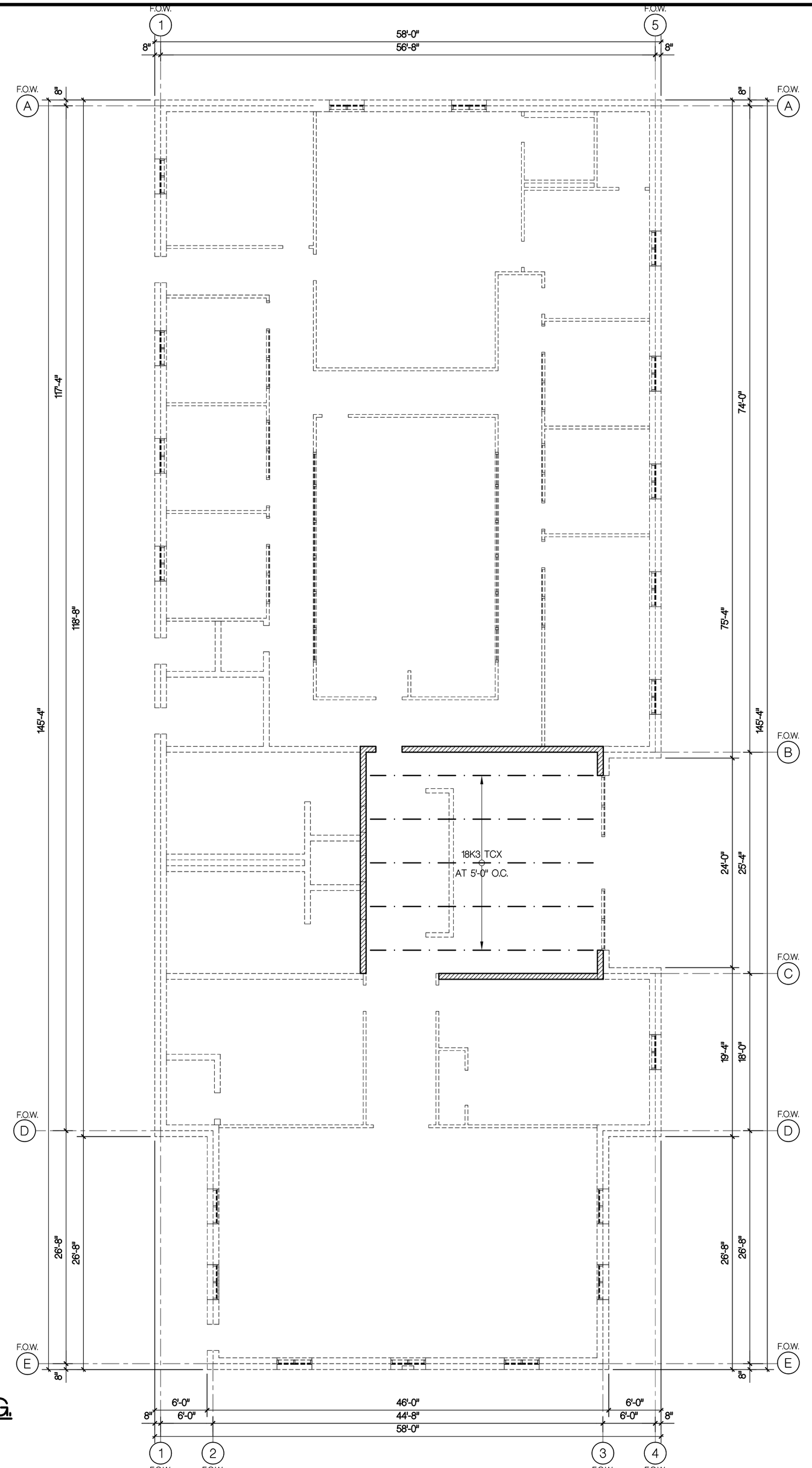
No.	Description	Date
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PROJECT NO.: 11-217
DRAWN BY: Mg
CHECKED BY: JG, AT, RH

SHEET TITLE:
STRUCTURAL FRAMING PLAN AREA "A"

SF102

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AREA "A"

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E-MAIL: Hinojosaengineering@aol.com
REGISTRATION NUMBER: F-999
EXPIRATION DATE: 06/30/2013

PROJECT NAME
HIDALGO COUNTY PRECINCT 4 ADMINISTRATION & MAINTENANCE BUILDINGS

PROJECT LOCATION
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EDINBURG, TX 78542

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HIDALGO COUNTY

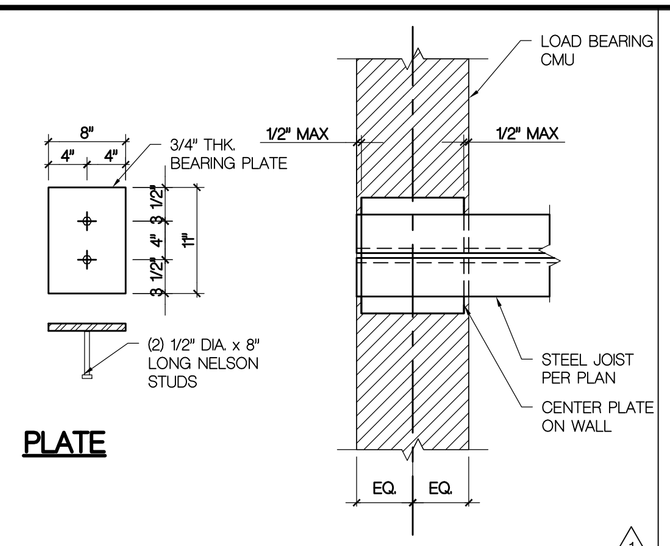
No.	Description	Date
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PROJECT NO.:	11-217
DRAWN BY:	Mg
CHECKED BY:	JG, AT, RH

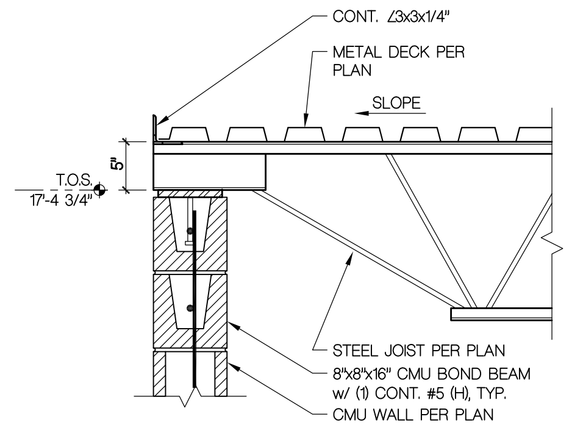
SHEET TITLE:
STRUCTURAL
HIGH ROOF FRAMING PLAN
AREA "A"

SF103

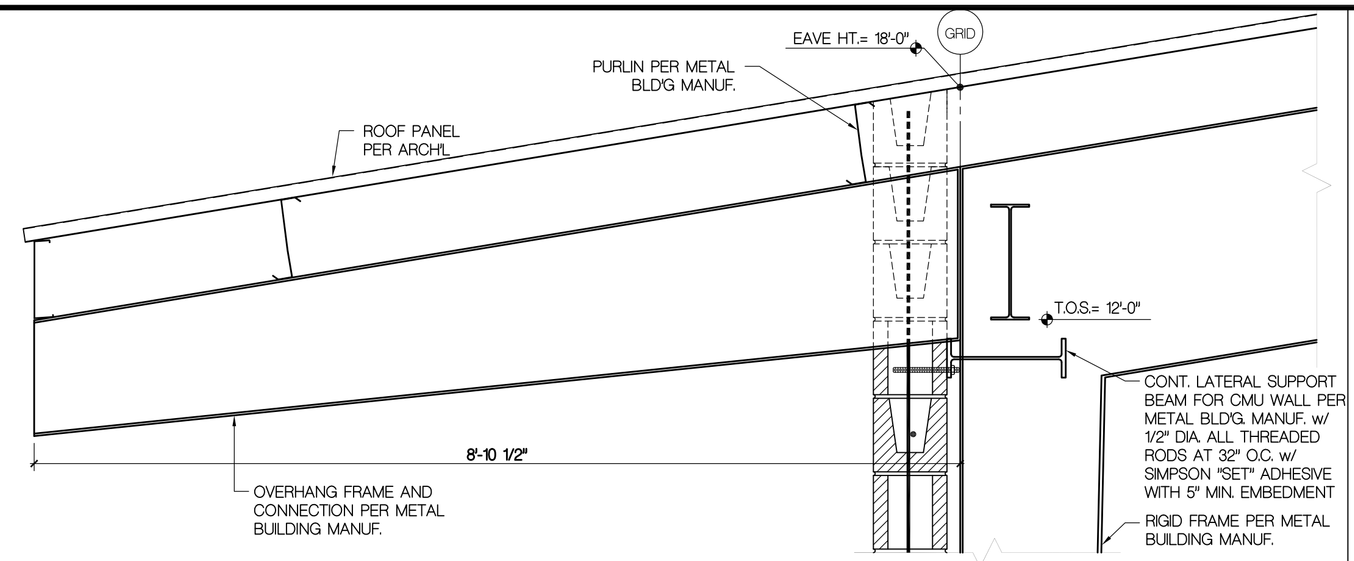
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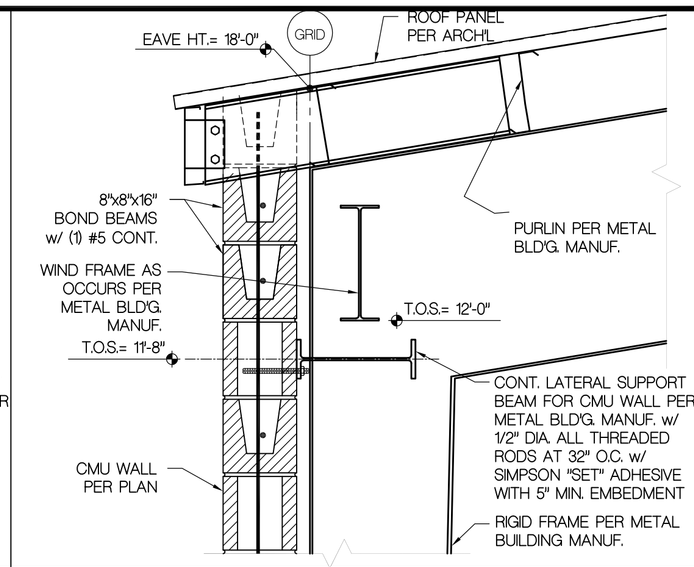
3/4" SINGLE JOIST BEARING PLATE | 17



