

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ**For vendor doing business with local governmental entity****This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.**

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor 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 vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

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

OFFICE USE ONLY

Date Received

1 Name of vendor 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 on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 Name of local government officer about whom the information is being disclosed._____
Name of Officer

4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7_____
Signature of vendor doing business with the governmental entity_____
Date

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

- (a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

- (2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed;
or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

- (a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

- (a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

- (1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

- (2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

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: _____

**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.

APPENDIX “H”

(IF APPLICABLE)

**2 C.F.R. § 200.327 & 2 C.F.R. PART 200, APPENDIX II,
REQUIRED CONTRACT CLAUSES FOR NON-FEDERAL
ENTITY CONTRACTS UNDER FEDERAL AWARDS**

&

**REQUIRED CONTRACT CLAUSES FOR NON-FEDERAL
ENTITY CONTRACTS UNDER FEDERAL AWARDS WITH THE
FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)**

2 C.F.R. § 200.327 & 2 C.F.R. PART 200, APPENDIX II, REQUIRED CONTRACT CLAUSES FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS

The United States Office of Management and Budget (OMB) issued in 2 C.F.R. 200: *Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards* (Uniform Guidance). Subpart D: Post Federal Award Requirements: 2 CFR §§200.317-200.327 of the Uniform Guidance contain provisions applicable to procurements made with federal grant funding. [Except as otherwise provided, updated Post Federal Award Requirements (i.e.: 2 CFR §§200.317-200.327) apply to declarations and awards issued on or after November 12, 2020].

As a non-Federal entity, the County of Hidalgo's ("County") contracts must contain the applicable contract clauses described in Appendix II to the Uniform Guidance (Contract Provisions for non-Federal Entity Contracts Under Federal Awards), which are set forth below. (2 C.F.R. §200.327). If applicable, the following clauses shall supersede any existing, similar clauses stated within the bid document, contract, and/or Terms and Conditions. *The term "Contractor" used herein refers to the proposer, bidder or other entity/individual responding to the applicable procurement packet.*

If applicable, the regulations in 2 CFR, Part 200 and Appendix II to the Uniform Guidance, as it may be amended from time to time, and the contract clauses below, are incorporated by reference as part of this procurement packet and any resulting agreement.

To procure goods and services using funds under a federal grant or contract, specific federal laws, regulations, and requirements may apply in addition to those under state law. The following provisions are required and apply when federal funds are expended by the County of Hidalgo for any contract resulting from this procurement process.

1. Remedies.

- a. **Applicability.** This requirement applies to all Federal grant and cooperative agreement programs.
- b. **Standard.** Contracts for more than the simplified acquisition threshold currently set at \$150,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate. See 2 C.F.R. Part 200, Appendix II, ¶ A.
- c. **Statement.** Pursuant to Federal Rule (A) above, when federal funds are expended by the County, the County reserves all rights and privileges under the applicable laws and regulations with respect to this procurement in the event of breach of contract by either party. Contractor shall comply with all applicable Federal, State of Texas, and local laws, rules, and regulations and shall obtain all applicable licenses and permits for the conduct of its business and the performance of the services, and any provision of equipment and material ("Applicable Law"). All transactions related to any of the Contract Documents shall be governed by the laws of the State of Texas, and trial of any action brought in connection with the bid or the Contract Documents shall be held exclusively in a state court in the County of Hidalgo, Texas.

2. Termination for Cause and Convenience.

- a. **Applicability.** This requirement applies to all Federal grant and cooperative agreement programs.
- b. **Standard.** All contracts in excess of \$10,000 shall address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement as follows. See 2 C.F.R. Part 200, Appendix II, ¶ B.
- c. **Statement.** *Termination.* County may terminate this Agreement for any reason upon ten (10) days written notice to the other party. County may terminate this Agreement immediately upon written notice if Contractor

breaches this Agreement. In the event of any termination, Contractor shall promptly deliver to the County any and all Work Materials prepared for the County prior to the effective date of such termination, all of which shall become County's sole property. After receipt of the Work Materials, County will pay Contractor for the services which the County determines were satisfactorily performed as of the effective date of the termination.

Excuses for Non-Performance. Either party shall be absolved from its obligations under this contract when and to the extent that performance is delayed or prevented (and in the County of Hidalgo's case when and to the extent that its need for the articles, materials or work to be supplied hereunder is reduced or eliminated) by reason of acts of God, fire explosion, war riots, strikes, labor disputes, or governmental laws, orders or regulations.

Default. If Contractor or Subcontractor shall breach any provision hereof or shall become insolvent, enter voluntary or involuntary bankruptcy or receivership proceedings or make an assignment to the benefit of creditors, County of Hidalgo shall have the right (without limiting any other rights or remedies which it may have hereunder or by operation of law) to terminate this contract by written notice to Contractor whereupon County shall be relieved of all further obligation hereunder except the obligation to pay the reasonable value of Contractor's prior performance (at not exceeding the contract rate), and Contractor shall be liable to County for all costs incurred by County in completing or procuring the completion of performance in excess of the contract price herein specified. The County's right to require strict performance of any obligation hereunder shall not be affected by any previous waiver, forbearance of course of dealing. Time is of the essence thereof.

3. **Equal Employment Opportunity.**

- a. **Applicability:** This requirement applies to all Federal grant and cooperative agreement programs.
- b. **Standard.** Except as otherwise provided under 41 C.F.R. Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 C.F.R. § 60-1.3 must include the equal opportunity clause provided under 41 C.F.R. § 60- 1.4(b), in accordance with Executive Order 11246, *Equal Employment Opportunity* (30 Fed. Reg. 12319, 12935, 3 C.F.R. Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, *Amending Executive Order 11246 Relating to Equal Employment Opportunity*, and implementing regulations at 41 C.F.R. Part 60 (Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor). See 2 C.F.R. Part 200, Appendix II, ¶ C.
- c. **Key Definitions:**
 - (1) *Federally Assisted Construction Contract.* The regulation at 41 C.F.R. § 60-1.3 defines a "federally assisted construction contract" as any agreement or modification thereof between any applicant and a person for construction work which is paid for in whole or in part with funds obtained from the Government or borrowed on the credit of the Government pursuant to any Federal program involving a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, or any application or modification thereof approved by the Government for a grant, contract, loan, insurance, or guarantee under which the applicant itself participates in the construction work.
 - (2) *Construction Work.* The regulation at 41 C.F.R. § 60-1.3 defines "construction work" as the construction, rehabilitation, alteration, conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction
- d. **Statement:** Contractor will comply with the Nondiscrimination Civil Rights Act of 1964, as amended and all Federal regulations relative to nondiscrimination in Federally assisted programs. The regulation at 41 C.F.R. Part 60-1.4(b) requires the insertion of the following contract clause:

“During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff 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 for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.”

4. Davis Bacon Act and Copeland Anti-Kickback Act.

- a. Applicability of Davis-Bacon Act. The Davis-Bacon Act only applies to the emergency Management Preparedness Grant Program, Homeland Security Grant Program, Nonprofit Security Grant Program, Tribal Homeland Security Grant Program, Port Security Grant Program, and Transit Security Grant Program. **It does not apply to other Federal grant and cooperative agreement programs, including the Public Assistance Program.**

- b. Standard. All prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. §§ 3141-3144 and 3146-3148) as supplemented by Department of Labor regulations at 29 C.F.R. Part 5 (Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction)).

In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week.

The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

In contracts subject to the Davis-Bacon Act, the contracts must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by Department of Labor regulations at 29 C.F.R. Part 3 (Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States). The Copeland Anti-Kickback Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to FEMA or applicable Federal entity. See 2 C.F.R. Part 200, Appendix II, ¶ D.

- c. Statement. The regulation at 29 C.F.R. § 5.5(a) does provide the required contract clause that applies to compliance with both the Davis-Bacon and Copeland Acts. However, as discussed in the previous subsection, the Davis-Bacon Act does not apply to Public Assistance recipients and subrecipients. In situations where the Davis-Bacon Act does not apply, neither does the Copeland “Anti-Kickback Act.” However, for purposes of grant programs where both clauses do apply, FEMA or applicable Federal entity requires the following contract clause:

“Compliance with the Copeland “Anti-Kickback” Act.

(1) *Contractor.* The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.

(2) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as Federal requirements may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

(3) *Breach.* A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.”

5. Contract Work Hours and Safety Standards Act.

- a. Applicability: This requirement applies to all Federal grant and cooperative agreement programs.
- b. Standard. Where applicable (see 40 U.S.C. § 3701), all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. §§ 3702 and 3704, as supplemented by Department of Labor regulations at 29 C.F.R. Part 5.

Under 40 U.S.C. § 3702, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week.

The requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence. See 2 C.F.R. Part 200, Appendix II, ¶ E.

The regulation at 29 C.F.R. § 5.5(b) provides the required contract clause concerning compliance with the Contract Work Hours and Safety Standards Act:

c. Statement.

“Compliance with the Contract Work Hours and Safety Standards Act.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The County of Hidalgo shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.”

6. Rights to Inventions Made Under a Contract or Agreement.

- a. Applicability: Stafford Act Disaster Grants. This requirement **does not apply to the Public Assistance, Hazard Mitigation Grant Program, Fire Management Assistance Grant Program, Crisis Counseling Assistance and Training Grant Program, Disaster Case Management Grant Program, and Federal Assistance**

to Individuals and Households – Other Needs Assistance Grant Program, as FEMA or Federal awards under these programs do not meet the definition of “funding agreement.”

- b. Standard. If the FEMA or Federal award meets the definition of “funding agreement” under 37 C.F.R. § 401.2(a) and the non-Federal entity wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the non-Federal entity must comply with the requirements of 37 C.F.R. Part 401 (Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements), and any implementing regulations issued by FEMA or applicable awarding agency. See 2 C.F.R. Part 200, Appendix II, ¶ F.
- c. Key Definition: The regulation at 37 C.F.R. § 401.2(a) currently defines “funding agreement” as any contract, grant, or cooperative agreement entered into between any Federal agency, other than the Tennessee Valley Authority, and any contractor for the performance of experimental, developmental, or research work funded in whole or in part by the Federal government. This term also includes any assignment, substitution of parties, or subcontract of any type entered into for the performance of experimental, developmental, or research work under a funding agreement as defined in the first sentence of this paragraph.

7. Clean Air Act and the Federal Water Pollution Control Act.

- a. Applicability and Standard: Contracts of amounts in excess of \$150,000 must contain a provision that requires the contractor to agree to comply with all applicable standards, orders, or regulations issued pursuant to the Clean Air Act (42 U.S.C. §§ 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. §§ 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency. See 2 C.F.R. Part 200, Appendix II, ¶ G.
- b. Statement: Included in contracts as provided in section “7a” above.
 - (1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq. and the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.
 - (2) The contractor agrees to report each violation to the Federal awarding agency (e.g. Federal Emergency Management Agency-FEMA) and the Regional Office of the Environmental Protection Agency. Contractor understands and agrees that each violation reported to the County of Hidalgo will, in turn, be reported as required to assure notification to the Federal awarding agency and the appropriate Environmental Protection Agency Regional Office.
 - (3) The contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by the applicable Federal awarding agency (e.g. FEMA).

8. Debarment and Suspension.

- a. Applicability: This requirement applies to all Federal grant and cooperative agreement programs.
- b. Standard. Non-Federal entities and contractors are subject to the debarment and suspension regulations implementing Executive Order 12549, *Debarment and Suspension* (1986) and Executive Order 12689, *Debarment and Suspension* (1989) at 2 C.F.R. Part 180 and the Department of Homeland Security’s regulations at 2 C.F.R. Part 3000 (Nonprocurement Debarment and Suspension).

These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in Federal assistance programs and activities. See 2 C.F.R. Part 200, Appendix II, ¶ H; and Chapter IV, ¶ 6.d and Appendix C, ¶ 2. A contract award must not be made to parties listed in the SAM Exclusions. SAM Exclusions is the list maintained by the General

Services Administration that contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549. SAM exclusions can be accessed at www.sam.gov. See 2 C.F.R. § 180.530; Chapter IV, ¶ 6.d and Appendix C, ¶ 2.

In general, an “excluded” party cannot receive a Federal grant award or a contract within the meaning of a “covered transaction,” to include subawards and subcontracts. This includes parties that receive Federal funding indirectly, such as contractors to recipients and subrecipients. The key to the exclusion is whether there is a “covered transaction,” which is any nonprocurement transaction (unless excepted) at either a “primary” or “secondary” tier. Although “covered transactions” do not include contracts awarded by the Federal Government for purposes of the nonprocurement common rule and DHS’s implementing regulations, it does include some contracts awarded by recipients and subrecipient.