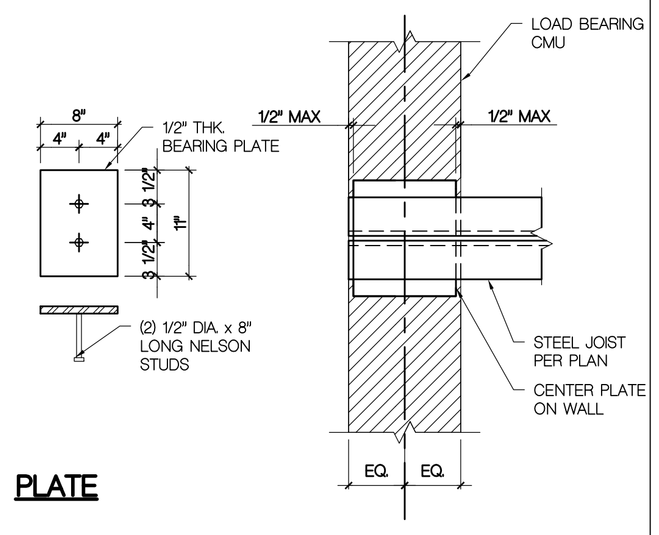
STEEL JOIST TO CMU | 13



RIGID FRAME TO CMU | 5

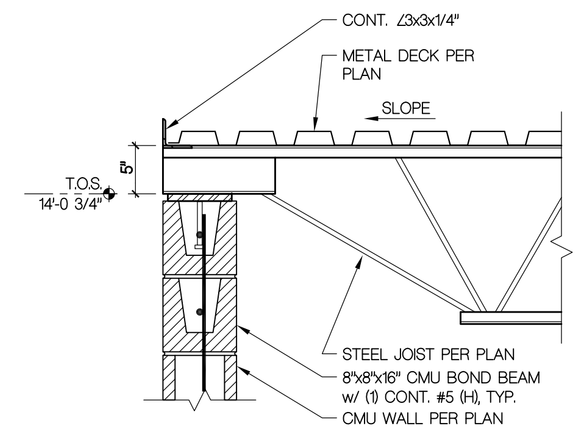


RIGID FRAME TO CMU | 1

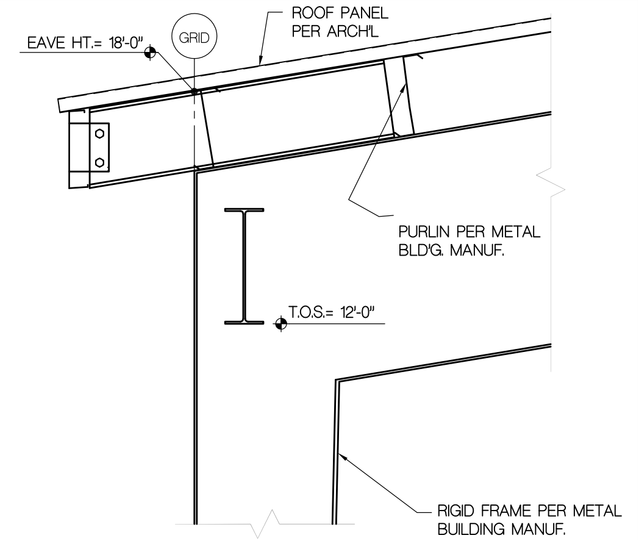


1/2" SINGLE JOIST BEARING PLATE | 18

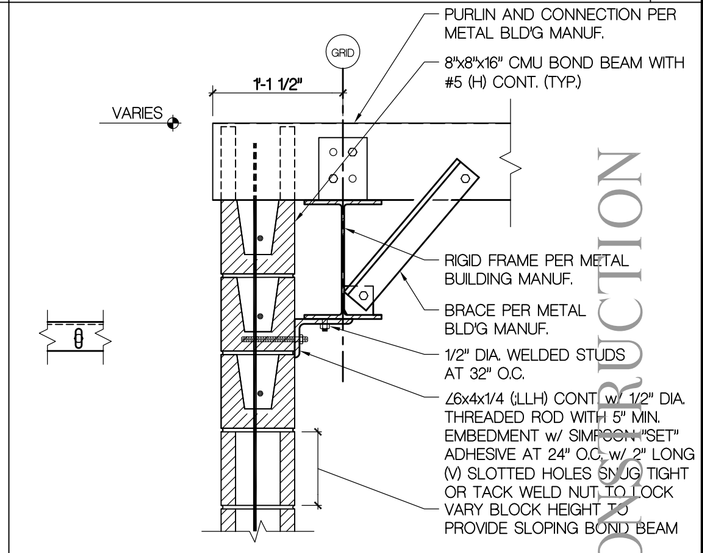
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STEEL JOIST TO CMU | 10

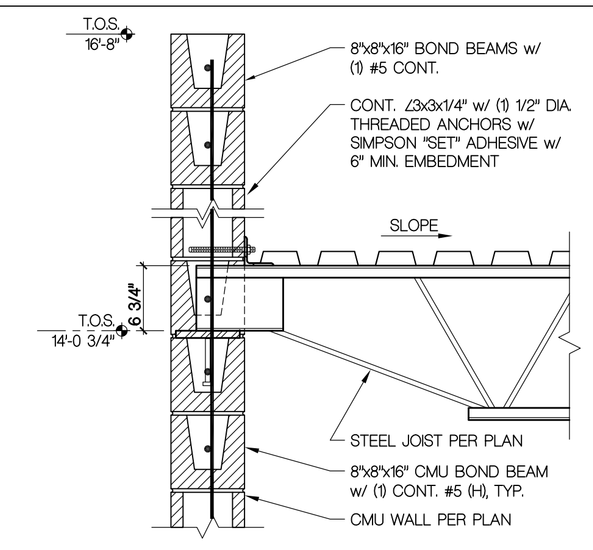


RIGID FRAME SECTION | 6

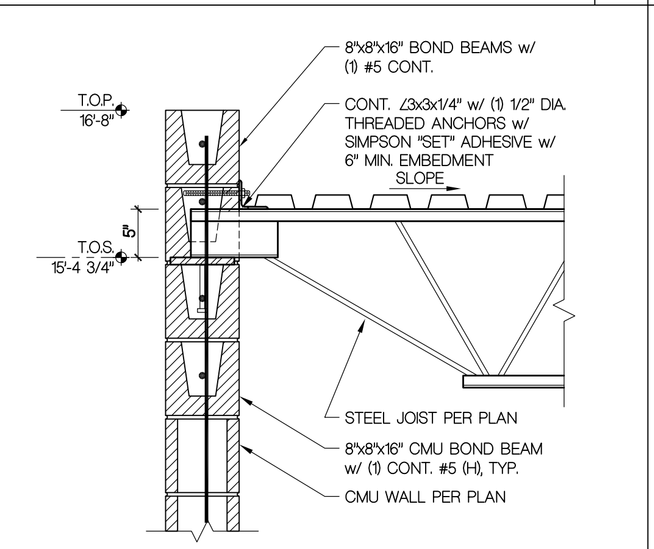


RIGID FRAME TO CMU | 2

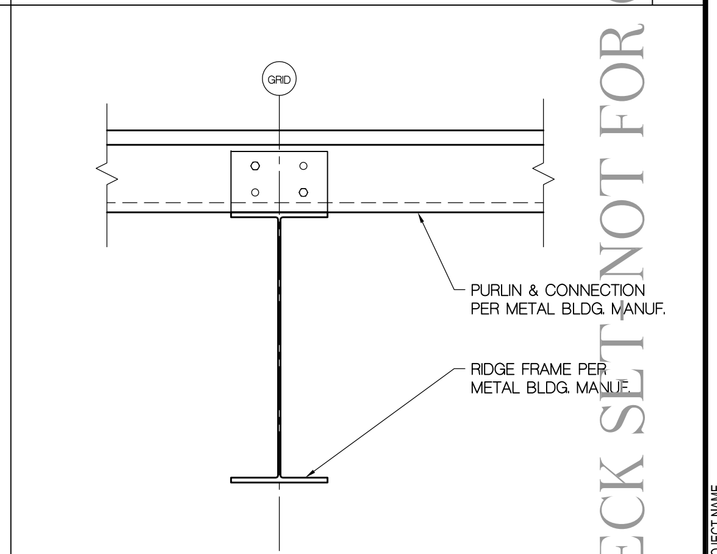
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STEEL JOIST TO CMU | 11



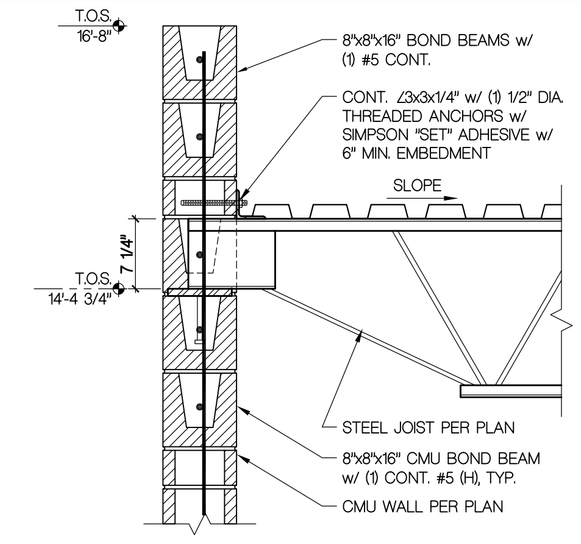
STEEL JOIST TO CMU | 7



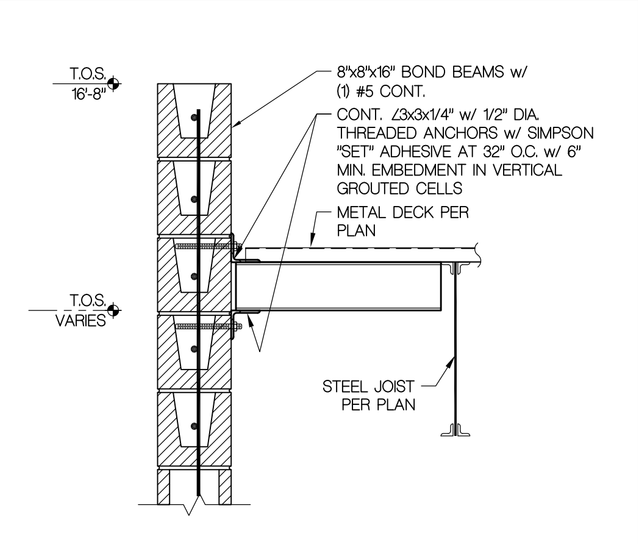
TYPICAL PURLINS TO METAL BUILDING | 3

| 19

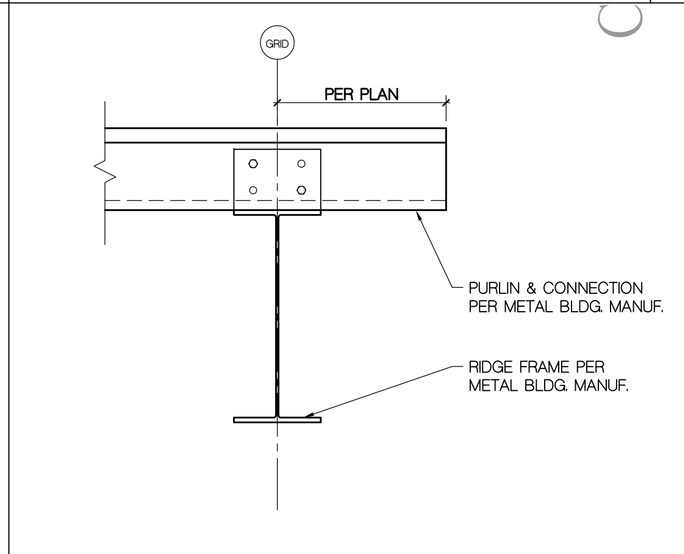
| 16



STEEL JOIST TO CMU | 12



STEEL JOIST TO CMU | 8



TYPICAL PURLINS TO METAL BUILDING | 4

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PROJECT LOCATION: 2042 NORTH DOOLITTLE ROAD, EDINBURG, TX 78542
PROJECT OWNER: HIDALGO COUNTY