Specifically, a covered transaction includes the following contracts for goods or services:

- (1) The contract is awarded by a recipient or subrecipient in the amount of at least \$25,000.
- (2) The contract requires the approval of FEMA or applicable Federal entity, regardless of amount.
- (3) The contract is for Federally-required audit services.
- (4) A subcontract is also a covered transaction if it is awarded by the contractor of a recipient or subrecipient and requires either the approval of FEMA or applicable Federal entity or is in excess of \$25,000.

- c. Statement. The following provides a debarment and suspension clause. It incorporates a method of verifying that contractors are not excluded or disqualified:

For maximum protection, provide a print or electronic document for every prime and subcontractor, from www.sam.gov in order to ensure that they are not debarred, suspended, or otherwise excluded from or ineligible for participation in Federal assistance programs and activities.

This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such the contractor is required to verify that none of the contractor, its principals (defined at 2 C.F.R. § 180.995), or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

This certification is a material representation of fact relied upon by (insert name of subrecipient). If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (name of entity serving as recipient and name of subrecipient), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.”

9. Byrd Anti-Lobbying Amendment.

- a. Applicability: This requirement applies to all Federal grant and cooperative agreement programs.
- b. Standard. Contractors that apply or bid for an award of \$100,000 or more must file the required certification. See 2 C.F.R. Part 200, Appendix II, ¶ I; 44 C.F.R. Part 18; Chapter IV, 6.c; Appendix C, ¶ 4. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or

organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. § 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award. See Chapter IV, ¶ 6.c and Appendix C, ¶ 4.

- c. Statement. The following statement in bold provides a Byrd Anti-Lobbying contract clause:

(IF APPLICABLE, PLEASE FILL IN BLANKS AND SIGN)

“Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352 (as amended)

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.”

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding \$100,000)

The undersigned Contractor, _____ certifies, to the best of his or her knowledge, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form- LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying

Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 *et seq.*, apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Name and Title of Contractor's Authorized Official

Date

10. **Procurement of Recovered Materials.**

- a. **Applicability:** This requirement applies to all Federal grant and cooperative agreement programs.
- b. **Standard.** A non-Federal entity that is a **state agency or agency of a political subdivision** of a state and its contractors must comply with Section 6002 of the Solid Waste Disposal Act, Pub. L. No. 89-272 (1965) (codified as amended by the Resource Conservation and Recovery Act at 42 U.S.C. § 6962). See 2 C.F.R. Part 200, Appendix II, ¶ J; 2 C.F.R. § 200.323; *PDAT Supplement*, Chapter V, ¶ 7.

The requirements of Section 6002 include procuring only items designated in guidelines of the EPA at 40 C.F.R. Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired by the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

- c. **Statement.** The following provides the clause that a state agency or agency of a political subdivision of a state and its contractors can include in contracts meeting the above contract thresholds:

“(1) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA- designated items unless the product cannot be acquired—

- (i) Competitively within a timeframe providing for compliance with the contract performance schedule;
 - (ii) Meeting contract performance requirements; or
 - (iii) At a reasonable price.
- (2) Information about this requirement, along with the list of EPA-designate items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.
- (3) The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.”

11. **Prohibition on Contracting for Covered Telecommunications Equipment or Services – 2 CFR § 200.216 (FEMA Interim Policy #405-143-1 effective August 13, 2020).**

- a. **Applicability:** This requirement applies to all Federal grant and cooperative agreement programs and/or as provided below, and is effective August 13, 2020.

- b. Standard. A non-Federal entity is prohibited against using federal funds to purchase telecommunications and video surveillance equipment and services (such as but not limited to mobile phones, land lines, internet, video surveillance, and cloud servers) from certain companies/entities in covered foreign countries for national security reasons. This regulation is being incorporated into federal grants and contracts received by the County through 2 CFR 200.216 and/or Federal Acquisition Regulations (FAR) clause 52.204-25; as well as guidance provided through Federal Emergency Management Agency (FEMA) Policy #405-143-1. See 2 C.F.R. Part 200, Appendix II, ¶ K

Currently, applicable federal provisions provide that Covered Foreign country means the People's Republic of China and covered telecommunications equipment or services means –

- i. Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation, (or any subsidiary or affiliate of such entities);
- ii. For the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
- iii. Telecommunications or video surveillance services provided by such entities or using such equipment; or
- iv. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

The definition of “Affiliate” can be found in FAR 2.101. Listing of subsidiaries and affiliates can be found in Supplement Number 4 to 15 CFR Part 744.

- c. Statement. Federal awards recipients and subrecipients, as well as their contractors and subcontractors, include the following required contract clause in applicable new, extended, or renewed contracts and subcontracts as per the provisions discussed above.

PROHIBITION ON CONTRACTING FOR COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES

- (a) Definitions. As used in this clause, the terms backhaul; covered foreign country; covered telecommunications equipment or services; interconnection arrangements; roaming; substantial or essential component; and telecommunications equipment or services have the meaning as defined in FEMA Policy, #405-143-1 Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services As used in this clause—
- (b) Prohibitions.
 - (1) Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after Aug.13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.
 - (2) Unless an exception in paragraph (c) of this clause applies, the contractor and its subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds from the Federal Emergency Management Agency to:

- (i) Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
 - (ii) Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
 - (iii) Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system; or
 - (iv) Provide, as part of its performance of this contract, subcontract, or other contractual instrument, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.
- (c) Exceptions.
 - (1) This clause does not prohibit contractors from providing—
 - a. A service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or
 - b. Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.
 - (2) By necessary implication and regulation, the prohibitions also do not apply to:
 - a. Covered telecommunications equipment or services that:
 - i. Are not used as a substantial or essential component of any system; and
 - ii. Are not used as critical technology of any system.
 - b. Other telecommunications equipment or services that are not considered covered telecommunications equipment or services.
- (d) Reporting requirement.
 - (1) In the event the contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the contractor is notified of such by a subcontractor at any tier or by any other source, the contractor shall report the information in paragraph (d)(2) of this clause to the recipient or subrecipient, unless elsewhere in this contract are established procedures for reporting the information.
 - (2) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause:
 - (i) Within one business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

- (ii) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: Any further available information about mitigation actions undertaken or recommended. In addition, the contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.
- (e) Subcontracts. The Contractor shall insert the substance of this clause, including this paragraph (e), in all subcontracts and other contractual instruments.

12. **Domestic Preferences for Procurements**

- a. **Applicability:** This requirement of this section must be included in all subawards including all contracts and purchase orders for work or products under Federal award applies to all contracts and purchase orders for work or products using federal funds.
- b. **Standard.** As appropriate, and to the extent consistent with law, Non Federal Entities should, to the greatest extent practicable under a federal award, provide a preference for the purchase, acquisition, or use of goods, products or materials produced in the United States. This includes, but is not limited to, iron, aluminum, steel, cement, and other manufactured products. See 2 C.F.R. Part 200.322 and 2 C.F.R. Part 200, Appendix II, ¶ L
- c. **Statement.** The following provides the required Domestic Preferences for Procurements contracts clause that is incorporated herein by reference.

“Domestic Preference for Procurements

As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

- *Produced in the United States* means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.
- *Manufactured products* mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.”

ADDITIONAL REQUIRED CONTRACT CLAUSES FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS WITH THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Additional FEMA or applicable Federal Requirements. In addition to the requirements above, non-Federal entity contracts under Federal award subject to financial assistance from FEMA are required to contain the following additional contract clauses. The Uniform Guidance authorizes FEMA to require additional provisions for non-Federal entity contracts. FEMA, pursuant to this authority, requires or recommends the following:

These clauses are incorporated by reference as part of this procurement packet and any resulting agreement.

1. **Changes.**

- a. **Standard.** To be eligible for FEMA assistance under the non-Federal entity’s Federal grant or cooperative agreement, the cost of the change, modification, change order, or constructive change must be allowable, allocable, within the scope of its grant or cooperative agreement, and reasonable for the completion of project scope. FEMA or applicable Federal entity recommends, therefore, that a non-Federal entity include a changes clause in its contract that describes how, if at all, changes can be made by either party to alter the method,

price, or schedule of the work without breaching the contract. The language of the clause may differ depending on the nature of the contract and the end-item procured.

- b. Statement. The following provides a contract clause regarding access to records:

“The contractor shall secure written authorization before proceeding with any additional work, whether requested by the County or required to complete the contract. The cost for any changes to the contract price, whether requested by the County or the Contractor will be approved only after submitting the contractor’s true costs for the work and related equipment costs and site expenses.”

2. **Access to Records.**

- a. Standard. All non-Federal entities must place into their contracts a provision that all contractors and their successors, transferees, assignees, and subcontractors acknowledge and agree to comply with applicable provisions governing Department and FEMA or applicable Federal entity access to records, accounts, documents, information, facilities, and staff. See DHS Standard Terms and Conditions, v 3.0, ¶ XXVI (2013).

- b. Statement. The following provides a contract clause regarding access to records:

“Access to Records. The following access to records requirements apply to this contract:

(1) The contractor agrees to provide the County of Hidalgo, the FEMA or applicable Federal Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The contractor agrees to provide the FEMA or applicable Federal Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.”

3. **DHS Seal, Logo, and Flags.**

- a. Standard. All non-Federal entities must place in their contracts a provision that a contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS officials without specific FEMA or applicable Federal entity pre-approval. See DHS Standard Terms and Conditions, v3.0, ¶ XXV (2013).

- b. Statement. The following provides a contract clause regarding DHS Seal, Logo, and Flags:

“The contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS officials without specific FEMA or applicable Federal entity pre- approval.”

4. **Compliance with Federal Law, Regulations, and Executive Orders.**

- a. Standard. All non-Federal entities must place into their contracts an acknowledgement that FEMA or applicable Federal financial assistance will be used to fund the contract along with the requirement that the contractor will comply with all applicable Federal law, regulations, executive orders, and FEMA or applicable Federal policies, procedures, and directives.

- b. Statement. The following provides a contract clause regarding Compliance with Federal Law, Regulations and Executive Orders:

“This is an acknowledgement that Federal financial assistance will be used to fund the contract only. The contractor will comply with all applicable Federal law, regulations, executive orders, FEMA or applicable Federal policies, procedures, and directives.”

5. **No Obligation by Federal Government.**

a. **Standard.** The non-Federal entity must include a provision in its contract that states that the Federal Government is not a party to the contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

b. **Statement.** The following provides a contract clause regarding no obligation by the Federal Government:

“The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.”

6. **Program Fraud and False or Fraudulent Statements or Related Acts.**

a. **Standard.** The non-Federal entity must include a provision in its contract that the contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to its actions pertaining to the contract.

b. **Statement.** The following provides a contract clause regarding Fraud and False or Fraudulent Related Acts:

“The contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the contractor’s actions pertaining to this contract.”

7. **FEMA Contract requirement regarding Prohibition on Contracting for Covered Telecommunications Equipment or Services – 2 CFR § 200.216 (FEMA Interim Policy #405-143-1 effective August 13, 2020).**

FEMA recipients and subrecipients and their contractors and subcontractors are required per 2 C.F.R. Part 200, Appendix II ¶ K to include a contract provision in all FEMA-funded contracts and subcontracts, including any purchase orders. To satisfy this requirement, the contract provision found in Number 11 above is incorporated by reference by the County of Hidalgo in all new, extended, or renewed contracts and subcontracts. Applicable County contractors and subcontractors shall also comply with the applicable law and requirements. (See Number 11 above).

8. **FEMA Contract requirement regarding Domestic Preferences for Procurements**

For purchases in support of FEMA declarations and awards issued on or after November 12, 2020, all FEMA recipients and subrecipients are required per 2 C.F.R. Part 200, Appendix II ¶ L to include in all contracts and purchase orders for work or products the contract provision included in number 12 above encouraging domestic preference for procurements.

Contractor agrees to comply with all federal, state and local laws, rules, regulations and ordinances, as applicable. It is further acknowledged that the Contractor read and understands all provisions, laws, acts, regulations, etc. as specifically noted above and certifies compliance with the same.

Vendor’s Name/Company Name: _____

Printed Name and Title of Authorized Representative: _____

Signature of Authorized Representative: _____

Date: _____

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:

The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics,

including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor

set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* \$27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages.

The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or

equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders

or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal 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, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.
2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**APPENDIX J
PROPOSER'S AFFIDAVIT**

**PROPOSER'S AFFIDAVIT OF NON-COLLUSION, NON-CONFLICT OF INTEREST, 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 another 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 another reward will be hereinafter paid.
- (2) Affiant further states they have neither recommended nor suggested to Hidalgo County or any 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 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 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____

THE STATE OF TEXAS §
 §
COUNTY OF HIDALGO §

**CONSTRUCTION CONTRACT
C-23-0085-XX-XX**

This Agreement entered into this _____ day of _____, **2023**, by and between the **County of Hidalgo** (hereinafter called the “**OWNER**,” or “County”) and, The _____ (a corporation), (a partnership), (an individual) of Edinburg, State of Texas, hereinafter called “**CONTRACTOR**”.

WITNESSETH

WHEREAS, OWNER requested responses to notices for Request for Bid (RFB) for: “Head Start Parking Lot Improvements” for the **County** (the “**Services**”). A copy of the procurement packet, including applicable specifications, is attached hereto as **Exhibit “A”** (the “**Procurement Packet**”), and is incorporated herein and made part of this agreement for all purposes;

WHEREAS, CONTRACTOR submitted a response to provide services in accordance with the specifications as proposed. A copy of the CONTRACTOR’s response to the Procurement Packet is attached hereto as **Exhibit “B”** (the “**Response**”), and is incorporated herein and made part of this agreement for all purposes;

WHEREAS, OWNER has determined that CONTRACTOR has submitted the lowest and best bid to meet OWNER's requirements for the Service, as herein described.

WHEREAS, CONTRACTOR represents that it is qualified and desires to perform such services; and

WHEREAS, in recognition of and in consideration of CONTRACTOR's agreement to perform the Services in accordance with the Procurement Packet, the Commissioners Court of County awards this contract to CONTRACTOR.

NOW, THEREFORE, that for and in consideration of the payments and agreement hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

1. OWNER and CONTRACTOR hereby agree that this Contract is entered into in order to provide the Services to OWNER. This Contract does not extend to any third parties any duties or benefits conferred in any manner hereunder or otherwise. During the term of this Contract,

CONTRACTOR shall be obligated and hereby promises and agrees to render and provide the Services in accordance with specifications and terms contained in Exhibit "A" Procurement Packet and Exhibit "B" CONTRACTOR's Response. If there are any discrepancies between this agreement and the General and Special Conditions of the Contract contained in Exhibit A, the General and Special Conditions of the Contract shall control.

2. **Project/Consideration.** Hereinafter called the project, for the sum of (\$) and all extra work in connection therewith, under the terms and stated in the General and Special Conditions of the Contract (See Exhibit "A"); and at CONTRACTOR'S own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions and Special Conditions printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by [NAME OF ENGINEER], entitled the Engineer, and as enumerated in Paragraph 1.01.A.12 of the General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The CONTRACTOR hereby agrees to commence work under this contract on or after a date to be specified in written "Notice to Proceed" of the OWNER and to fully complete the project within two hundred 200 working calendar days thereafter. The CONTRACTOR further agrees to pay, as liquidated damages, the sum of **\$500.00** for each consecutive calendar day thereafter.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the contract, and to make payments on account thereof as provided in Paragraphs 14.02.C and 14.07.C of the General Conditions.

3. CONTRACTOR agrees in performing the Services that it will use proper professional standards, comply with any and all appropriate laws and regulations and devote such time as is necessary to safely and efficiently provide the Services.

4. **Licenses/Certifications.** As a condition of this Contract, CONTRACTOR shall hold and maintain throughout the term of this Contract all licenses and permits required, or which may be required by any authority, including the State of Texas, during the term hereof to provide the Services. CONTRACTOR further represents that it is qualified to perform and execute the services described above. If such license or permit is suspended or revoked, this Contract shall automatically be terminated and CONTRACTOR shall immediately notify the OWNER. CONTRACTOR shall provide the OWNER with all current state certifications, permits, and/or licenses with applicable seals, or as otherwise required by the State of Texas.

5. **Equipment.** If applicable, CONTRACTOR shall provide a sufficient number of trucks, vehicles, personnel and equipment available to safely and efficiently provide the Services. All trucks or vehicles operated by the CONTRACTOR to perform the Services shall contain all equipment required by any authority to operate on streets and roads and all persons in the employ of CONTRACTOR who operate such trucks or vehicles shall have the required licenses, qualifications, skill, and expertise to perform such Services and shall comply with all laws, rules, and regulations prescribed by any agency or authority having jurisdiction with regard to the operation of such trucks or vehicles in providing the Services. CONTRACTOR shall provide a sufficient number of trucks, vehicles, personnel, and equipment available to safely and efficiently provide the Services.

6. **Independent Contractor.** The CONTRACTOR must comply with all applicable Hidalgo County policies and with any applicable federal, state, or local laws, regulations, orders, or ordinances applicable to the Services provided by CONTRACTOR under this Agreement. Notwithstanding the foregoing sentence, CONTRACTOR represents and maintains that CONTRACTOR is an Independent Contractor and is not an employee of the OWNER, or any agency thereof, and represents and warrants that CONTRACTOR does not desire or request any fringe benefits provided to employees of OWNER, and/or any agency of the OWNER, including but not limited to benefits associated with Hidalgo County's Civil Service Program. CONTRACTOR agrees to be responsible for any federal income tax, withholding or social security tax liability that might arise from payments received hereunder. CONTRACTOR will incur no financial obligation on behalf of the OWNER without prior written approval of the OWNER. CONTRACTOR will be responsible for all personal and professional expenses, including, but not limited to, membership fees and dues and expenses of attending conventions and meetings.

7. **Termination.** OWNER may terminate this Agreement without cause upon thirty (30) days written notice.

8. **Non-Exclusive Services of CONTRACTOR.** Hidalgo OWNER reserves the right to request this Product, Good and/or service from other sources other than the CONTRACTOR and shall not be in violation of any terms or conditions of this Agreement.

9. **Insurance.** Consistent with its status as an independent contractor and at its sole expense, CONTRACTOR agrees that throughout the duration of the work under this contract and any extension hereof, it shall provide and maintain any and all insurances and abide by any requirements which are specified in the Procurement Packet/Specifications and/or which may be necessary in providing Services or are otherwise required by law. Insurance policies shall cover, but are not limited to, CONTRACTOR's activities and all persons, vehicles, equipment and

property connected with providing Services, to include theft or loss. The amount of insurance required shall be in accordance with amounts specified by the OWNER or as prescribed by law, but in no event shall any amount be less than the minimum amounts prescribed by law, including, but not limited to the Texas Tort Claims Act. These requirements do not establish limits of CONTRACTOR's liability. Any and all applicable insurance requirements and amounts are incorporated herein by reference for all purposes. CONTRACTOR is responsible for ensuring all required insurance policies are valid for the duration of the contract. All insurance policies are to be issued by an insurance company authorized to do business in the State of Texas and acceptable to OWNER. CONTRACTOR shall cause all subcontractors utilized by CONTRACTOR to also comply with these specifications. CONTRACTOR shall furnish to OWNER certificate(s) of coverage, and all renewals throughout the duration of the Project, issued by the insurer that such insurance is in full force and effect. (See **Exhibit "C"** attached hereto and incorporated herein for all purposes). For each applicable policy, CONTRACTOR shall name the OWNER as an additional insured. CONTRACTOR shall notify OWNER a minimum of thirty (30) days in advance of cancellation of all or part of a policy. CONTRACTOR shall make any other insurance documentation available to OWNER upon request. CONTRACTOR will be considered in breach of contract should the CONTRACTOR fail to maintain an insurance policy in the minimum limits of liability and requirements identified above while performing services for and under this Agreement, and will be subject to default and immediate termination of the Agreement. Additionally, CONTRACTOR covenants and agrees to use its best efforts to maintain an insurance policy in the minimum limits of liability and requirements identified above until one year following the conclusion of this Agreement.

10. INDEMNIFICATION. CONTRACTOR SHALL INDEMNIFY AND HOLD OWNER, ITS ELECTED OFFICIALS, EMPLOYEES AND AGENTS HARMLESS FROM ANY AND ALL CLAIMS, ACTIONS, LIABILITY, DAMAGES, LOSSES AND EXPENSES (INCLUDING COSTS OF JUDGMENTS, SETTLEMENTS, COURT COSTS, AND ATTORNEYS' FEES, REGARDLESS OF THE OUTCOME OF SUCH CLAIM OR ACTION) CAUSED BY, RESULTING FROM, OR ALLEGING NEGLIGENT OR INTENTIONAL ACTS OR OMISSIONS OR ANY FAILURE TO PERFORM ANY OBLIGATION UNDERTAKEN OR ANY COVENANT IN THIS CONTRACT, WHETHER SUCH ACT, OMISSION, OR FAILURE WAS THE CONTRACTOR'S OR THAT OF ANY PERSON PROVIDING SERVICES HEREUNDER THROUGH OR FOR THE CONTRACTOR. UPON WRITTEN NOTICE FROM THE OWNER, THE CONTRACTOR WILL RESIST AND DEFEND AT ITS OWN EXPENSE, AND BY COUNSEL REASONABLY SATISFACTORY TO OWNER, ANY SUCH CLAIM OR ACTION. THE CONTRACTOR WILL CARRY PROPER INSURANCE WITH THE OWNER AS AN ADDITIONAL NAMED INSURED. THIS INDEMNIFICATION CLAUSE SHALL SURVIVE THIS AGREEMENT AND BE ENFORCEABLE AS A SEPARATE AGREEMENT IN THE EVENT ITS SURVIVAL AND ENFORCEMENT BECOME NECESSARY.

11. Notice. Except as may be otherwise specifically provided in this Agreement, all notices, demands, requests, or communications required or permitted hereunder shall be in writing and

shall either be (i) personally delivered against a written receipt, or (ii) sent by registered or certified mail, return receipt requested, postage prepaid and addressed to the parties at the addresses set forth below, or at such other addresses as may have been theretofore specified by written notice delivered in accordance herewith:

If to OWNER: The County of Hidalgo
Attn: County Judge
100 E. Cano, 2nd Floor
Edinburg, Texas 78539

If to CONTRACTOR: CONTRACTOR Name:
Attention:
Address
City, State, Zip Code

Each notice, demand, request, or communication which shall be delivered or mailed in the manner described above shall be deemed sufficiently given for all purposes at such time as it is personally delivered to the addresses or if mailed at such time as it is deposited in the United States mail.

12. GENERAL PROVISIONS.

- a. **Assignment.** Except as otherwise herein provided, CONTRACTOR shall not assign the obligations or rights under this Agreement to any person without the prior written consent of OWNER.
- b. **Conflict with Applicable Laws.** Nothing in this Agreement shall be construed so as to require the commission of any act contrary to law, and whenever there is any conflict between any provision of this Agreement and any present or future law, ordinance or administrative, executive or judicial regulation, order or decree, or amendment thereof, contrary to which the parties have no legal right to contract, the latter shall prevail, but in such event, the affected provision or provisions of this Agreement shall be modified only to the extent necessary to bring them within the legal requirements and only during the time such conflict exists. In case any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision thereof and this Agreement shall be

construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

- c. **No Waiver.** No waiver by OWNER of any breach of any provision of this Agreement shall be deemed to be a waiver of any preceding or succeeding breach of the same or any other provision hereof.
- d. **Governing Law.** This Agreement shall be construed under and in accordance with the laws of the State of Texas, and all obligations of the parties created hereunder are performable in Hidalgo County, Texas. The CONTRACTOR hereby consents to personal jurisdiction in Hidalgo County, Texas.
- e. **Successors.** This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto and their respective heirs, executors, administrators, legal representatives, successors, and assigns where permitted by this Agreement.
- f. **Commitment of Current Revenues Only.** In the event that, during any term hereof, the Commissioners Court does not appropriate sufficient funds to meet the obligations of OWNER under this Agreement, OWNER may terminate this Agreement upon ninety (90) days written notice to CONTRACTOR. OWNER agrees, however, to use reasonable 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 OWNER. *Agreements for the acquisition, including lease of real or personal property under Tex. Loc. Govt. Code §271.903:* In the event that, during any term hereof, the Commissioner's Court does not appropriate sufficient funds to meet the obligations of OWNER under this Agreement, OWNER may terminate this Agreement upon ninety (90) days written notice to CONTRACTOR, OWNER agrees, however, to use a best efforts attempt to obtain and appropriate funds for payment of the Agreement. The parties intend this provision, if applicable, to be a continuing right to terminate this at the expiration of each budget period of OWNER in accordance with the Texas Local Government Code.
- g. **Immunities.** Nothing in this Agreement is intended to and OWNER does not hereby waive, release or relinquish any right to assert any of the defenses OWNER enjoys by virtue of the state or federal constitution, laws, rules or regulations, and any sovereign, official or qualified immunity available to OWNER as to any claim or action of any person, entity, or individual against OWNER.