No.	Description	Date

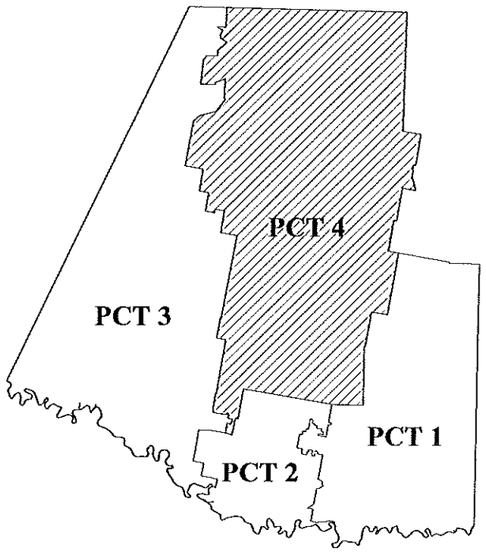
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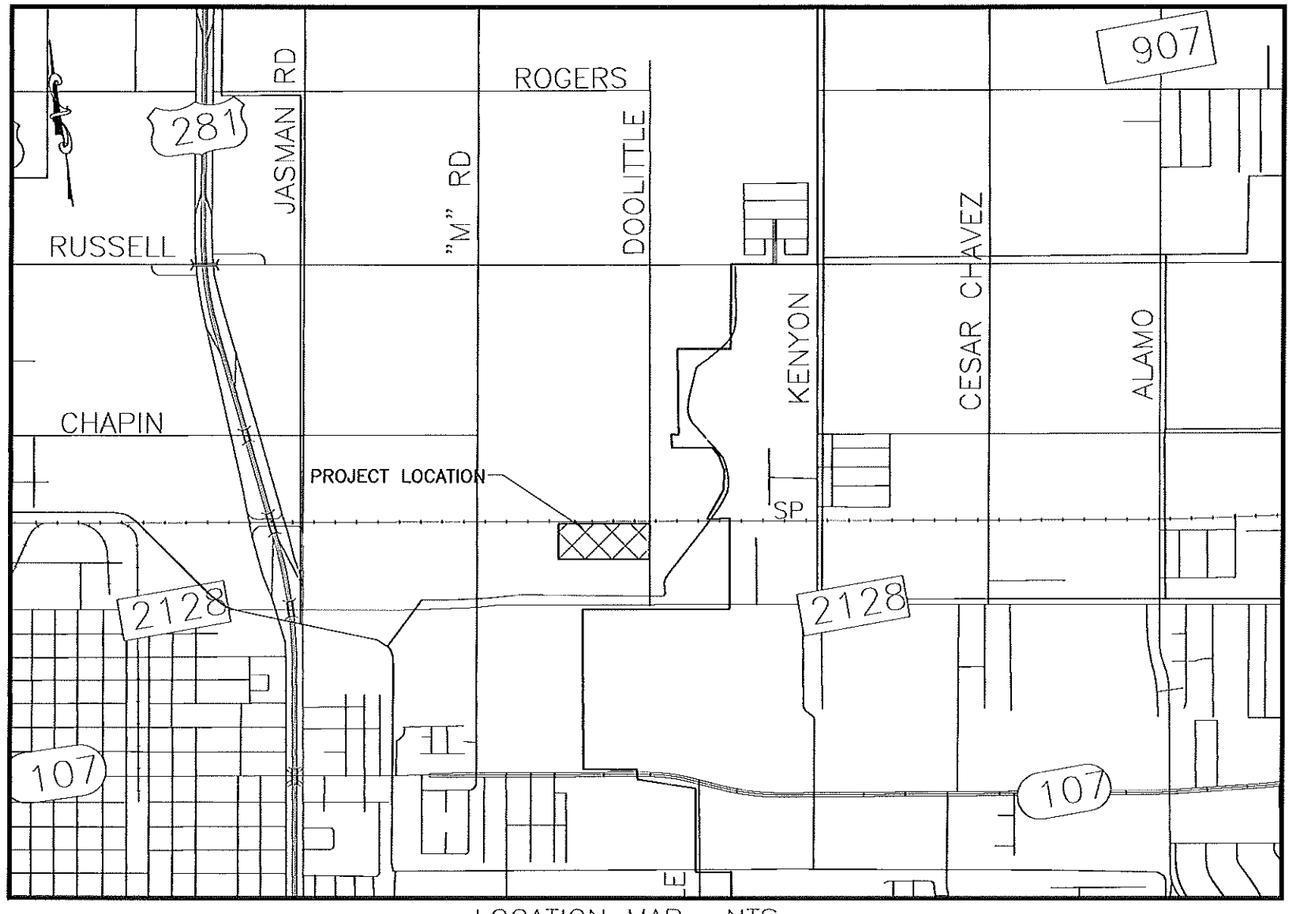
SHEET TITLE: STRUCTURAL FRAMING DETAILS

SF501

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PRECINCT 4 DRAINAGE PROJECT





LOCATION MAP– NTS

THE COUNTY OF HIDALGO TEXAS

HIDALGO COUNTY
PLANNING DEPARTMENT

1304 S. 25 TH. STREET
EDINBURG TX. 78539
TEL: (956) 318-2840 ✯ FAX: (956) 318-2844
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RAUL E. SESIN, P.E., C.F.M.
PLANNING ADMINISTRATOR

HIDALGO COUNTY PCT 4 CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

PROJECT No. 2012-056C-08-01-MSS

RAMON GARCIA	*COUNTY JUDGE*
COMMISSIONER JOEL QUINTANILLA	*PRECINCT No. 1*
COMMISSIONER HECTOR " TITO " PALACIOS	*PRECINCT No. 2*
COMMISSIONER JOE M. FLORES	*PRECINCT No. 3*
COMMISSIONER JOSEPH PALACIOS	*PRECINCT No. 4*

STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER

07/03/12

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RAUL E. SESIN P.E. No. 86374

Drawing: I:\PCT 4\pct 4 new building parking layout\PCT NEW BLDG COVER SHEET.dwg Plotted by: cynthia.perez
Layout Tab: COVER SHEET Date: 07/03/2012 Time: 01:29:29 PM

GENERAL NOTES

1. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE HIDALGO COUNTY PRECINCT No. 4
2. THE CONTRACTOR SHALL REMOVE ALL FENCES LOCATED WITHIN THE R.O.W. INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCES SHALL BE REPLACED WITH A NEW FENCE OR UNDAMAGED ORIGINAL FENCING. REMOVAL AND REPLACEMENT OF EXISTING AND TEMPORARY FENCES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
3. CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT CITY OF EDINBURG 48 HOURS PRIOR TO COMMENCEMENT OF WORK @ (956) 292-2090 TO COORDINATE AND MEET ANY ADDITIONAL REQUIREMENTS AND/OR SPECIFICATIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE TO CALL DIG TESS 48 HOURS PRIOR TO COMMENCEMENT OF WORK FOR UTILITY SPOTTING @ (1-800-DIG-TESS).
5. LOCATIONS OF UNDERGROUND FACILITIES ARE FROM BEST INFORMATION AVAILABLE. NEITHER THE OWNER OR ENGINEER, WARRANT THE ACCURACY OF THE INFORMATION PROVIDED. ANY DEVIATIONS SHALL BE CALLED TO THE ENGINEER'S ATTENTION IMMEDIATELY.
6. AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL INSTALL APPROPRIATE TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH THE TMUTCD LATEST EDITION, AND AS APPROVED BY THE ENGINEER.
7. ALL MATERIALS AND DEBRIS, EXCEPT HMAC AND CALICHE BASE, RESULTING FROM DEMOLITION IN PREPARATION FOR THE PROPOSED IMPROVEMENTS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. THESE MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED.
8. ANY DAMAGES TO FENCES, WALKS, MAIL BOXES, OR PRIVATE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.
9. NO OPEN EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED. AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AND UNPAVED AREAS SUBJECT TO VEHICULAR LOADING; ¾ PLYWOOD, WOOD PLANKING WITH O.S.H.A. ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS NOT SUBJECT TO VEHICULAR LOADING, OR AS APPROVED BY THE ENGINEER.
10. THE PREPARATION OF THESE PLANS REFLECTS INFORMATION, PROVIDED BY OTHERS, ON THE APPROXIMATE LOCATION AND EXISTENCE OF EXISTING UTILITY AND ADJACENT PHYSICAL FEATURES. HOWEVER, THEY DO NOT IMPLY OR AFFIRM THAT ALL UTILITIES OR PHYSICAL FEATURES ARE SHOWN. GENERALLY, UTILITY SERVICE CONNECTIONS ARE NOT INDICATED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATIONS OF THE OWNER IMMEDIATELY UPON ENCOUNTERING UNFORESEEN CONFLICTS.
11. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN, CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. CONTRACTOR TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES.
12. PUBLIC AND PRIVATE UTILITY LINES AND CUSTOMER SERVICE LINES MAY EXIST THAT ARE NOT SHOWN ON THE CONSTRUCTION DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE, MAINTAIN AND PROTECT THE INTEGRITY OF THESE LINES. HAND EXCAVATION MAY BE REQUIRED.
13. CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANY TO RELOCATE OR DIVERT ANY UTILITY IN CONFLICT WITH PROPOSED CONSTRUCTION SO AS NOT TO DISRUPT SERVICE OF IT. CONTRACTOR SHALL RESTORE, RELOCATED, OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION.
14. CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES FOR VERIFICATION OF LOCATION OF EXISTING FACILITIES PRIOR TO BEGINNING ANY EXCAVATION.
15. CONTRACTOR TO MAINTAIN ALL EQUIPMENT AND TRANSPORTATION OF SAID EQUIPMENT WITHIN THE EXISTING RIGHT-OF-WAYS OF THE CITY, COUNTY, OR STATE.
16. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY SURFACE IRREGULARITIES, AS DIRECTED BY THE ENGINEER, CAUSED BY THE CONTRACTOR'S WORKING OPERATIONS.
17. DURING EXCAVATION OPERATIONS FOR DRAINAGE AND/OR UTILITIES, THE CONTRACTOR SHALL NOT PILE ANY EXCAVATED MATERIAL OR EXCAVATE WITHIN THE DRIP LINE OF TREES THAT ARE TO BE PRESERVED.
18. WHERE NEW WATER LINES AND SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC 317 (DESIGN OF SEWAGE SYSTEMS) OR 30 TAC 290 (WATER HYGIENE).
19. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER AND SEWER CONNECTIONS TO ALL HOMES AND BUSINESS IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR CONNECTIONS TO BE REINSTALLED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE DRAINAGE AT ALL TIMES DURING CONSTRUCTION OF PROPOSED FACILITIES.
21. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AT ALL TIMES DURING THE INSTALLATION OF THE STRUCTURES, DRAINAGE, IRRIGATION AND ROAD IMPROVEMENTS.
22. THE CONTRACTOR SHALL CLEANUP AND RESTORE THE AREA OF OPERATIONS TO A CONDITION AS GOOD AS OR BETTER THAN THAT WHICH EXISTED PRIOR TO INSTALLATION OF ALL ITEMS TO BE CONSTRUCTED.
23. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT AREA ALL SURPLUS MATERIAL. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED OTHERWISE. SURPLUS MATERIALS FROM EXCAVATION INCLUDING DIRT, TRASH, ETC., SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE TO HIDALGO COUNTY PRECINCT No 4 THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAYS WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE HIDALGO COUNTY PRECINCT No 4. IF THE CONTRACTOR PLACES EXCESS MATERIAL IN THE AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND CONTRACTOR SHALL REMOVE THE MATERIAL AT OWN COST.
24. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION AND SUBMITTAL OF THE TRENCH EXCAVATION PROTECTION PLAN IN THE EVENT A TRENCH BOX IS NEEDED. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS BEFORE CONSTRUCTING THE SHORING. THE ENGINEER RESERVES THE RIGHT TO REJECT DESIGNS NOT MEETING THE REQUIREMENTS OF SECTION 402 AND 403.
25. NEW CALICHE MATERIAL GRADATION SHALL BE ARGILLACEOUS LIMESTONE, CALCAREOUS OR CALCAREOUS CLAY PARTICLES, WITH OR WITHOUT STONE CONGLOMERATE GRAVEL, SAND OR GRANULAR MATERIAL:

TYPE D GRADE 6

SIEVE No.	PERCENT RETAINED
2	0
½	20-60
4	40-75
40	75-85

26. COUNTY WILL PROVIDE CALICHE MATERIAL AND CONTROL POINTS (BENCHMARK AND PROPERTY CORNERS) FOR THE WORK TO BE PERFORMED BY THE CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING INCLUDING BUT NOT LIMITED TO HORIZONTAL & VERTICAL GRADE CUTS FOR ROADWAY AND PARKING. BASE AND SUB GRADE SHALL HAVE A MINIMUM CROSS SLOPE OF 2% FOR THE ROAD AND SLOPE AS PER PLAN FOR THE PARKING AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY EXCESS CALICHE TO THE BASE THAT WOULD REQUIRED MORE THAN 8" AND 10" OF CALICHE BASE DUE TO OVER EXCAVATIONS OF THE BASE & SUB GRADE OR NOT PROVIDING ADEQUATE FILL TO MEET FINISH GRADE ELEVATIONS. CONTRACTOR SHALL PROVIDE MATERIAL AND LABOR FOR ALL CONCRETE WORK. (SIDE WALK, VALLEY GUTTER, CONCRETE SPILLWAYS, CONCRETE APRONS, AND CURB AND GUTTER) AND APPLICATION OF TACK COAT FOR ROADWAY AND PARKING AREA FOR BASE BID.
27. CONTRACTOR SHALL RELOCATE EXCAVATED DIRT FROM DETENTION SWALES AT APPROXIMATELY 1000 FT WEST FROM PROPOSED CONSTRUCTION SITE.
28. THE BUILDING CONTRACTOR SHALL BE RESPONSIBLE TO CONNECT TO SERVICE LINE STUB OUTS AS PART OF THE BUILDING BID.
29. CIVIL SITE IMPROVEMENTS CONTRACTOR SHALL BE RESPONSIBLE FOR THE LIMITS OF WORK DEFINED IN THE PLANS. COORDINATION WITH PRECINCT No 4 AND BUILDING CONTRACTOR SHALL BE REQUIRED PRIOR TO FINALIZING WORK AREA WITHIN 5.0 FEET OF PROPOSED BUILDING SITES.