- h. **Headings.** The headings and captions contained in this Agreement are solely for convenient reference and shall not be deemed to affect the meaning or interpretation of any provision or paragraph hereof.
- i. **Gender and Number.** All pronouns used in this Agreement shall include the other gender, whether used in the masculine, feminine or neuter gender, and the singular shall include the plural whenever and as often as may be appropriate.
- j. **Entire Agreement.** This Agreement contains the entire agreement between the parties hereto, and each party acknowledges that neither has made (either directly or through any agent or representative) any representations or agreements in connection with this Agreement not specifically set forth herein. This Agreement may be modified or amended only by an agreement in writing executed by OWNER and CONTRACTOR, and not otherwise.
- k. **Purchasing Ethics.** CONTRACTOR represents and warrants it has not, during the process of being awarded this contract violated the following ethical standards of OWNER and, upon and after the execution of this Agreement, agrees to abide by the following ethical standards of OWNER:
 - i. 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 OWNER, or for any elected official, department head or employee or former elected official, department head or employee of OWNER, to solicit, demand, accept or agree to accept from another person, entity or organization, a gratuity or an office 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 advise, 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 OWNER.
 - ii. 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 OWNER, or any person associated therewith, as an inducement for the award of a subcontract or order.

- l. **Void Contract.** CONTRACTOR understands that an awarded contract may immediately become void if the OWNER determines that a lack of compliance with applicable policies and/or statutes has occurred in the procurement process.
- m. **Nondiscrimination.** CONTRACTOR, including subcontractors, assignees and successors in interest, ensures that no person shall on the grounds of race, religion, color, national origin, sex, age, or disability, or any other protected class under law, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination or retaliation in any federally or non-federally funded program or activity when providing any services described herein under this contract/agreement. Applicable nondiscrimination statements and provisions of Title VI of the Civil Rights Act of 1964, as amended, were provided as part of the initial procurement packet and are incorporated herein and made a part of this agreement for all purposes.
- n. **Additional Documents.** The parties hereto covenant and agree that they will execute each such other and further instruments and documents as are or may become necessary or convenient to effectuate and carry out the terms of this Agreement.
- o. **Required Contract Provision for Contracts Subject to Federal Award (*if applicable*).** Pursuant to 2 CFR 200.327, a non-federal entity's contracts must contain the applicable provisions described in appendix II to 2 CFR 200-Contract Provisions for non-Federal Entity Contracts under Federal Awards. Additionally, OWNER contracts under Federal award which are subject to assistance from the Federal Emergency Management Agency (FEMA) are also required to contain additional contract clauses. The applicable required contract clauses were provided as part of the initial procurement packet and are incorporated herein and made part of this agreement for all purposes.
- p. **Authority to Execute.** The execution and performance of this Agreement by OWNER and CONTRACTOR have been duly authorized by all necessary laws, resolutions, or corporate action, and this Agreement constitutes the valid and enforceable obligations of OWNER and CONTRACTOR in accordance with its terms.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the parties to these present have executed this contract in the year and day first written above.

APPROVED BY COMMISSIONERS COURT ON _____, 2022.

Agenda Item No.: _____

Executive Office: _____

CONTRACTOR:

COUNTY:

COUNTY OF HIDALGO, Texas

Signature: _____

Print Name: _____

Title: _____

Hon. Richard F. Cortez, County Judge

APPROVED AS TO FORM

Office of the Hidalgo County
Criminal District Attorney,
Toribio "Terry" Palacios

ATTEST:

_____, ADA

Arturo Guajardo, Jr., County Clerk

ATTACHMENTS:

- A. PROCUREMENT PACKET**
- B. RESPONSE**
- C. CERTIFICATE OF INSURANCE**

SUPPLEMENTAL SIGNATURES:

(If Applicable)

This form must be signed and included in your submission.

REFERENCE FORM

Respondent's involvement with reference checks is not permitted. Only Hidalgo County Purchasing Department or authorized designees will conduct reference checks. Any deviation to this may result in rejection of your response.

Reference One

Client's Name: _____

Type of Organization: _____

Address: _____

Contact Person: _____ Title: _____

Telephone: _____ E-mail: _____

Project Information

Name of Project: _____

Scope of Work: _____

Contract Period: From _____ to _____

Cost: Projected \$: _____ Actual \$: _____

Timeframe (Include Unit Measure) Projected _____ Actual _____

Status as of _____ (Circle One) Complete In Progress Canceled
Date

Reference Two

Client's Name: _____

Type of Organization: _____

Address: _____

Contact Person: _____ Title: _____

Telephone: _____ E-mail: _____

Project Information

Name of Project: _____

Scope of Work: _____

Contract Period: From _____ to _____

Cost: Projected \$: _____ Actual \$: _____

Timeframe (Include Unit Measure) Projected _____ Actual _____

Status as of _____ (Circle One) Complete In Progress Canceled
Date

Reference Three

Client's Name: _____

Type of Organization: _____

Address: _____

Contact Person: _____ Title: _____

Telephone: _____ E-mail: _____

Project Information

Name of Project: _____

Scope of Work: _____

Contract Period: From _____ to _____

Cost: Projected \$: _____ Actual \$: _____

Timeframe (Include Unit Measure) Projected _____ Actual _____

Status as of _____ (Circle One) Complete In Progress Canceled
Date

Reference Four

Client's Name: _____

Type of Organization: _____

Address: _____

Contact Person: _____ Title: _____

Telephone: _____ E-mail: _____

Project Information

Name of Project: _____

Scope of Work: _____

Contract Period: From _____ to _____

Cost: Projected \$: _____ Actual \$: _____

Timeframe (Include Unit Measure) Projected _____ Actual _____

Status as of _____ (Circle One) Complete In Progress Canceled
Date

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THE SEAL APPEARING ON THIS
DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302



DIVISION 01 – GENERAL REQUIREMENTS

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SECTION 01010

SCOPE OF WORK

This Scope of Work and any accompanying drawings are intended as a guide to the Contractor in identifying the work to be accomplished in completing this project. This Scope of Work may not be all inclusive and the Contractor shall be responsible for providing all supervision, labor, materials, equipment, direction, and coordination necessary to perform and totally complete the work in conformance with the drawings and specifications. If an "or equal" substitution is made for any of the recommended items shown in the specifications or drawings, the Contractor shall be responsible for providing all the necessary physical modifications to fully accommodate the substitution at no change in contract price.

PART 1. **GENERAL**

1.01 CIVIL

- A. Head Start Parking Lot and Safety Improvements to include; canopy structure columns & beams members, concrete base, concrete sidewalks with handicap ramps, area grading to achieve positive drainage flow at new asphalt parking lot proposed with concrete curb, striping, lighting and new concrete pads for waste disposals.

1.02 CONSTRUCTION RECORD DRAWINGS

- A. The Contractor shall maintain a complete master set of construction "red-line" drawings to document any field changes to the "Issued for Construction" drawing set which shall accurately depict the "As-Built" construction of the plant. Following Mechanical completion, this drawing set shall be turned over to the Engineer for updating the for Record "As-Built" drawings.
- B. Any drawings and documentation which are to be supplied by the Contractor, shall be updated to accurately depict the "As-Built" construction of the plant and turned over to the Engineer following Mechanical Completion of the project. These items shall be certified by the Contractor's Project Manager as accurate and complete.

1.03 SUBCONTRACTOR COORDINATION

The Contractor shall be responsible for coordination of the work between his various subcontractors to prevent conflicts and schedule interruptions.

1.04 SAFETY REQUIREMENTS

- A. The Contractor shall provide all safety equipment required by his employees to meet Occupational Safety and Health Administration (OSHA) safety requirements.

END OF SECTION 01010

SPECIFICATIONS

SCHEDULE OF VALUES

Section 01292
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation and submittal of a Schedule of Values for stipulated price contracts or for major lump sum items on unit price contracts for which the Contractor requests progress payments.

1.02 DEFINITION

- A. The Schedule of Values is an itemized list that establishes the value of each part of the Work for a stipulated price contract and for major lump sum items in a unit price contract. The Schedule of Values is used as the basis for preparing applications for payments. Quantities and unit prices may be included in the schedule when designated by the Engineer.
- B. A major lump sum item is a lump sum item in the Schedule of Unit Price Work which qualifies as Major Unit Price Work as defined in Document 00700 - General Conditions.

1.03 PREPARATION

- A. For stipulated price contracts, subdivide the Schedule of Values into logical portions of the Work, such as major work items or work in contiguous geographic areas. Use Section 01325 - Construction Schedule to guide the subdivision of work items. The items in the Schedule of Values will correlate directly with the tasks enumerated in the Construction Schedule. Then organize each portion using the Table of Contents of this Project Manual as an outline for listing the value of work by Sections. A pro rata share of mobilization, bonds, and insurance may be listed as separate items for each portion of the work.
- B. For unit price contracts, items should include a proportional share of Contractor's overhead and profit so that the total of all items will equal the Contract Price.
- C. For lump sum equipment items where submittal of operation/maintenance data and testing are required, include a separate item for equipment operation and maintenance data submittal valued at 5 percent of the lump sum amount for each equipment item and a separate item for testing and adjusting valued at 5 percent of the lump sum amount for each equipment item.
- D. Round off figures for each listed item to the nearest \$100.00 except for the value of one item, if necessary, to make the total of all items in the Schedule of Values equal the Contract Price for stipulated price contracts or the lump sum amount in the Schedule of Unit Price Work.
- E. Type the schedule of values on 8-1/2-inch by 11-inch white bond paper.

1.04 SUBMITTAL

- A. Submit within 30 days of Notice to Proceed, or at the pre-construction meeting, whichever occurs sooner.
- B. Revise the Schedule of Values and resubmit for items affected by contract modifications, change orders, and work change directives. After the changes are reviewed without exception by the

Engineer, make the submittal at least 10 days prior to submitting the next application for progress payment.

PART 2 P R O D U C T S - Not Used
PART 3 E X E C U T I O N - Not Used

END OF SECTION

Section 01312

COORDINATION AND MEETINGS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Section includes general coordination including preconstruction conference, site mobilization conference, and progress meetings.

1.02 RELATED DOCUMENTS

- A. Coordination is required throughout the documents. Refer to all of the Contract Documents and coordinate as necessary.

1.03 ENGINEER AND REPRESENTATIVES

- A. The Engineer may act directly or through designated representatives as defined in the General Conditions and as identified by name at the preconstruction conference.

1.04 CONTRACTOR COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Specifications sections to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirement characteristics of operating equipment are compatible with existing or planned utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Conceal pipes, ducts, and wiring within the construction in finished areas, except as otherwise indicated. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. Coordinate access to site for correction of nonconforming Work to minimize disruption of Owner's activities where Owner is in partial occupancy.

1.05 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a preconstruction conference.

B. Attendance Required: Owner's Representatives, Engineer's Representatives, Resident Project Representative, Funding Agency Representatives, Contractor, and major Subcontractors.

C. Agenda:

1. Distribution of Contract Documents.
2. Designation of personnel representing the parties in Contract, and the Engineer.
3. Review of insurance.
4. Discussion formats proposed by the Contractor for schedule of values (if any), and construction schedule.
5. Procedures and processing of shop drawings and other submittals, substitutions, pay estimates or applications for payment, Requests for Information, Request for Proposal, Change Orders, and Contract closeout.
6. Scheduling of the Work and coordination with other contractors and utility service providers.
7. Review of Subcontractors.
8. Appropriate agenda items listed for Site Mobilization Conference, paragraph 1.06C, when preconstruction conference and site mobilization conference are combined.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Other items as may be deemed appropriate.

1.06 SITE MOBILIZATION CONFERENCE

A. When required by the Contract Documents, Engineer will schedule a conference at the Project site prior to Contractor occupancy.

B. Attendance Required: Engineer representatives, Resident Project Representative, Special Consultants, Contractor's Superintendent, and major Subcontractors.

C. Agenda:

1. Use of premises by Owner and Contractor.
2. Safety and first aid procedures.
3. Construction controls provided by Owner.

4. Temporary utilities.
5. Survey and layout.
6. Security and housekeeping procedures.
7. Field office requirements.

1.07 PROGRESS MEETINGS

- A. Project meetings shall generally be held at Project field office or other location as designated by the Engineer. Meeting shall generally be held at monthly intervals, or more frequent intervals if directed by Engineer.
- B. Attendance Required: Job superintendent, major Subcontractors and Suppliers, Owner's Representatives, Engineer's Representatives, Funding Agency Representatives (if any), and Resident Project Representative as appropriate to agenda topics for each meeting.
- C. Engineer or his representative will make arrangements for meetings, and recording minutes.
- D. Engineer or his representative will prepare the agenda and preside at meetings.
- E. Contractor shall provide required information and be prepared to discuss each agenda item.
- F. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Record Documents.
 3. Review of Work progress schedule submittal, and pay estimates, payroll and compliance submittals.
 4. Field observations, problems, and decisions.
 5. Identification of problems which may impede planned progress.
 6. Review of submittals schedule and status of submittals.
 7. Review of RFI and RFP status.
 8. Change order status.
 9. Review of off-site fabrication and delivery schedules.
 10. Maintenance of progress schedule.
 11. Corrective measures to regain projected schedules.

12. Planned progress during succeeding work period.
13. Coordination of projected progress.
14. Maintenance of quality and work standards.
15. Effect of proposed changes on progress schedule and coordination.
16. Other items relating to Work.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION

SECTION 01325 CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 GENERAL

- A. Provide Construction Schedules for the Work included in this Contract in accordance with requirements in this Section. Create Construction Schedule using Critical Path Method (CPM) computer software capable of mathematical analysis of Precedence Diagramming Method (PDM) plan. Provide printed activity listings and bar charts in formats described in this Section.
- B. Combine activity listings and bar charts with narrative report to form Construction Schedule submittal for Engineer.

1.02 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.
- B. During preconstruction meeting, as described in Section 01312 - Coordination and Meetings, provide sample bar charts and activity listings produced from scheduling software proposed. Scheduling software is subject to review by Engineer and must meet requirements provided in this Section. Engineer will provide review of samples within seven days of submittal.
- C. Within 21 days of receipt of approval of Contractor's format, or 30 days of Notice to Proceed, whichever is later, **submit proposed Construction Schedule for review.**
- D. Construction Schedule submittals shall include:
 - 1. printed bar charts that meet criteria outlined in this Section;
 - 2. activity listings that meet criteria outlined in this Section and are produced by Contractor's approved scheduling software; and
 - 3. a predecessor/successor listing sorted by Activity ID that meets criteria outlined in this Section and is produced by Contractor's scheduling software.
 - 4. A logic network diagram is required with the first Construction Schedule submittal for facilities projects.
 - 5. Prepare and submit graphic or tabular display of estimated monthly billings (i.e. a cash flow curve for the Work) with the first schedule submittal. This information is not required in monthly updates, unless significant changes in work require re-submittal of schedule for review. Display shall allocate units indicated in bid

schedule or Schedule of Values to Construction Schedule activities. Weighted allocations are acceptable, where appropriate. Dollar value associated with each allocated unit will be spread across the duration of that activity on a monthly basis. Total for each month and cumulative total will be indicated. These monthly forecasts are only for Engineer's planning purposes. Monthly payments for actual work completed will be made in accordance with Document 00700 - General Conditions.

6. Narrative Report that provides the information outlined in this Section.

SPECIFICATIONS

CONSTRUCTION SCHEDULE

- E. No payment will be made until Engineer approves Construction Schedule and billing forecast.
- F. If Contractor desires to make changes in its method of operating and scheduling, after Engineer has reviewed original schedule, notify Engineer in writing, stating reasons for changes. When Engineer considers these changes to be significant, Contractor may be required to revise and resubmit for review all or affected portion of Contractor's Construction Schedule to show effect on the Work.
- G. Upon written request from Engineer, revise and submit for review all or any part of Construction Schedule submittal to reflect changed conditions in the Work or deviations made from original schedule.
- H. Updated Construction Schedule with actual start and actual finish dates, percent complete, and remaining duration of each activity shall be submitted monthly. Data date used in updating monthly Construction Schedule shall be the same date as used in monthly Payment Application. Monthly update of Construction Schedule is required for monthly Payment Application to be processed for payment.

1.04 SCHEDULING COMPUTER SOFTWARE REQUIREMENTS

- A. Contractor's scheduling software shall be capable of creating bar charts and activity listings, which can be sorted by various fields.
- B. Use scheduling software to provide monthly time in Bar Chart format and scale with 12-month scale not to exceed one page width. Bar charts may be printed or plotted on 8-1/2 by 11-inch, 8-1/2 by 14-inch or 11 by 17-inch sheet sizes. Over-size plots are not acceptable.

1.05 NARRATIVE SCHEDULE REPORT

- A. Narrative schedule report shall list activities started this month, activities completed this month, activities continued this month, activities scheduled to start or complete next month, problems encountered this month, and actions taken to solve these problems.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION - 01325

Section 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Schedule of Values.
2. Construction Schedules.
3. Shop Drawings, Product Data, and Samples
4. Operations and Maintenance Data.
5. Manufacturer's Certificates.
6. Construction Photographs.
7. Project Record Documents.
8. Video Tapes.
9. Design Mixes.

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling:

1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal has been approved.
2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Engineer will review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 30 days for initial review by the Engineer. This time for review shall in no way be justification for delays or additional compensation to the Contractor. Recognizing that time is of the essence, the Contractor is to stamp the top of each submittal with the words ROUTINE or CRITICAL. Routine submittals shall be processed in accordance with the timeframe set forth previously. Critical submittals are those that: were overlooked by the Contractor, involve complex coordination, or are crucial to the successful completion of a specific portion of the project. For critical submittals:

- i. Contractor shall indicate on the submittal his realistically estimated date of when a review must be returned;
- ii. Upon return of critical submittals, Contractor shall date-stamp the transmittal page with date and time received;

iii. Contractor is cautioned that the use of critical submittals is not a substitute for proper due diligence on his part. Review of critical submittals found to be routine shall be accompanied by an invoice for excess time and material expenditures that were required in order to complete the critical review as compared to a routine review. The Resident Project Representative shall make the determination as to whether a critical submittal was in fact routine.

3. The Engineer's review of submittals covers only general conformity to the Drawings, Specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. Quantities may be verified by the Engineer. The Contractor is responsible for any errors, omissions or deviations from the Contract requirements; review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Drawings and Specifications.
4. Submit sufficient copies of documents. Unless otherwise specified in the following paragraphs or in the Specifications, provide 6 copies in addition to the number the Contractor requires returned. For portions of the project involving electrical or signal components, provide one additional copy (7 copies in addition to the number the Contractor requires returned).
5. Revise and resubmit submittals as required. Identify all changes made since previous submittal.
6. A maximum of three (3) reviews will be conducted on any one submittal. Submittals requiring more than three (3) reviews will be considered inadequate and result in a recovery of review expenses from the Contractor.
7. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work or included in periodic progress payments until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering:

1. Transmit each submittal to the Engineer with a Transmittal Cover.
2. Sequentially number each transmittal form beginning with the number 1. Re-submittals shall use the original number with an alphabetic suffix (i.e., 2A for first re-submittal of Submittal 2 or 15C for third re-submittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.
3. Identify time nature of submittal, either ROUTINE or CRITICAL.

4. Identify variations from requirements of Contract Documents and identify product or system limitations.
5. For submittal numbering of video tapes, see paragraph 1.10 Video.

C. Transmittal Cover:

1. Transmittal Cover, certifying that the items have been reviewed in detail and are correct and in accordance with Contract Documents, except as noted by any requested variance. A stamp may be used to print the information on the Transmittal Cover except for the Contractor's signature. Regardless of whether the transmittal cover is typed or stamped, the transmittal cover text shall be a minimum of fourteen (14) point.
2. As a minimum, Transmittal Cover information shall include:

-
- a. Contractor's name.
 - b. Job number.
 - c. Submittal number.
 - d. Certification statement that the Contractor has reviewed the submittal and it is in compliance with the Contract Documents.
 - e. Signature line for Contractor.
 - f. Submittal type – routine or critical

3. The bottom half of the Transmittal Cover shall be kept blank.

1.03 SCHEDULE OF VALUES

- A. Submit a Schedule of Values in accordance with Section 01292 - Schedule of Values.

1.04 CONSTRUCTION SCHEDULES

- A. Submit Construction Schedules as provided in Project Manual.

1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- A. Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, and Samples.

1.06 OPERATIONS AND MAINTENANCE DATA

- A. Submit Operations and Maintenance data in accordance with Section 01782 - Operations and Maintenance Data.

1.07 MANUFACTURER'S CERTIFICATES

- A. When required in Specification sections, submit manufacturers' certificate of compliance for review by Engineer.

- B. Transmittal Cover, as described in paragraph 1.02C, shall be placed on front page of the certification.
- C. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.08 CONSTRUCTION PHOTOGRAPHS

- A. Submit Construction Photographs in accordance with Section 01321 - Construction Photographs.

1.09 PROJECT RECORD DOCUMENTS

- A. Submit Project Record Documents in accordance with Section 01785 - Project Record Documents.

1.10 VIDEO

- A. Submit television video tapes as required in Section 02533 - Acceptance Testing for Sanitary Sewers.
- B. Transmittal forms for video tapes shall be numbered sequentially beginning with T01, T02, T03, etc.

1.11 DESIGN MIXES

-
- A. When specified in Specifications, submit design mixes for review.
 - B. Transmittal Cover, as described in paragraph 1.02C, shall be placed on front page of each design mix.
 - C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.
 - D. Maintain a copy of approved design mixes at mixing plant.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

- A. Submittals made as part of this project will become a vital portion of the project record and will be referenced by the Owner for the useful life of the project. All submittals shall be of high quality. To this end, the following requirements are made:

- i. As much as possible, all catalog cuts and manufacturer's information shall be original. ii. Copies, when required, shall be clean and entirely legible.
 - iii. Neither facsimiles nor copies of facsimiles are to be included as part of any submittal.
 - iv. Binders, if used, shall be rugged, lock-ring type. Spine of binders shall be clearly labeled with the information outlined in items 1.02 C.2.a. through c.
- B. Reviewed submittals shall be returned to Contractor for distribution to subcontractors and other trades as required. As a minimum, submittals returned to the Contractor will be marked with review comments indicating findings of the review and giving instruction as to necessity of a resubmittal. The Engineer may, at his option, use a stamp for this purpose. Detailed correspondence covering the review may also accompany returned submittals.

END OF SECTION

TESTING LABORATORY SERVICES

Section 01454

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing laboratory services and Contractor responsibilities related to those services.

1.02 REFERENCES

- A. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- B. ASTM D 3666 - Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
- C. ASTM D 3740 - 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.
- D. ASTM E 329 - Specification for Minimum Requirements for Agencies Engaged the Testing and/or Inspection of Materials Used in Construction.

1.03 SELECTION AND PAYMENT

- A. The Owner shall employ and pay for the services of an independent testing laboratory, or laboratories, to perform product and material quality control, perform in-place quality control and verification identified in individual Specification sections.
- B. The Owner, with the assistance of the Engineer, shall have control of testing, sampling, and expenditures.
- C. All tests required by the project plans and specifications shall be included in a schedule of fees.
- D. The Contractor shall coordinate the services of the project's Geotechnical Engineer of Record to conduct observation and testing of the subgrade preparation, and the selection, placement and compaction of select fill material. The foundation excavations for structures shall be observed by the Geotechnical Engineer of Record prior to steel and/or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the subsurface materials described in the project's Geotechnical Engineering Study.
- E. Employment of a testing laboratory by the Owner shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

- F. Remedial work and re-testing costs, resulting from deficiencies in materials and/or workmanship, shall be borne by the Contractor. Re-testing costs shall not be paid for from the allowance for field and laboratory testing.

1.04 QUALIFICATION OF LABORATORY

- A. Meet laboratory requirements of ASTM E 329 and applicable requirements of ASTM C 1077, ASTM D 3666, and ASTM D 3740.
- B. Where a laboratory subcontracts any part of the testing services, such work shall be placed with a laboratory complying with the requirements of this Section.

1.05 LABORATORY REPORTS

TESTING LABORATORY SERVICES

- A. The testing laboratory shall provide and distribute copies of laboratory reports to the distribution list provided by the Engineer.
- B. One copy of each laboratory report distributed or faxed to the Contractor shall be kept at the site field office for the duration of the project.
- C. Before close of business on the working day following test completion and review, reports which indicate failing test results shall be transmitted immediately via fax from the testing laboratory to the material supplier, Contractor, Engineer and Resident Project Representative.

1.06 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of the Contractor.
- D. Laboratory has no authority to stop the Work.

1.07 CONTRACTOR RESPONSIBILITIES

- A. Provide safe access to the Work and to manufacturer's facilities for the Engineer, Resident Project Representative and for testing laboratory personnel.
- B. Provide to the testing laboratory a copy of the construction schedule and a copy of each update to the construction schedule.
- C. Notify the Resident Project Representative and the testing laboratory during normal working hours of the day previous to the expected time for operations requiring inspection and testing services. If the Contractor fails to make timely prior notification, then the Contractor shall not proceed with the operations requiring inspection and testing services.