PROJECT No. 2012-056C-08-01-MSS

HIDALGO COUNTY
PLANNING DEPARTMENT
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RAUL E. SESIN, P.E., C.F.M.
PLANNING ADMINISTRATOR

COMMISSIONER
JOSEPH PALACIOS
HIDALGO COUNTY
PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND
MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

GENERAL NOTES

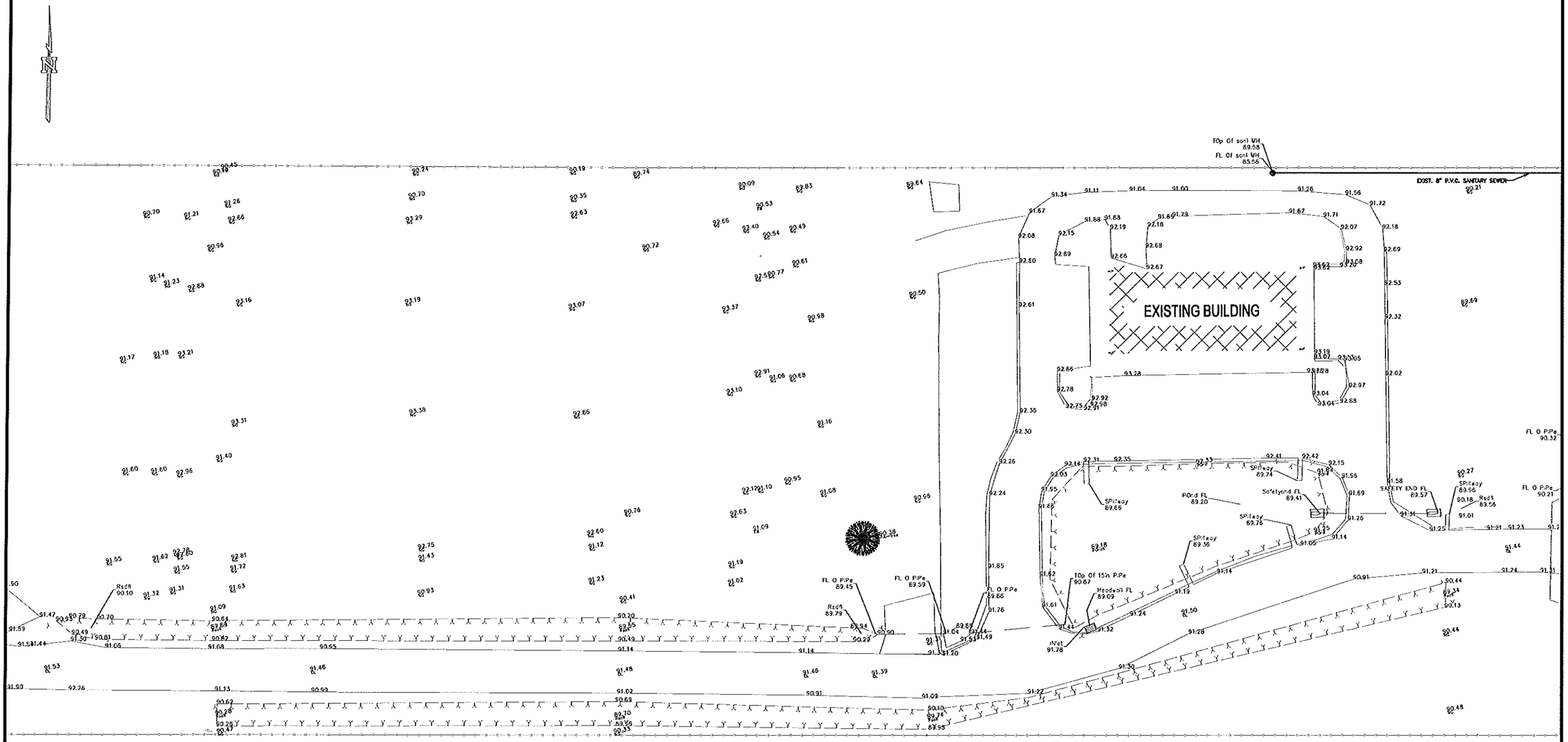
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED
PROFESSIONAL ENGINEER
07/03/12

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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-1

Drawings: I:\PCT 4\Jet 4 new building parking layout\GENERAL NOTES.dwg Plotted by: cynthia.perez
Layout Tab: GENERAL NOTES Date: 07/03/2012 Time: 09:45:49 AM



NOTE:

THE (HORIZONTAL AND/OR VERTICAL LOCATION OF EXISTING UNDERGROUND UTILITIES AS ILLUSTRATED ON THESE PLANS IS APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION IN THE AREA OF SAID UTILITIES. CONTRACTOR SHALL CONTACT UTILITY PROVIDERS AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION/EXCAVATING IN THE AREA OF EXISTING UTILITIES

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COMMISSIONER JOSEPH PALACIOS
HIDALGO COUNTY
PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

EXISTING TOPOGRAPHY PLAN

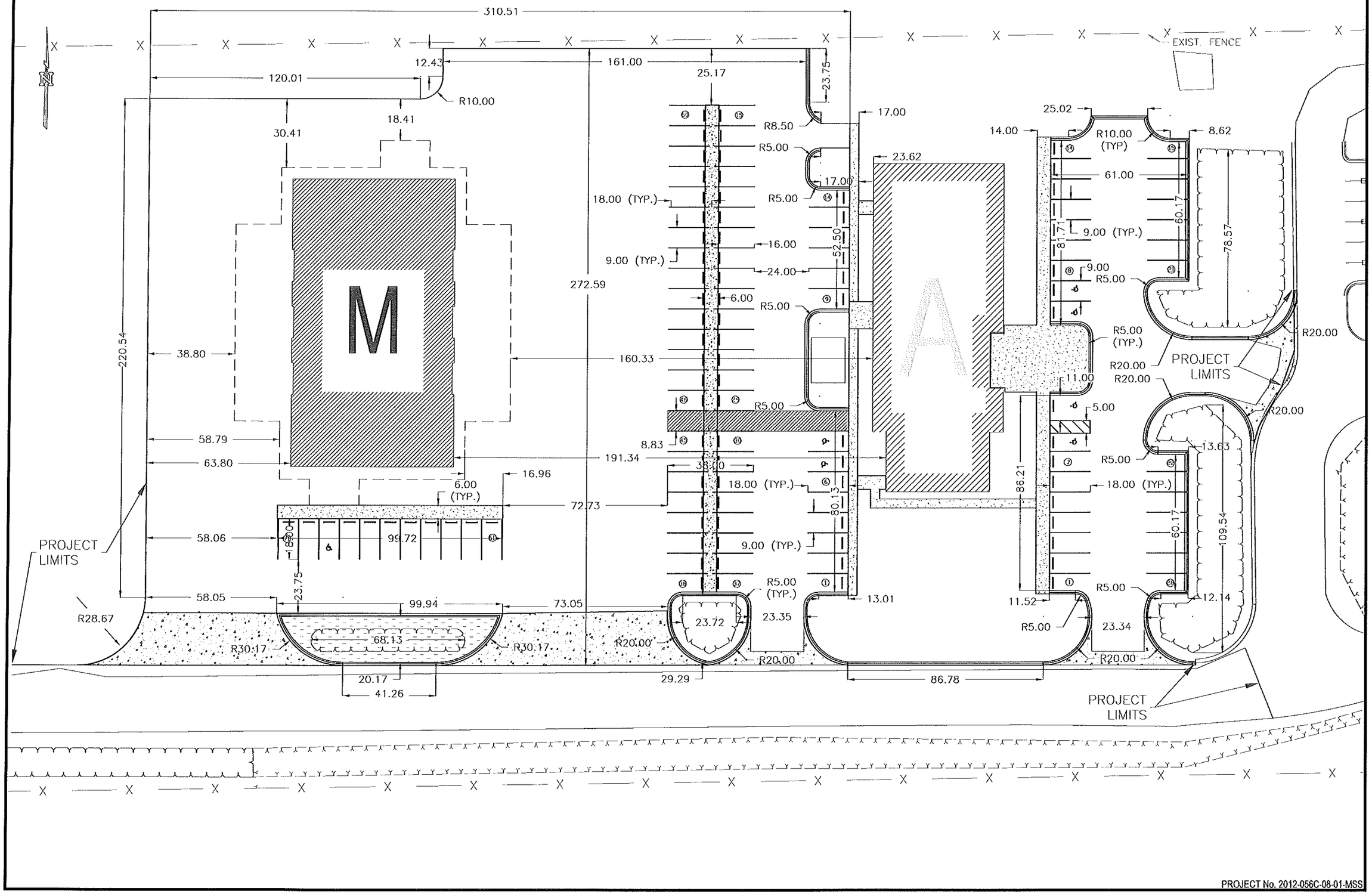
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
07/05/12

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SHEET:	C-2

Drawing: I:\PCT 4\pct 4 new building parking layout\Pct 4 Office Topography Information.dwg) Plotted by: cynthia.perez
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PROJECT No. 2012-056C-08-01-MSS

HIDALGO COUNTY
PLANNING DEPARTMENT

1304 S. 25 TH. STREET
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RAUL E. SESIN, P.E., C.F.M.
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THE COUNTY OF HIDALGO TEXAS

COMMISSIONER
JOSEPH PALACIOS
HIDALGO COUNTY
PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND
MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