- D. Notify the Resident Project Representative 24 hours in advance if the Specification requires the presence of the Resident Project Representative or testing laboratory for sampling or testing.
- E. Request and monitor testing as required to provide timely results and to avoid delay to the Work. Provide samples to the laboratory in sufficient time to allow the required test to be performed in accordance with specified test methods before the intended use of the material.
- F. Cooperate with laboratory personnel in collecting samples on site. Provide incidental labor and facilities for safe access to the Work to be tested; to obtain and handle samples at the site or at source of products to be tested; and to facilitate tests and inspections including storage and curing of test samples.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N

3.01 C O N D U C T I N G T E S T I N G

- A. Laboratory sampling and testing specified in individual Specification sections shall conform to the latest issues of ASTM standards, TxDOT methods, or other recognized test standards as approved by the Engineer.
- B. The requirements of this section shall also apply to those tests for approval of materials, for mix designs, and for quality control of materials as performed by the testing laboratories employed by the Contractor.

END OF SECTION

SPECIFICATIONS

MOBILIZATION

Section 01502

MOBILIZATION

PART 1 G E N E R A L

1.01 S E C T I O N I N C L U D E S

- A. Mobilization of construction equipment and facilities onto the site.

1.02 M E A S U R E M E N T & P A Y M E N T

- A. Measurement and payment for mobilization is on a stipulated price basis.
- B. Mobilization payments will be made in accordance with the following provisions:
 - 1. Authorization for payment of 50 percent of the Contract Price for mobilization will be made upon receipt and approval by Engineer of the following items, as applicable:

- a. Establishment of the field office for the Resident Project Representative where an office is required by other Sections;
 - b. Establishment of the Contractor's office;
 - c. Establishment of Contractor's material and equipment storage areas (as evidenced by executed leases or rental agreement); and.
 - d. Issuance of Notice to Proceed by Engineer to Contractor.
- .
- 2. Authorization for payment of the remaining fifty (50) percent of the Contract Price for mobilization will be made upon completion of Work amounting to five (5) percent of the Contract Price less the mobilization unit price.
- C. Mobilization payments will be subject to retainage amounts stipulated in the General Conditions.
- D. All cost difference between the stipulated amount and the actual cost of the initial mobilization and the cost of all subsequent mobilization shall be included in the various other prices bid.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION

Section 01572

SOURCE CONTROLS FOR EROSION AND SEDIMENTATION

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Description of erosion and sediment control and other control-related practices, which shall be utilized during construction activities.

1.02 UNIT PRICES

- A. No separate payment will be made for work performed under this Section. Include cost of work performed under this Section in pay items of which this work is a component.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N

3.01 PREPARATION AND INSTALLATION

- A. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Resident Project Representative to allow soil testing and surveying.
- B. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately by the Contractor.
- C. The Contractor shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, and waste materials as specified in this or other Specifications and in compliance with applicable federal, state, and local rules and regulations.
- D. Contractor shall conduct all construction operations under this Contract in conformance with the erosion control practices described in the SWPPP, Drawings, and this Specification.
- E. The Contractor shall install, maintain, and inspect erosion and sediment control measures and practices as specified in the SWPPP, Drawings, and in this or other Specifications.

3.02 TOPSOIL PLACEMENT FOR EROSION AND SEDIMENT CONTROL SYSTEMS

- A. When topsoil is specified as a component of another Specification, the Contractor shall conduct erosion control practices described in this Specification during topsoil placement operations.
 - 1. When placing topsoil, maintain erosion and sediment control systems, such as swales, grade stabilization structures, berms, dikes, waterways, and sediment basins.

2. Maintain grades which have been previously established on areas to receive topsoil.
3. After the areas to receive topsoil have been brought to grade, and immediately prior to dumping and spreading the topsoil, loosen the subgrade by discing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil.
4. No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

3.03 SEDIMENT CONTROL MAINTENANCE

- A. All erosion, sediment, and water pollution controls will be maintained in good working order. A rain gauge provided by the Contractor shall be located on the project site. Within 24 hours of a rainfall event of 0.5 inches or more as measured by the project rain gauge, the Contractor and the Resident Project Representative shall inspect the entire project to determine the condition of the control measures. Sediment shall be removed and devices repaired as soon as practicable but no later than 7 days after the surrounding ground has dried sufficiently to prevent further damage from equipment operations needed for repairs.
- B. In the event of continuous rainfall over a 24 hour period, or other circumstances that preclude equipment operation in the area, the Contractor shall install additional backup storm water pollution control devices, as determined by the Resident Project Representative, by other appropriate methods. The Contractor shall remove sediment accumulations and deposit the spoils in an area approved by the Resident Project Representative as soon as practical and in accordance with the SWPPP. Any corrective action needed for the control measures is to be accomplished in the sequence directed by the Resident Project Representative; however, areas adjacent to receiving waters shall generally have priority, followed by devices protecting storm sewer inlets.

3.04 DUST CONTROL

- A. Implement dust control methods to control dust creation and movement on construction sites and roads and to prevent airborne sediment from reaching receiving streams or storm water conveyance systems, to reduce on-site and off-site damage, to prevent health hazards, and to improve traffic safety.
- B. Control blowing dust by using one or more of the following methods:
 1. Mulches bound with chemical binders.
 2. Temporary vegetative cover.
 3. Spray-on adhesives on mineral soils when not used by traffic.
 4. Tillage to roughen surface and bring clods to the surface.
 5. Irrigation by water sprinkling.
 6. Barriers using solid board fences, snow fences, burlap fences, crate walls, bales of straw, or similar materials.

- C. Implement dust control methods immediately whenever dust can be observed blowing on the project site.

3.05 KEEPING STREETS CLEAN

- A. Keep streets clean of construction debris and mud carried by construction vehicles and equipment. If necessary to keep the streets clean, install stabilized construction exits at construction, staging, storage, and disposal areas. A vehicle/equipment wash area (stabilized with coarse aggregate) may be installed adjacent to the stabilized construction exit, as needed. Release wash water into a drainage swale or inlet protected by erosion and sediment control measures. Construction exit and wash areas are specified in Section 01575 - Stabilized Construction Exit.
- B. In lieu of or in addition to stabilized construction exits, shovel or sweep the pavement to the extent necessary to keep the street clean. Waterhosing or sweeping of debris and mud off of the street into adjacent areas is not allowed.

3.06 EQUIPMENT MAINTENANCE AND REPAIR

- A. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose. Locate such areas so that oils, gasoline, grease, solvents, and other potential pollutants cannot be washed directly into receiving streams or storm water conveyance systems. Provide these areas with adequate waste disposal receptacles for liquid as well as solid waste. Clean and inspect maintenance areas daily.
- B. On a construction site where designated equipment maintenance areas are not feasible, take precautions during each individual repair or maintenance operation to prevent potential pollutants from washing into streams or conveyance systems. Provide temporary waste disposal receptacles.

3.07 WASTE COLLECTION AND DISPOSAL

- A. Contractor shall formulate and implement a plan for the collection and disposal of waste materials on the construction site. In plan, designate locations for trash and waste receptacles and establish a collection schedule. Methods for ultimate disposal of waste shall be specified and carried out in accordance with applicable local, state, and federal health and safety regulations. Make special provisions for the collection and disposal of liquid wastes and toxic or hazardous materials.
- B. Keep receptacles and waste collection areas neat and orderly to the extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they will least likely be affected by concentrated storm water runoff.

3.08 WASHING AREAS

- A. Vehicles such as concrete delivery trucks or dump trucks and other construction equipment shall not be washed at locations where the runoff will flow directly into a watercourse or storm water conveyance system. Designate special areas for washing vehicles. Locate these areas where the wash water will spread out and evaporate or infiltrate directly into the ground, or where the runoff can be collected in a temporary holding or seepage basin. Beneath wash areas construct a gravel or rock base to minimize mud production.

3.09 STORAGE OF CONSTRUCTION MATERIALS AND CHEMICALS

- A. Isolate sites where chemicals, cements, solvents, paints, or other potential water pollutants are stored in areas where they will not cause runoff pollution.
- B. Store toxic chemicals and materials, such as pesticides, paints, and acids in accordance with manufacturers' guidelines. Protect groundwater resources from leaching by placing a plastic mat, packed clay, tar paper, or other impervious materials on any areas where toxic liquids are to be opened and stored.

3.10 DEMOLITION AREAS

- A. Demolition activities which create large amounts of dust with significant concentrations of heavy metals or other toxic pollutants shall use dust control techniques to limit transport of airborne pollutants. However, water or slurry used to control dust contaminated with heavy metals or toxic pollutants shall be retained on the site and shall not be allowed to run directly into watercourses or storm water conveyance systems. Methods of ultimate disposal of these materials shall be carried out in accordance with applicable local, state, and federal health and safety regulations.

3.11 SANITARY FACILITIES

- A. Provide and maintain sanitary facilities for persons on the job site; comply with the regulations of State and local departments of health.
- B. Enforce the use of sanitary facilities by construction personnel at the job site. Such facilities shall be enclosed. Pit-type toilets will not be permitted. No discharge will be allowed from these facilities. Collect and store sewage and waste so as not to cause a nuisance or health problem; have sewer and waste hauled off-site and properly disposed in accordance with City regulations.
- C. Located toilets near the Work site and secluded from view insofar as possible. Keep toilets clean and supplied throughout the course of the Work.

3.12 PESTICIDES

- A. Use and store pesticides during construction in accordance with manufacturers' guidelines and with local, state, and federal regulations. Avoid overuse of pesticides which could produce contaminated runoff. Take great care to prevent accidental spillage. Never wash pesticide containers in or near flowing streams or storm water conveyance systems.

END OF SECTION

FILTER FABRIC FENCE

Section 01573

FILTER FABRIC FENCE

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Installation of erosion and sediment control filter fabric fences used during construction and until final development of the site. The purpose of filter fabric fences is to contain pollutants from overland flow. Filter fabric fences are not for use in channelized flow areas.

1.02 UNIT PRICES

- A. No separate payment will be made for Filter Fabric Fence under this section. Include payment in unit price for related sections.

1.03 SUBMITTALS

- A. Manufacturer's catalog sheets and other product data on geotextile fabric.

1.04 REFERENCES

- A. ASTM D3786 - Standard Test Method for Hydraulic Bursting Strength for Knitted Goods and Nonwoven Fabrics
- B. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

PART 2 P R O D U C T S

2.01 FILTER FABRIC

- A. Provide woven or nonwoven geotextile filter fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.
- B. Geotextile fabric shall have a grab strength of 100 psi in any principal direction (ASTM D-4632), Mullen burst strength exceeding 200 psi (ASTM D-3786), and the equivalent opening size between 50 and 140.
- C. Filter fabric material shall contain ultraviolet inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 degrees F to 120 degrees F.
- D. Representative Manufacturers: Mirafi, Inc., or equal.

PART 3 E X E C U T I O N

3.01 PREPARATION AND INSTALLATION

- A. Provide erosion and sediment control systems at the locations shown on the SWPPP. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on the Drawings and specified in this Section.
- B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Resident Project Representative to allow soil testing and surveying.

SPECIFICATIONS

FILTER FABRIC FENCE

- C. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Resident Project Representative to remove and discard the existing system.
- D. Regularly inspect and repair or replace damaged components of filter fabric fences as specified in this Section. Unless otherwise directed, maintain the erosion and sediment control systems until the project area stabilization is accepted by the City. Remove erosion and sediment control systems promptly when directed by the Resident Project Representative. Discard removed materials off site.
- E. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at a location not in or adjacent to a stream or floodplain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.
- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.
- G. Conduct all construction operations under this Contract in conformance with the erosion control practices described in Section 01572- Source Controls for Erosion and Sedimentation.

3.02 CONSTRUCTION METHODS

- A. Provide filter fabric fence systems in accordance with the Drawing detail for Filter Fabric Fences. Filter fabric fences shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.
- B. Attach the filter fabric to steel posts spaced 6 to 8 feet and embedded a minimum of 18 inches. Steel posts shall have a minimum length of 4 feet. If filter fabric is factory preassembled with support

netting, then maximum spacing allowable is 8 feet. Install stakes at a slight angle toward the source of anticipated runoff.

- C. Trench in the toe of the filter fabric fence with a spade or mechanical trencher so that the downward face of the trench is flat and perpendicular to the direction of flow. The v-trench configuration as shown on the Drawings may also be used. Lay filter fabric along the edges of the trench. Backfill and compact trench.
- D. Filter fabric fence shall have a minimum height of 18 inches and a maximum height of 36 inches above natural ground.
- E. Provide the filter fabric in continuous rolls and cut to the length of the fence to minimize the use of joints. When joints are necessary, splice the fabric together only at a support post with a minimum 6inch overlap and seal securely.
- F. Inspect sediment filter barrier systems after each rainfall, daily during periods of prolonged rainfall, and at a minimum once each week. Repair or replace damaged sections immediately. Remove sediment deposits when silt reaches a depth one-third the height of the fence or 6 inches, whichever is less.

END OF SECTION

Section 01575

STABILIZED CONSTRUCTION EXIT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Installation of erosion and sediment control for stabilized construction exits used during construction and until final development of the site.

1.02 SUBMITTALS

- A. Manufacturer's catalog sheets and other product data on geotextile fabric.
- B. Sieve analysis of aggregates conforming to requirements of this Specification.

1.03 UNIT PRICES

- A. No separate payment will be made for work performed under this Section. Include cost of work performed under this Section in pay items for which this work is a component.

1.04 REFERENCES

- A. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

PART 2 P R O D U C T S

2.01 GEOTEXTILE FABRIC

- A. Provide woven or nonwoven geotextile fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.
- B. Geotextile fabric shall have a minimum grab strength of 270 psi in any principal direction (ASTM D4632), and the equivalent opening size between 50 and 140.
- C. Both the geotextile and threads shall be resistant to chemical attack, mildew, and rot and shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable life at a temperature range of 0°F to 120°F.
- D. Representative Manufacturers: Mirafi, Inc., or equal.

2.02 COARSE AGGREGATES

- A. Coarse aggregate shall consist of crushed stone, gravel, crushed blast furnace slag, or a combination of these materials. Aggregate shall be composed of clean, hard, durable materials free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials, or organic and injurious matter.

- B. Coarse aggregates shall conform to the following gradation requirements.

<u>Sieve Size</u> <u>(Square Mesh)</u>	<u>Percent Retained</u> <u>(By Weight)</u>
2-1/2"	0
2"	0 - 20
1-1/2"	15 - 50
3/4"	60 - 80
No. 4	95 - 100

PART 3 EXECUTION

3.01 PREPARATION AND INSTALLATION

- A. If necessary to keep the street clean of mud carried by construction vehicles and equipment, Contractor shall provide stabilized construction roads and exits at the construction, staging, parking, storage, and disposal areas. Such erosion and sediment controls shall be constructed in accordance with the details shown on the Drawings and specified in this Section.
- B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than as specifically directed by the Resident Project Representative to allow soil testing and surveying.
- C. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Resident Project Representative to remove and discard the existing system.
- D. Regularly inspect and repair or replace components of stabilized construction exits. Unless otherwise directed, maintain the stabilized construction roads and exits until the project is accepted by the City. Remove stabilized construction roads and exits promptly when directed by the Resident Project Representative. Discard removed materials off site.
- E. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.
- F. Conduct all construction operation under this Contract in conformance with the erosion control practices described in the Specification 01572 - Source Controls for Erosion and Sedimentation.

3.02 CONSTRUCTION METHODS

- A. Provide stabilized construction exits, and truck washing areas when approved by Resident Project Representative, of the sizes and locations where shown on SWPPP or as specified in this Section.
- B. Vehicles leaving construction areas shall have their tires cleaned to remove sediment prior to entrance onto public right-of-way. When washing is needed to remove sediment, Contractor shall construct a truck washing area. Truck washing shall be done on stabilized areas which drain into a drainage system protected by erosion and sediment control measures.

- C. Details for stabilized construction exit shall be shown on the SWPPP. Construction of all other stabilized areas shall be to the same requirements. Roadway width shall be at least 14 feet for oneway traffic and 20 feet for two-way traffic and shall be sufficient for all ingress and egress. Furnish and place geotextile fabric as a permeable separator to prevent mixing of coarse aggregate with underlying soil. Exposure of geotextile fabric to the elements between laydown and cover shall be a maximum of 14 days to minimize damage potential.
- D. Roads and parking areas shall be graded to provide sufficient drainage away from stabilized areas. Use sandbags, gravel, boards, or similar methods to prevent sediment from entering public right-of-way, receiving stream or storm water conveyance system.
- E. The stabilized areas shall be inspected and maintained daily. Provide periodic top dressing with additional coarse aggregates to maintain the required depth. Repair and clean out damaged control measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto public right-of-way shall be removed immediately.
- F. The length of the stabilized area shall be as shown on the SWPPP, but not less than 50 feet. The thickness shall not be less than 8 inches. The width shall not be less than the full width of all points of ingress or egress.
- G. Stabilization for other areas shall have the same coarse aggregate, thickness, and width requirements as the stabilized construction exit, except where shown otherwise on the SWPPP.
- H. Stabilized area may be widened or lengthened to accommodate truck washing area when authorized by Resident Project Representative.
- I. Alternative methods of construction may be utilized when shown on SWPPP, or when approved by the Resident Project Representative. These methods include the following:
 - 1. Cement-Stabilized Soil - Compacted cement-stabilized soil or other fill material in an application thickness of at least 8 inches.
 - 2. Wood Mats/Mud Mats - Oak or other hardwood timbers placed edge-to-edge and across support wooden beams which are placed on top of existing soil in an application thickness of at least 6 inches.
 - 3. Steel Mats - Perforated mats placed across perpendicular support members.

END OF SECTION

WASTE MATERIAL DISPOSAL

Section 01576

WASTE MATERIAL DISPOSAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Disposal of waste material and salvageable material.

1.02 UNIT PRICES

- A. No separate payment will be made for waste material disposal under this Section. Include payment in unit price for related sections.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances.
- C. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 SALVAGEABLE MATERIAL

- A. Excavated Material: When indicated on Drawings, load, haul, and deposit excavated material at a location or locations shown on Drawings outside the limits of Project.
- B. Other Salvageable Materials: Conform to requirements of individual Specification Sections.

3.02 EXCESS MATERIAL

- A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become the property of Contractor and shall be removed from the job site and legally disposed of.
- B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner. See Paragraph 1.03 C above.

- C. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.
- D. All sanitary sewer wastes must be properly pumped into the sanitary sewer collection system. Cleaning of the lift station residue, sand blasting and prior to resurfacing material must be hauled to a City and State approved agency for disposal.

END OF SECTION

PROJECT RECORD DOCUMENTS

Section 01785

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Maintenance and Submittal of Project Record Documents and samples.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Maintain one record copy of documents at the site in accordance with Document 00700 - General Conditions.
- B. Store Record Documents and samples in Contractor's field office if a field office is required by Contract Documents, or in a secure location. Provide files, racks, and secure storage for Record Documents and samples.
- C. Label each document "PROJECT RECORD" in neat, large, printed letters.
- D. Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.
- E. Keep Record Documents and Samples available for inspection by Resident Project Representative.

1.03 RECORDING

- A. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- B. Contract Drawings and Shop Drawings: Legibly mark each item to record all actual construction, or "as built" conditions, including:
 - 1. Measured depths of elements of foundation in relation to finish first floor datum.

2. Measured horizontal locations and elevations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Elevations of underground utilities referenced to bench mark utilized for project.
 4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
 5. Field changes of dimension and detail.
 6. Changes made by modifications.
 7. Details not on original contract drawings.
 8. References to related shop drawings and modifications.
- C. Record information with a red felt-tip marking pen on a set of blue or black line opaque drawings, provided by Engineer.

PROJECT RECORD DOCUMENTS

1.04 SUBMITTALS

- A. At contract closeout, deliver Project Record Documents to Engineer.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION

DIVISION 02 – SITE WORK

<u>Section</u>	<u>Title</u>
02040	SEEDING FOR EROSION CONTROL
02076	REMOVING EXISTING PAVEMENTS AND STRUCTURES
02200	EARTHWORK & SITE GRADING
02233	CLEARING AND GRUBBING
02270	SOIL EROSION AND SEDIMENT CONTROL
02316	EXCAVATION AND BACKFILL FOR STRUCTURES
02320	UTILITY BACKFILL MATERIALS
02321	CEMENT STABILIZED SAND
02330	EMBANKMENT
02516	CAST-IN-PLACE CONCRETE
02740	ASPHALT OVERLAY AND BASE REPAIR
02741	ASPHALTIC CONCRETE PAVEMENT
02742	PRIME COAT
02751	CONCRETE PAVING
02752	CONCRETE PAVEMENT JOINTS
02753	CONCRETE PAVEMENT CURING
02771	CURB, CURB AND GUTTER, AND HEADERS
02775	CONCRETE SIDEWALKS
02920	TOPSOILING AND FINISHED GRADING

Section 02040

SEEDING FOR EROSION CONTROL

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. "Seeding for Erosion Control" shall consist of preparing ground, providing for sowing of seeds, mulching with straw, hay or cellulose fiber and other management practices along and across such areas as are designated on the plans and in accordance with these specifications.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. Payment for square yard of ground cover using manufacturer recommended application rates.
 - 2. Refer to Section 01270 - Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

PART 2 P R O D U C T S

2.01 GENERAL

- A. All seed must meet the requirements of the Texas Seed Law including the labeling requirements for showing pure live seed, (PLS = Purity x Germination), name and type of seed.
- B. Additional materials required shall be provided as required.

2.02 SEED

- A. Seed furnished shall be of the previous season's crop and the date of analysis shown on each bag shall be within nine months of the time of use on the project.
- B. Each variety of seed shall be furnished and delivered in separate bags or containers.
- C. A sample of each variety of seed shall be furnished for analysis and testing when directed by the Engineer.
- D. Buffalo grass shall be treated with a fungicide approved the Engineer.
- E. The amount of seed planted per acre shall be of the type listed in the Table below.

<u>Common Name</u>	<u>Scientific Name</u>
Green Spragletop	Leptochloa dubia
Sid oats Grama (El Reno or Premier)	Boutleoua gracilis Blue
Gramma (Texas Grown)	Bouteloua gracilis
Buffalo grass (Treated)	Buchloe dactyloides
Western Wheat grass	Agropyron smithii

SPECIFICATIONS

SEEDING FOR EROSION CONTROL

Blackwell Switch grass	Panicum virgatum
Caucasian Bluestem	Andropogon caucasicus
K.R. Bluestem	Andropogon lehmanniana
Lehmann Love grass	Pennisetum ciliare
Rhode grass	Chloris gayana
Bermuda and Giant Bermuda Grass (Hulle)	Cynoden Dactolyn
Sand Dropseed	Sporobolus cryptandrum
Bahia grass (Pensacola)	Paspalum noatum
Weeping Love grass	Eragrotis curvula
Sand Bluestem	Andropogon hallii

PART 3 EXECUTION

3.01 PLANTING SEASON

- A. All Planting shall be done between the dates specified for each highway district except as specifically authorized in writing
- B. The pure live seed planted per acre shall be of the type specified with the mixture, rate and planting dates as follows except as specifically shown on plans.
 - a. September 15 to March 1: Seeding to be with combination of 2 pounds per 1,000 square feet of un-hulled Bermuda grass (Cynoden Dactolyn) and 2 pounds per 1,000 square feet of winter rye with a purity of 95% germination.
 - b. March 2 to September 14: Seeding to be with hulled Bermuda grass (Cynoden Dactolyn) at a rate of 2 pounds per 1,000 square feet with a purity of 95% with 85% germination.

END OF SECTION

REMOVING EXISTING PAVEMENTS AND STRUCTURES

SECTION 02076 REMOVING EXISTING PAVEMENTS AND STRUCTURES

PART 1 – G E N E R A L

1.1 SECTION INCLUDES

- A. Removing concrete paving, asphaltic concrete pavement, and base courses.
- B. Removing concrete curbs, concrete curb and gutters, sidewalks and driveways.
- C. Removing pipe culverts and sewers.
- D. Removing miscellaneous structures of concrete, masonry, or combination of concrete and masonry.

1.2 MEASUREMENTS AND PAYMENT

- A. Refer to Section 01200 – Measurement and Payment, any work completed for this specification will be considered subsidiary to 02534 Sewer Connections.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for disposal of debris.
- B. Coordinate removal work with utility companies.

PART 2 –PRODUCTS - Not Used

PART 3 – EXECUTION

3.1 PREPARATION

- A. Obtain advance approval from Owner for dimensions and limits of removal work.
- B. Identify known utilities below grade. Stake and flag locations.

3.2 PROTECTION

- A. Protect utilities that remain from damage.

- B. Protect trees and other plant growth, and features designated to remain.
- C. Protect adjacent public and private property from damage.
- D. Protect benchmarks, monuments, and existing structures designated to remain, from damage or displacement.