DIMENSIONAL PLAN

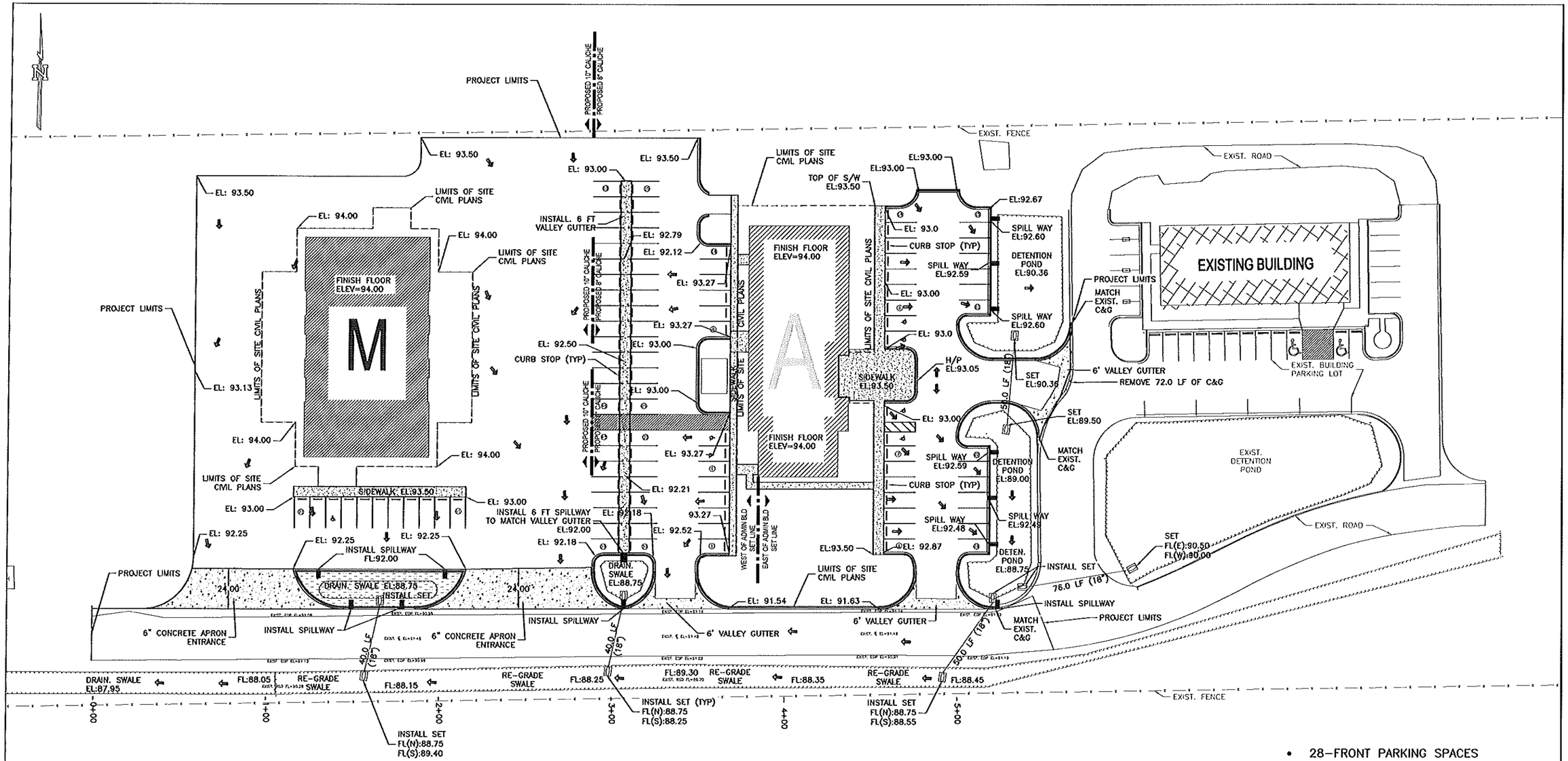
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED
PROFESSIONAL ENGINEER
07/03/12

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RAUL E. SESIN, P.E. No. 86374

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CHECKED BY:	RAUL E. SESIN
COPY BY:	EDGAR ISIDRO
SHEET:	C-3

Drawing: I:\PCT 4\Sect 4 new building parking layout\Sect 4 GRADING PLAN-DIMENSIONAL PLAN.dwg Plotted by: cynthia.perez
Layout Tab: dimensional plan Date: 07/03/2012 Time: 08:46:20 AM



- 28–FRONT PARKING SPACES
- 4–HANDICAP PARKING SPACES
- 71–REAR PARKING SPACES
- ⇦ WATER FLOW ARROW
- ELEVATIONS REFER TO TOP OF ASPHALT

BASE BID
(WEST SIDE OF ADMIN BLDG)

6,149	SY	PRIME COAT (MC-30) ENTIRE BASE OF PARKING AREA AND LEAVE IT READY FOR HMAC INSTALLATION (MATERIAL & LABOR)
1,855	SY	8" COMPACTED CALICHE (LABOR ONLY)
4,294	SY	10" COMPACTED CALICHE (LABOR ONLY)
4,294	SY	TENSAR TX 5 TRIAX GEOGRID (MATERIAL & LABOR)
520	LF	TYPE "A" BARRIER CONCRETE CURB AND GUTTER (MATERIAL & LABOR)
276	LF	6 FT CONCRETE VALLEY GUTTER (MATERIAL & LABOR)
425	SY	6" CONCRETE APRON ENTRANCE (MATERIAL & LABOR)

ALT BID No 2
(WEST SIDE OF ADMIN BLDG)

1,692	SF	(4") CONCRETE SIDE WALK (MATERIAL & LABOR) (185.0 SY)
1	LS	PARKING LOT STRIPPING AND SIGNAGE AS PER PLANS (MATERIAL & LABOR) (WEST OF ADMIN BLDG)
6	EA	CONCRETE SPILLWAYS (MATERIAL & LABOR)
71	EA	CONCRETE STOPS
3	EA	18" SAFETY END TREATMENT
80	LF	18" RCP-RJ CL III
71	LF	24" RCP-RJ CL III
2,034	SF	DETENTION SWALE EXCAVATION

ALT BID No1
(EAST SIDE OF ADMIN BLDG)

1,392	SY	PRIME COAT (MC-30) ENTIRE BASE OF PARKING AREA AND LEAVE IT READY FOR HMAC INSTALLATION (MATERIAL & LABOR)
1,557	SY	8" COMPACTED CALICHE (LABOR ONLY)
684	LF	TYPE "A" BARRIER CONCRETE CURB AND GUTTER (MATERIAL & LABOR)
128	LF	6 FT CONCRETE VALLEY GUTTER (MATERIAL & LABOR)
72	LF	REMOVE AND DISPOSE OF CONCRETE CURB AND GUTTER

ALT BID No 3
(EAST SIDE OF ADMIN BLDG)

2,661	SF	(4") CONCRETE SIDE WALK (MATERIAL & LABOR) (285.0 SY)
1	LS	PARKING LOT STRIPPING AND SIGNAGE AS PER PLANS (MATERIAL & LABOR)(EAST SIDE OF ADMIN BLDG)
7	EA	CONCRETE SPILLWAYS (MATERIAL & LABOR)
18	EA	CONCRETE STOPS
5	EA	18" SAFETY END TREATMENT
176	LF	18" RCP-RJ CL III
6,642	SF	DETENTION SWALE EXCAVATION

NOTE:

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COMMISSIONER
JOSEPH PALACIOS
HIDALGO COUNTY
PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

GRADING PLAN

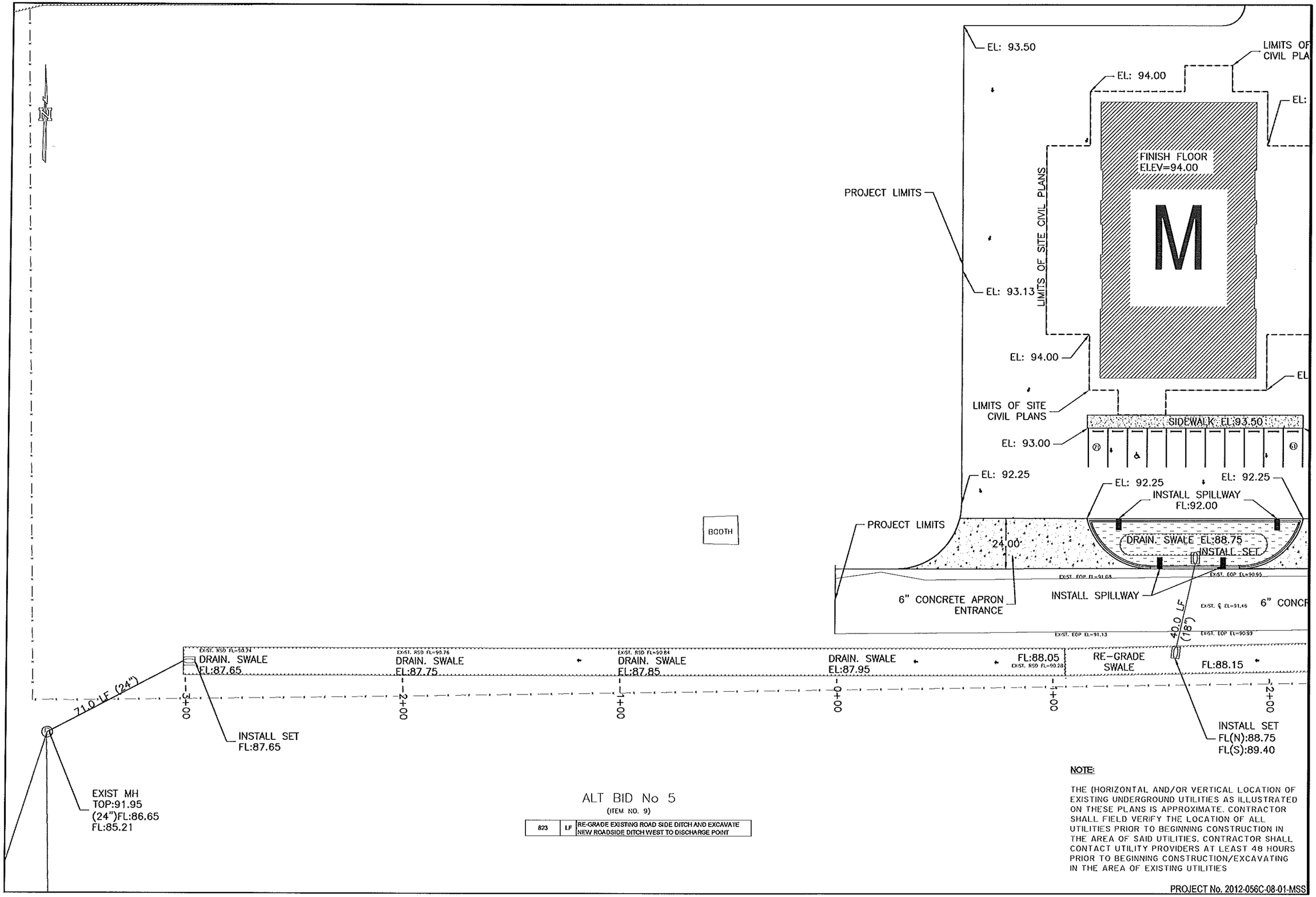
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
8/29/12

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RAUL E. SESIN, P.E. No. 86374

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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-4

Drawing: I:\PCT 4\pct 4 new building parking layout\pct 4 grading plan-site plan.dwg) Plotted by: cynthia.perez
Layout Tab: grading plan Date: 07/02/2012 Time: 08:49:06 AM



ALT BID No 5

(ITEM NO. 9)

823	LF	RE-GRADE EXISTING ROAD SIDE DITCH AND EXCAVATE NEW ROADSIDE DITCH WEST TO DISCHARGE POINT

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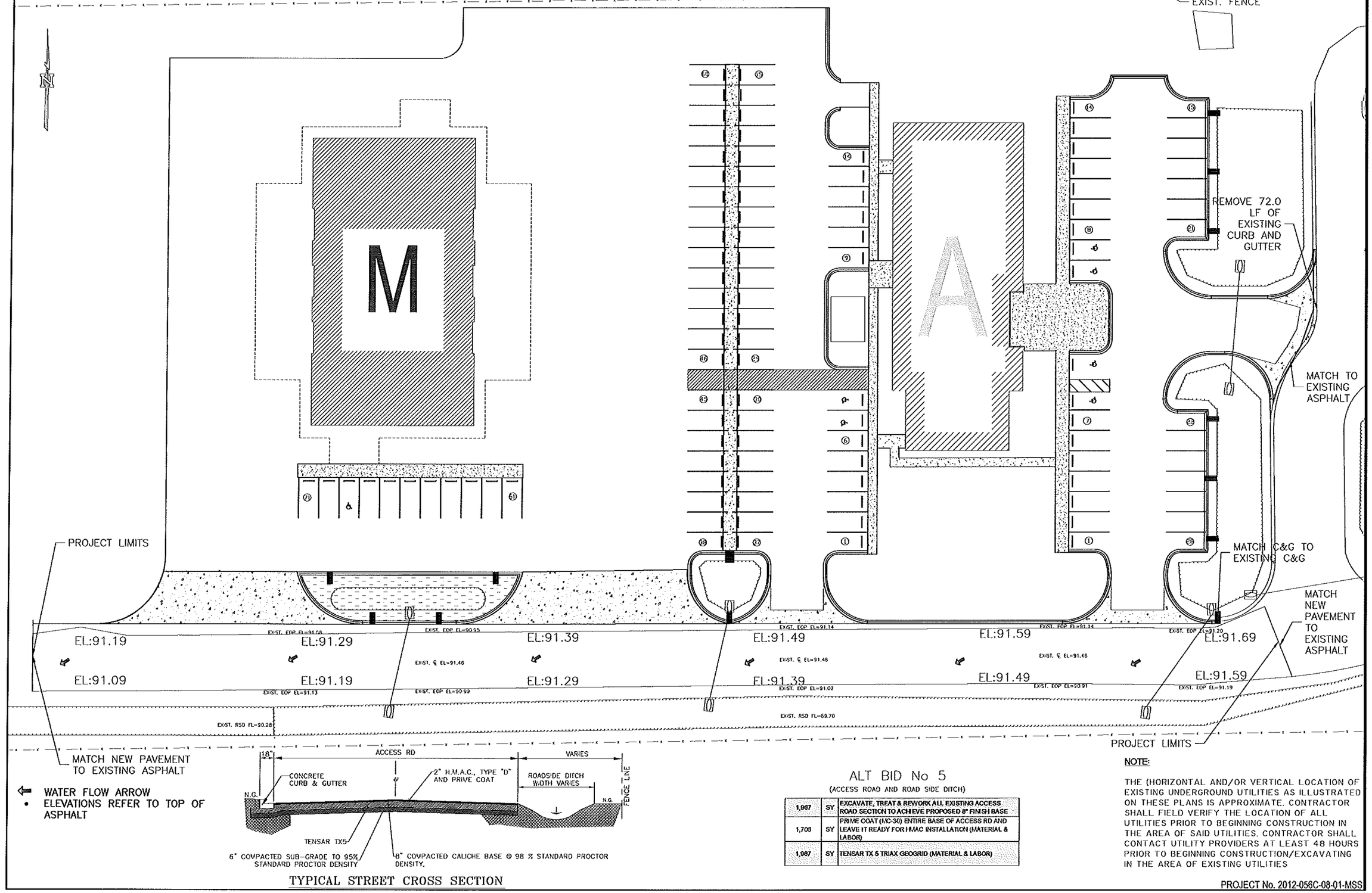
RSD OUTFALL PLAN

STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
9/12

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RAUL E. SESIN P.E. No. 86374

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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-5



TYPICAL STREET CROSS SECTION

ALT BID No 5

(ACCESS ROAD AND ROAD SIDE DITCH)

1,987	SY	EXCAVATE, TREAT & REWORK ALL EXISTING ACCESS ROAD SECTION TO ACHIEVE PROPOSED 8" FINISH BASE
1,708	SY	PRIME COAT (MC-30) ENTIRE BASE OF ACCESS RD AND LEAVE IT READY FOR HMAC INSTALLATION (MATERIAL & LABOR)
1,987	SY	TENSAR TX 5 TRIAX GEOGRID (MATERIAL & LABOR)

NOTE:

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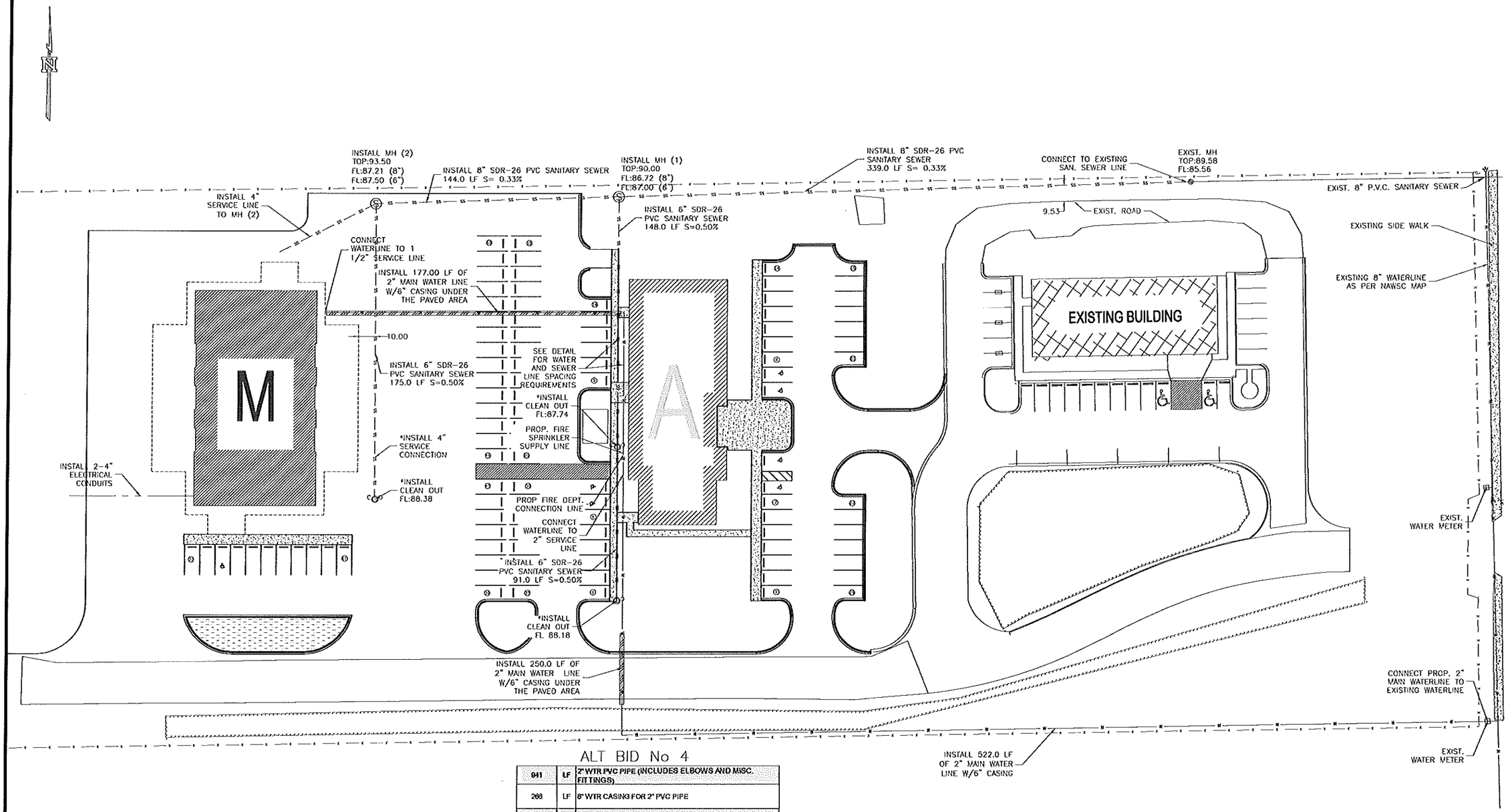
RECONSTRUCTION OF ACCESS RD

STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED
PROFESSIONAL ENGINEER

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RAUL E. SESIN P.E. No. 86374

SCALE: 1"=40'
DRAWN BY: CYNTHIA PEREZ
CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-6



ALT BID No 4

941	LF	2" WTR PVC PIPE (INCLUDES ELBOWS AND MISC. FITTINGS)
268	LF	6" WTR CASING FOR 2" PVC PIPE
483	LF	SAN SWR 8" SDR-26 PVC PIPE
410	LF	SAN SWR 6" SDR-26 PVC PIPE
2	EA	SANITARY SWR MANHOLE
2	EA	4" SWR SERVICE CONNECTION
3	EA	SWR CLEAN OUT
74	LF	2-4" PVC ELECTRICAL CONDUIT
2,100	LF	PIPE BEDDING AS PER DETAIL SHEET C-8

NOTE:
* BUILDING CONTRACTOR SHALL CONNECT 4" SERVICE CONNECTION TO 6" SERVICE LINE AND INSTALL CLEAN OUT

*IT SHALL BE BUILDING CONTRACTORS RESPONSIBILITY TO CONNECT TO ALL SERVICE LINE STUB OUTS.

NOTE:

THE (HORIZONTAL AND/OR VERTICAL LOCATION OF EXISTING UNDERGROUND UTILITIES AS ILLUSTRATED ON THESE PLANS IS APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION IN THE AREA OF SAID UTILITIES. CONTRACTOR SHALL CONTACT UTILITY PROVIDERS AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION/EXCAVATING IN THE AREA OF EXISTING UTILITIES

PROJECT No. 2012-056C-08-01-MSS

HIDALGO COUNTY
PLANNING DEPARTMENT
1304 S. 25 TH. STREET
EDINBURG TX. 78539
TEL: (956) 318-2840 ★ FAX: (956) 318-2844
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RAUL E. SESIN, P.E., C.F.M.
PLANNING ADMINISTRATOR

COMMISSIONER
JOSEPH PALACIOS
HIDALGO COUNTY
PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND
MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

UTILITY IMPROVEMENTS PLAN

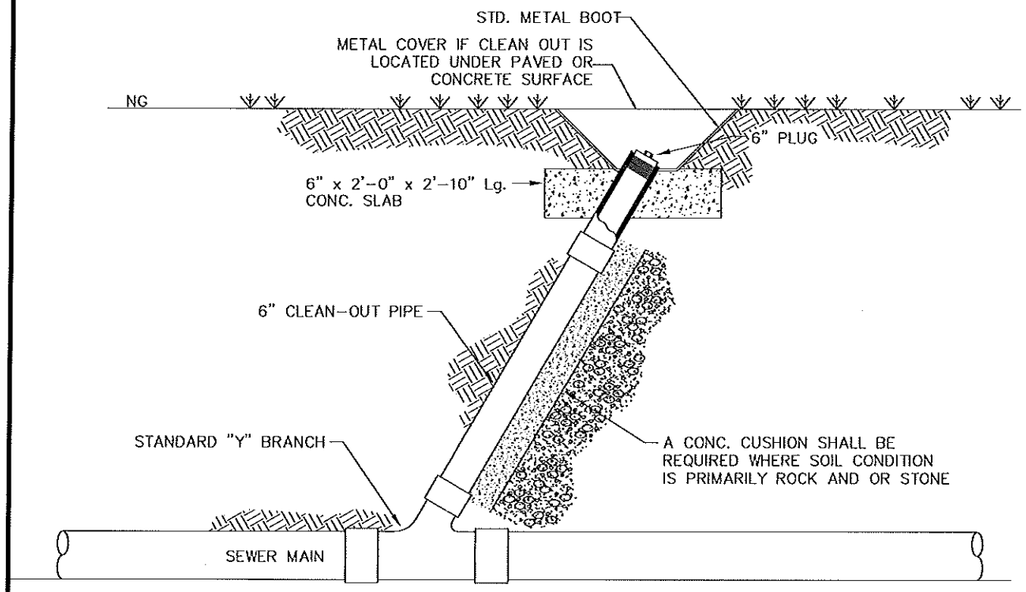
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED
PROFESSIONAL ENGINEER
07/12

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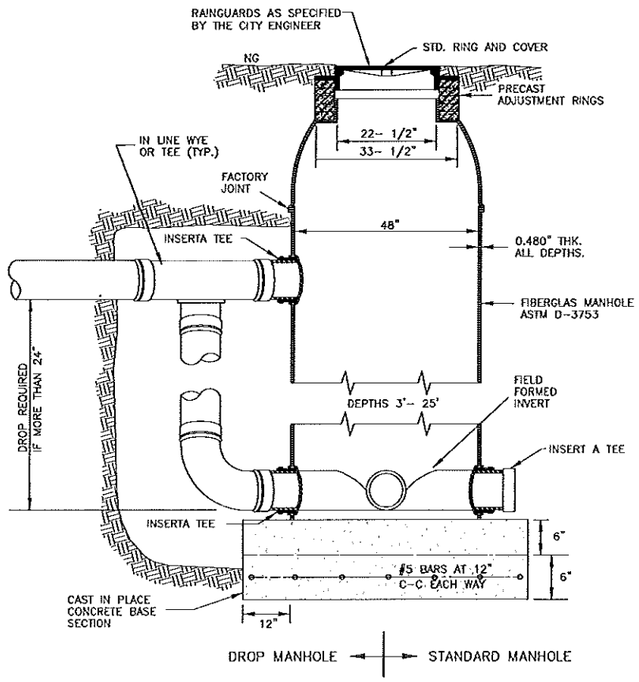
RAUL E. SESIN P.E. No. 86374

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DRAWN BY: CYNTHIA PEREZ
CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-7

Drawing: I:\PCT 4\pct 4 new building parking layout\pct 4 office sewer and water PLAN.dwg Plotted by: cynthia.perez
Layout Tab: UTIL Date: 07/03/2012 Time: 09:39:57 AM



STANDARD CLEAN-OUT

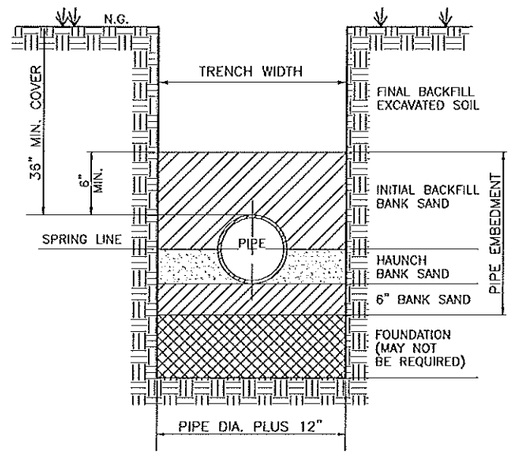


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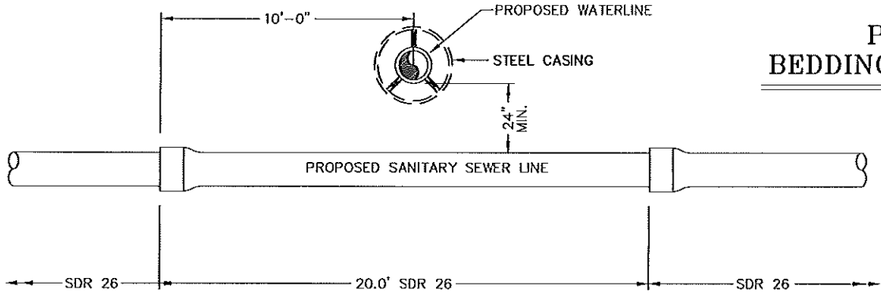
TYPICAL FIBERGLASS MANHOLE

SCALE: N.T.S.

NOTE: (FOR FIBERGLASS & POLYETHLENE MANHOLES) FILL SHALL BE SAND OR SOIL W/ MODERATE COMPACTION & PLACED IN ONE FOOTLIFTS BEGINNING AT MANHOLE WORKING OUTWARD TO THE EXCAVATION WALLS

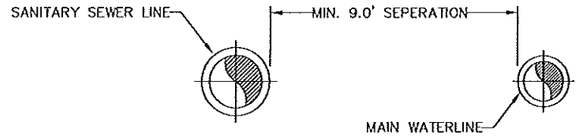


P.V.C. PIPE BEDDING REQUIREMENTS



TYPICAL CROSSING DETAIL FOR WATER & SANITARY SEWER LINE

NOTE: PROPOSED WATERLINE TO HAVE A MINIMUM VERTICAL CLEARANCE OF 2.0 FEET ABOVE PROPOSED SANITARY SEWER LINE AS MEASURED FROM OUTSIDE DIAMETER OF PIPES. IF MINIMUM CLEARANCE CAN NOT BE ACHIEVED, WATERLINE SHALL BE CONSTRUCTED WITH STEEL CASING. REFERENCE TITLE 30 ENVIRONMENTAL QUALITY – PART I TNRCC CHAPTER 317 APPENDIX E – SEPARATION DISTANCES.



WATERLINE AND SANITARY SEWER LINE TYPICAL HORIZ. SEPARATION DETAIL

NOTE: CONTRACTOR SHALL MAINTAIN A MIN. HORIZ. SEPARATION OF 9 FEET BETWEEN WATERLINE AND SANITARY SEWER LINE.

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SEWER AND WATER DETAILS

STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
07/03/12

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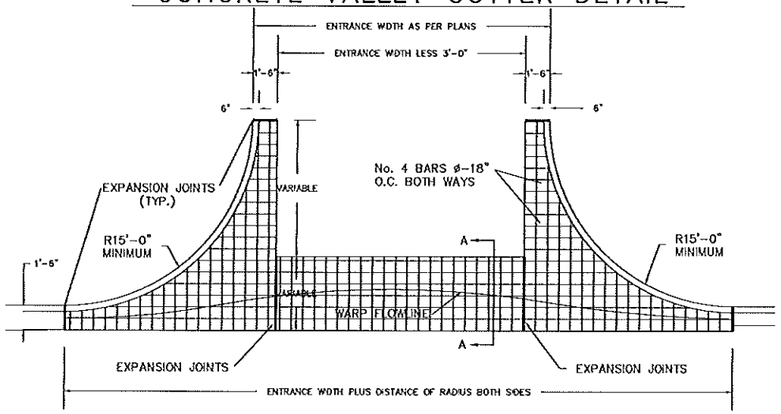
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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C-8

PROJECT No. 2012-056C-08-01-MSS

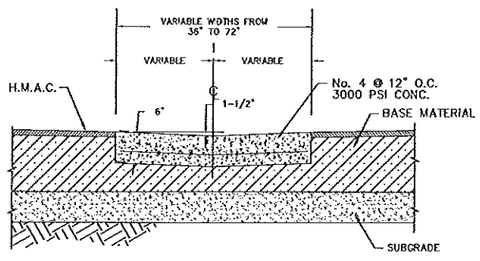
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Layout Tab: Layout1 Date: 07/03/2012 Time: 09:41:24 AM

SEWER LINE AS MEASURED FROM OUTSIDE DIAMETER OF PIPES. IF MINIMUM CLEARANCE CAN NOT BE ACHIEVED, WATERLINE SHALL BE CONSTRUCTED WITH STEEL CASING. REFERENCE TITLE 30 ENVIRONMENTAL QUALITY – PART I TNRCC CHAPTER 317 APPENDIX E – SEPARATION DISTANCES.

CONCRETE VALLEY GUTTER DETAIL



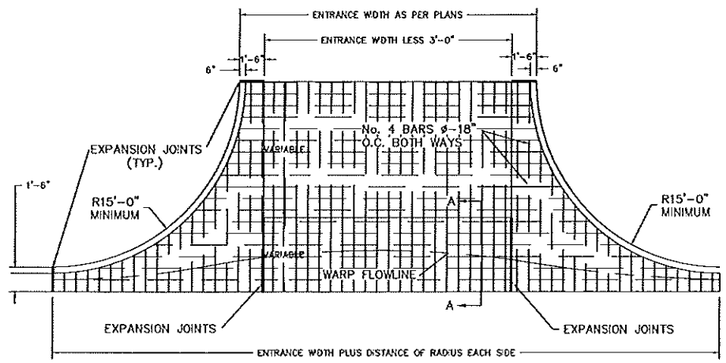
PLAN



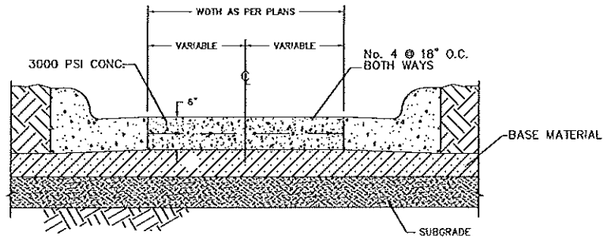
TYPICAL VALLEY GUTTER SECTION

SECTION A–A

TYPICAL CONCRETE APRON



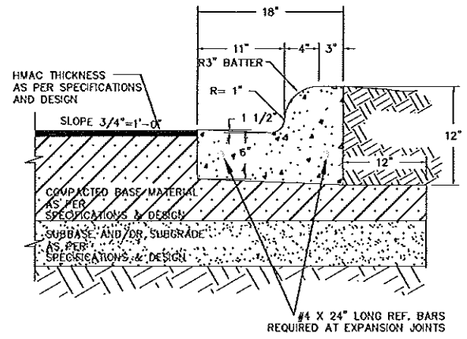
PLAN



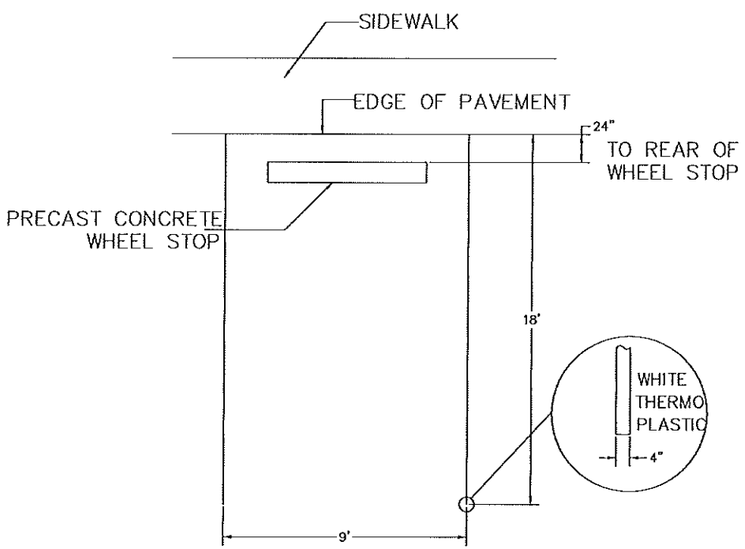
TYPICAL CONCRETE APRON

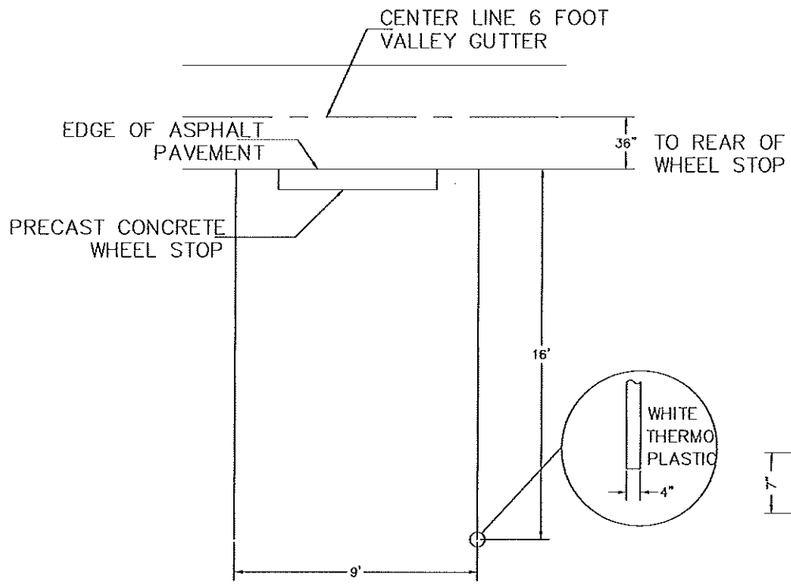
SECTION A–A

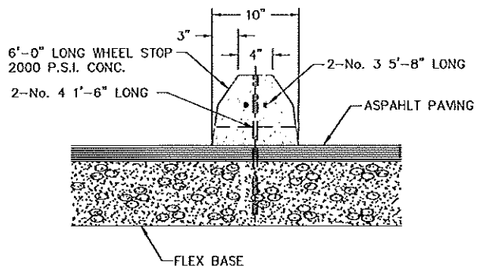
TYPICAL CURB & GUTTER DETAIL

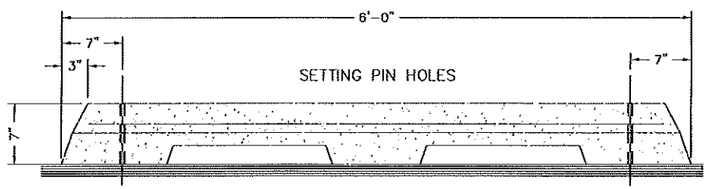


1. ALL HONEYCOMBING SHALL BE GROUTED TO PROVIDE A UNIFORM SURFACE.
2. WHEN HONEYCOMBING IS EXCESSIVE AS DETERMINED BY THE COUNTY OF HIDALGO DESIGNATED REPRESENTATIVE, CURB AND GUTTER SHALL BE REPLACED.
3. BACKFILL BEHIND CURBS SHALL BE ACCOMPLISHED WITHIN 24 HOURS AFTER BACK FORM IS REMOVED OR 48 HOURS AFTER SLIP FORMING.
4. CURB AND GUTTER CONCRETE SHALL BE CLASS "A" (3000 PSI).
5. REINFORCING STEEL AS SHOWN.
6. MAX. LENGTH OF CURB AND GUTTER SECTION IS 80' BETWEEN 3/4" EXPANSION JOINT.









PRECAST CONCRETE WHEEL STOP

PROJECT No. 2012-056C-08-01-MSS

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HIDALGO COUNTY PRECINCT No. 4

HIDALGO COUNTY PCT 4
CONSTRUCTION OF NEW MULTY-PURPOSE FACILITY AND MECHANICAL SHOP-CIVIL SITE IMPROVEMENTS

PARKING AREA DETAILS

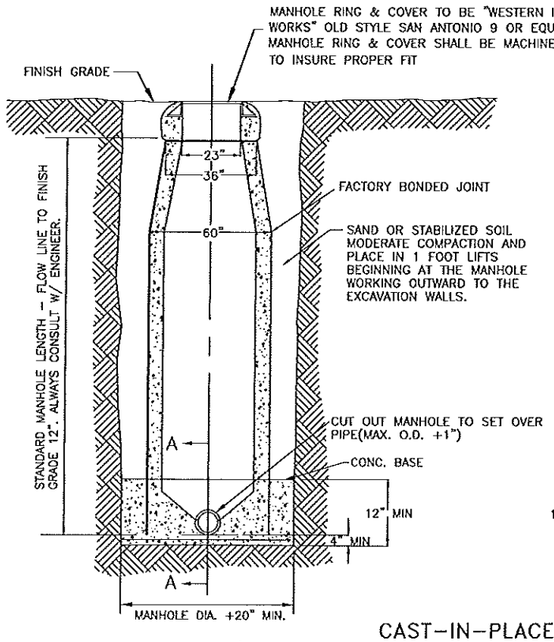
STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
07/03/12

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RAUL E. SESIN P.E. No. 86374

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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C - 9

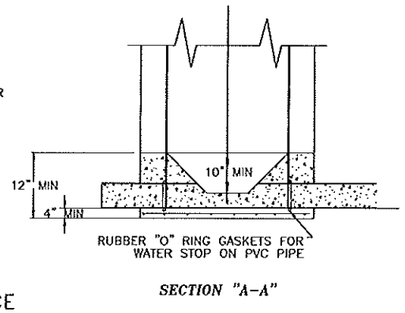
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Layout Tab: Layout2 Date: 07/03/2012 Time: 09:44:08 AM



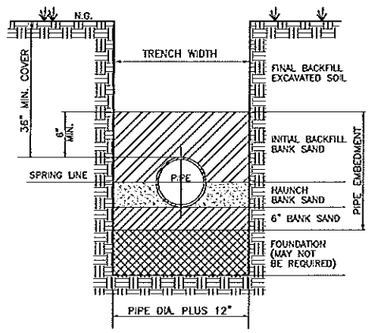
CAST–IN–PLACE
4' DIA. CONCRETE STORM SEWER MANHOLE

GENERAL NOTES

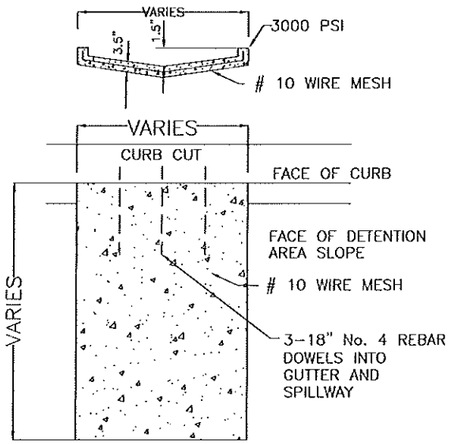
1. BEFORE ATTEMPTING TO INSTALL ANY MANHOLE BE SURE EXCAVATION HAS BEEN SHORED OR SLOPED PROPERLY.
2. CONCRETE BASE TO BE POURED IN PLACE IN TRENCH.
3. MANHOLE CUT–OUT TO BE MADE AT TIME OF INSTALLATION.
4. MANHOLE TO BE INSTALLED BY INSERTING INTO WET CONCRETE BASE.
5. FUTURE CONNECTIONS. IF A SEALANT BETWEEN PIPE & MANHOLE IS NEEDED USE STAUFFER CHEMICAL SWS940RTV SILICONE SEALANT OR EQUAL.
6. USE 4'–0" INSIDE DIAMETER (ID) PRECAST SECTION FOR SEWERS WHOSE NOMINAL SIZE IS 24" OR SMALLER.
7. USE 5'–0" ID SECTION FOR SEWER SIZES 30"–36"
8. USE 6'–0" ID SECTIONS FOR SEWERS LARGER THEN 30".
9. MANHOLE SHALL BE PLACED ON 6–INCH SAND BEDDING.
10. SUBGRADE SHALL BE COMPACTED TO 95% DENSITY
11. 6' DIAMETER BY 12" CONCRETE COLLAR REQUIRED WHEN INSIDE PAVEMENT



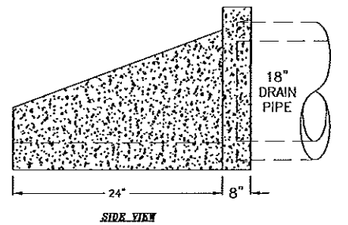
SECTION "A–A"



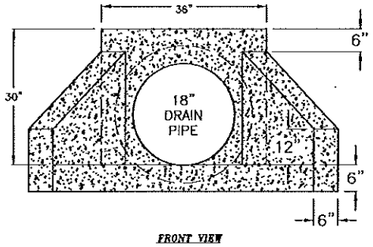
P.V.C. PIPE
BEDDING REQUIREMENTS



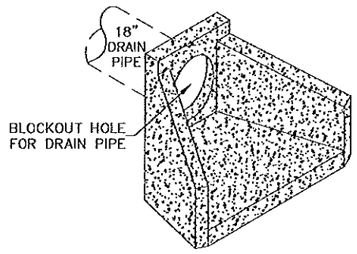
CONCRETE SPILLWAY
NOT TO SCALE



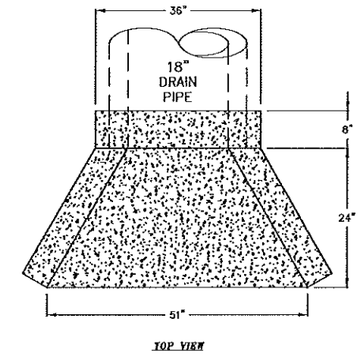
SIDE VIEW



FRONT VIEW

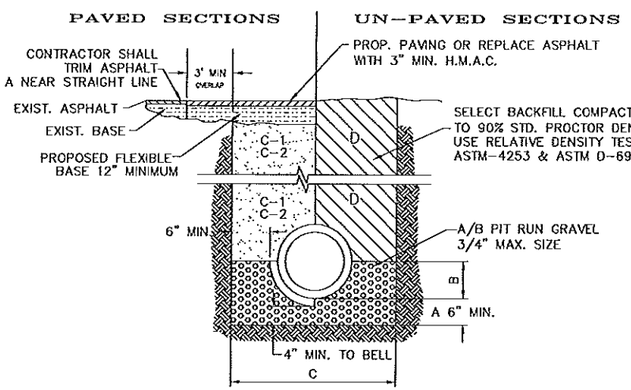


NOTES:
1. CLASS 1 CONCRETE WITH OF DESIGN STRENGTH OF 4500 PSI AT 28 DAYS. UNIT IS OF MONOLITHIC CONSTRUCTION INCLUDING WALLS AND FLOOR.
2. GRADE 60 REINFORCED. No. 4 REBAR TO CONFORM TO ASTM A615 ON REQUIRED CENTERS OR EQUAL.



TOP VIEW

PRECAST CONCRETE HEADWALL DETAIL



A. GRAVEL BEDDING PLACED BEFORE PIPE IS LAID UP TO FLOW OF PIPE (MIN. THICKNESS = 6") – PIT RUN GRAVEL 3/4" MAX. SIZE.

B. GRAVEL PLACED AFTER PIPE IS LAID, FROM BOTTOM OF PIPE TO SPRING LINE OF PIPE. PIT RUN GRAVEL 3/4" MAX. SIZE

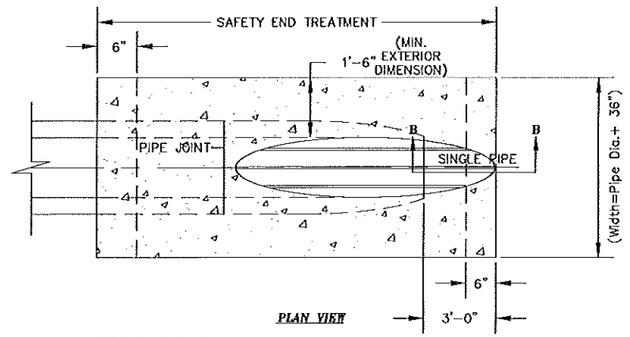
C. TRENCH WIDTHS SHALL BE BELL O.D. + 12".

C–1 (CITY STREETS, PARKING AREA, DRIVEWAYS) SELECT EXCAVATED BACK FILL COMPACTED TO 95% SPD, 8" LIFTS, MECHANICAL COMPACTION.

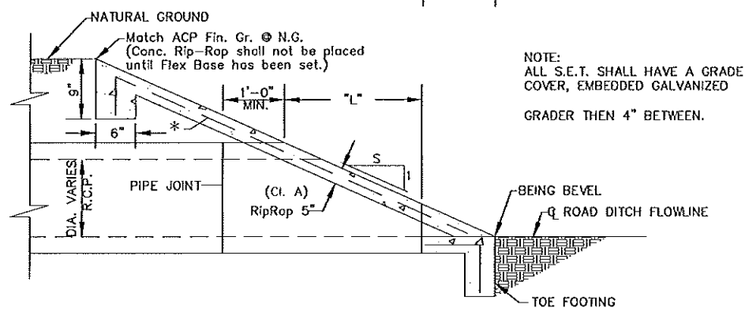
C–2 (STATE MAINTAINED ROADWAYS) COMPACTED SAND/CEMENT STABILIZED BACK FILL WITH 7% PORTLAND CEMENT COMPACTED AS PER ASTM D–4253 AND ASTM D–698.

D. SELECTED EARTH BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY (12" LIFT, MECHANICAL COMPACTION). FOUNDATION PREPARATION (WELLPOINTS, GRAVEL OR CEMENT STABILIZATION, OR APPROVED SUBSTITUTE) SHALL BE REQUIRED WHEN TRENCH BOTTOM IS UNSTABLE. BACKFILLING AT STRUCTURES SHALL BE PLACED IN UNIFORM LAYERS, MOISTENED AS REQUIRED TO APPROXIMATE OPTIMUM MOISTURE CONTENT, AND COMPACTED TO 95% STANDARD PROCTOR DENSITY (USE RELATIVE DENSITY TEST PER ASTM D–4253 & ASTM D–698). THE THICKNESS OF EACH LOOSE LAYER SHALL NOT EXCEED 6". STRUCTURE BACKFILL MATERIAL SHALL BE SAND, APPROVED SITE SOIL, OR OTHER APPROVED SUBSITUTE.

STORM TRENCH BEDDING AND BACKFILL DETAILS



PLAN VIEW



NOTE:
ALL S.E.T. SHALL HAVE A GRADE COVER, EMBEDDED GALVANIZED

GRADER THEN 4" BETWEEN.

SAFETY END TREATMENT

PROJECT No. 2012-056C-08-01-MSS

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DRAINAGE DETAILS

STATE OF TEXAS
RAUL E. SESIN
86374
LICENSED PROFESSIONAL ENGINEER
01/03/12

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CHECKED BY: RAUL E. SESIN
COPY BY: EDGAR ISIDRO
SHEET: C - 10

Drawing: I:\PCT 4\pct 4 new building parking layout\new multi purpose facility and mechanical shop detail sheets.dwg) Plotted by: cynthia.perez
Layout Tab: Layout3 Date: 07/03/2012 Time: 02:40:21 PM