REMOVING EXISTING PAVEMENTS AND STRUCTURES

3.3 REMOVALS

- A. Remove by methods that will not damage underground utilities. Do not use a drop hammer near existing underground utilities.
- B. Minimize amount of earth loaded during removal operations.
- C. Where existing pavement is to remain, make straight saw cuts in existing pavement to provide clean breaks prior to removal. Do not break concrete pavement or base with drop hammer unless concrete or base has been saw cut minimum depth of 2 inches.
- D. Where street and driveway saw cut locations coincide or fall within three feet of existing construction or expansion joints, breakout to existing joint.
- E. Remove sidewalks and curbs to nearest existing dummy, expansion, or construction joint.

3.4 DISPOSAL

- A. Inlet frames, grates, and plates; and manhole frames and covers, may remain Owner property. Disposal shall be in accordance with requirements of Section 01710.
- B. Remove debris resulting from Work under this section from site in accordance with requirements of Section 01564.

END OF SECTION

SECTION 02200

EARTHWORK & SITE GRADING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to complete the project as indicated by the Contract Documents, and furnish all supplementary items necessary for the completion of all work specified in this Section.
- B. The work included in this Section shall include furnishing all labor, tools, materials and incidentals required to complete the work; excavate and fill to the lines, elevations and limits shown on the drawings for all pavements, buildings, landscaped areas, etc. as indicated below and cleaning up. The landscaped areas shall be graded to an elevation 6 inches below finished grade allowing for topsoil placement. The pavement areas shall be graded to an elevation below finished grade allowing for pavement placement. Building foundation areas shall be prepared in accordance with the geotechnical investigation and these specifications. The Contractor shall comply with all requirements of the city standards, the E.P.A. requirements and with the standards and specifications stated herein. All earthwork shall be done in accordance with the Geotechnical Investigation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02100 - Site Clearing
- B. Section 02270 - Soil Erosion and Sediment Control
- B. Section 02515 - Portland Cement Concrete Paving

1.3 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction. The contractor shall have a trench safety plan prepared by a registered professional engineer for all excavations in excess of 5 feet deep.
- B. Testing and Inspection Service
 - 1. The owner will engage a soil testing and inspection service for quality control testing during earthwork operations to inspect and test all soil materials proposed for use in all excavation and fill operations.

1.4 JOB CONDITIONS

- A. Existing Utilities
 - 1. It shall be the Contractor's responsibility to verify the location (horizontal and vertical

depth) of all utilities prior to beginning earthwork operations. If utilities are to remain in place, provide protection from damage during construction operations.

2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult owner immediately for directions as to how to proceed. Cooperate with owner, public and private utility companies in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Do not interrupt existing utilities serving facilities occupied and used by owner or adjacent properties, except when permitted in writing by property owner and then only after temporary utility services have been provided.

B. Use of Explosives

1. The use of explosives is not permitted.

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights. Provide traffic control as required by the city and as required to protect the public.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout and other hazards created by excavation operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Fill Material:

1. Onsite excavated material free from trash, vegetation, rocks and lumps of earth larger than 4 inches in diameter or other objectionable material. Imported fill, if required, shall also be clean and have a liquid limit less than 50 percent.

B. Select Material:

1. Uniformly blended clayey sand to very sandy with a plasticity index between 6 and 15 and liquid limit of less than 35 percent.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which earthwork and site grading operations are to be performed. After excavation to subgrade, proof roll with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 25 tons or greater to help compact pockets of loose soil and expose additional areas of weak, soft or wet soils in the

presence of the owner's representative. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 EXCAVATION

- A. The Contractor shall excavate to the lines and elevations shown on the drawings, as previously indicated herein, regardless of the type, condition, or moisture content of the material encountered. Conduct excavation operations to provide positive drainage, at contractor's expense, at all times during construction. If positive drainage cannot be maintained, contractor shall keep standing water out of all excavations with adequate dewatering equipment.
- B. All areas shall be cut accurately to the indicated grades. Care shall be taken to prevent excavation below the grades indicated and any bottoms or slopes that have been undercut shall be backfilled with approved materials and compacted to the required fill density.
- C. Excavation required for rough grading shall be finished within a tolerance of 0.10 foot above or below the rough grade and in no case shall depressions be left that will not completely drain.

3.3 BUILDING SUBGRADE

- A. Follow recommendations in geotechnical report and on the structural drawings.

3.4 FILLING

- A. Remove all vegetation, organic materials and debris prior to placing fill.
- B. Fill used below the parking and landscape areas shall be onsite soils encountered in the excavation or imported fill except grass, weeds, roots, vegetation and similar materials. The largest rock, particle or clod shall be less than 4 inches in diameter prior to compaction.
- C. Care should be taken that utility cuts are not left open for extended periods and that cuts are properly backfilled. A positive cut-off of 1' thick compacted clay at the building line shall be used to help prevent water from migrating in the utility trench.
- D. Before fill is placed under pavement or if subgrade is in an excavation, subgrade soils shall be scarified to a depth of 8" and recompact between 93 and 98 percent of maximum dry density per ASTM D698 at a moisture content from +2 to +5 percent above optimum moisture content.
- E. Fill below all pavement and landscaped areas shall be placed in 6 to 8 inch loose lifts and compacted to a minimum dry density of 95 percent of the standard proctor density (ASTM D698) under pavement and 90 percent elsewhere. The moisture content shall be between -1 and +3 percent above optimum.
- F. Compaction shall be obtained by use of sheep foot rollers, rubber-tired rollers, or other approved equipment capable of obtaining the required density. In the event the embankment material is too wet or too dry for adequate compaction, the contractor shall add moisture or dry the material as required to the extent necessary to obtain the required density.

3.5 PAVEMENT SUBGRADE

- A. Construct subgrades for paved areas to conform to the grades, lines and cross sections shown on the drawings and per the recommendations in the geotechnical report.
- B After the pavement subgrades have been shaped and compacted, bring the surface to a firm, unyielding surface by rolling the entire area with an approved vibratory roller. Compact all areas inaccessible to the roller with hand tampers weighing not less than 50 pounds, and with face area not more than 100-square-inches. Unless the material at the time of the rolling contains sufficient moisture to insure proper compaction, add water as directed before compacting. Allow the material containing excess moisture to dry to the proper consistency and moisture content before being compacted.

3.6 MOISTURE CONTROL

- A. Where soil material must be moisture conditioned before compaction, uniformly apply required amount of water to surface of soil material in such manner as to prevent free water appearing on surface during, or subsequent to, compaction operations.
- B. Remove and replace, or scarify and air dry soil material that is too wet to permit compaction to specified percentage of maximum density.
- C. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread on surface where directed by owner's representative and permitted to dry. Assist drying by dicing, harrowing or pulverizing until moisture-density relation tests fall within the herein-specified range.

3.7 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction
 - 1. Testing laboratory services shall be in accordance with section 01410.
 - 2. Allow owner's testing service to inspect and approve subgrades and fill layers before further construction work is performed. In the building areas, there will be at least 1 density test per 2500 square feet per lift with a minimum of 3. In the pavement areas there will be at least 1 density test per 5000 square feet per lift with a minimum of 3.
 - 3. If, in the opinion of the owner, based on testing service and inspection, the subgrade or fills which have been placed are below the specified density, the contractor shall provide additional compaction and testing at no additional expense to the owner.
 - 4. The results of density tests which may be selected will be considered satisfactory when they are in each instance equal to or greater than the specified density, and if not more than 1 density test out of 5 has a value greater than 2% below the required density.

3.8 MAINTENANCE

- A. Protection of Graded Areas

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded, and rutted areas to the specified tolerances.

B. Reconditioning Compacted Areas

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction. Use hand tamping for compaction over underground utilities.

3.8 DISPOSAL OF EXCESS AND WASTE MATERIALS

Remove all excess excavation, trash, debris and waste materials, and legally dispose of off the owner's property, at no additional cost.

END OF SECTION

Section 02233

CLEARING AND GRUBBING

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Removing surface debris and rubbish.
- B. Clearing site of plant life and grass.
- C. Removing trees and shrubs.
- D. Removing root system of trees and shrubs.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No Separate payment will be made for work performed under this Section. Include cost of work performed under this Section in pay items for which this work is a component.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for disposal of debris.
- B. Coordinate clearing work with utility companies.

1.04 SUBMITTALS

- A. Conform to the requirements of Submittal Procedures Section of this Project Manual.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N

3.01 PREPARATION

- A. Verify that existing plant life and features designated to remain are identified and tagged. Submit preconstruction photographs in accordance with the applicable portions of the Construction Photographs Section.

3.02 PROTECTION

- A. Protect the following from damage or displacement:
 - 1. Living trees located 3 feet or more outside of the intersection of side slopes and original ground line.
 - 2. Plants other than trees and landscape features designated to remain.

STANDARD SPECIFICATION

CLEARING AND GRUBBING

- 3. Utilities designated to remain.
- 4. Bench marks, monuments, and existing structures designated to remain.

3.03 CLEARING

- A. Remove stumps, main root ball, and root system to:
 - 1. A depth of 24 inches below the finished subgrade elevation in the area bounded by lines two feet behind back of curbs.
 - 2. A depth of 24 inches below the finished surface of the required cross section for other areas.
- B. Clear undergrowth and deadwood without disturbing subsoil.
- C. Remove vegetation from top soil scheduled for reuse.

3.04 REMOVAL

- A. Remove debris, rubbish, and extracted plant material life from the site in accordance with requirements of Waste Material Disposal.

END OF SECTION

SPECIFICATIONS

SOIL EROSION AND SEDIMENT CONTROL

SECTION 02270

SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish all labor, materials, tools, equipment, and services for all soil erosion and sediment control, as indicated, in accord with provisions of Contract Documents.
- B. Completely coordinate with work of all other trades.
- C. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation in order to meet the United States Environmental Protection Agency requirements.

1.2 QUALITY ASSURANCE

- A. Erosion Control Standards:
 - 1. United States Environmental Protection Agency, National Pollutant Discharge Elimination System (NPDES) - Storm Water Management for Construction Activities.
 - 2. North Central Texas Council of Governments (NCTCOG) - Storm Water Quality Best Management Practices for Construction Activities.

1.3 EROSION CONTROL PRINCIPLES:

- A. Perform demolition, construction and other soil disturbances in a manner which minimizes soil erosion.
- B. Retain and protect existing vegetation as much as is feasible.
- C. Keep area which is exposed and free of vegetative cover to a minimum, within practical limits.
- D. Protect exposed critical areas during prolonged construction or other land disturbance by temporary seeding, mulching or other suitable stabilization measures.

1.4 JOB CONDITIONS:

- A. Comply with all requirements of the EPA for implementation of the storm water pollution prevention plan, under the NPDES General Permits for Storm Water Discharges from Construction Sites.

1.5 SUBMITTALS

- A. Project Information:

- 1. Submit copy of NPDES Storm Water Permit for Construction Activities to Owner prior to construction.

SPECIFICATIONS

SOIL EROSION AND SEDIMENT CONTROL

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Filter Fabric: Sediment control silt fabrics, AMOCO Style #2125 or approved equal.
- B. Crushed stone.
- C. Metal clips or ties.
- D. Steel fence posts.
- E. Grass Seed: annual ryegrass or Bermuda depending on the season.
- F. Concrete block.
- G. Wire screen.

PART 3 - EXECUTION

3.1 BEGINNING CONSTRUCTION

- A. Prior to general demolition, install temporary silt fences and stabilized construction entrance as indicated on the storm water pollution prevention plan or where directed by Owner.
- B. Construct erosion control devices in accordance with the storm water pollution prevention plan and as directed by the Owner during demolition and as demolition progresses.

- C. Seed disturbed areas where construction activities temporarily cease at rate necessary to achieve a full stand of grass. Reseed as required until good stand of grass is achieved.

3.2 DURING CONSTRUCTION

- A. Maintain temporary silt fences.
- B. Inspect regularly, especially after rainstorms.
- C. Repair or replace damaged or missing items.
- D. Sow temporary grass cover over disturbed areas where construction activities temporarily cease for more than 21 days and as required by NPDES permit.
- E. Install inlet protection as indicated by the storm water pollution prevention plan at each inlet.
- F. Provide swales and dikes as necessary to direct all water towards a protected device.
- G. Do not disturb existing vegetation (grass and trees) outside limits of demolition.
- H. Remove sediment from behind temporary silt fences when it reaches a depth of 6 in.

3.3 COMPLETION OF CONSTRUCTION AND STABILIZATION OF THE SITE

- A. Remove from site all temporary erosion control devices.

END OF SECTION

SECTION 02316

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Excavation, backfilling, and compaction of backfill for structures.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.

1. No payment will be made for structural excavation and backfill under this Section. Include payment in unit price or lump sum for construction of structures.
2. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for work in this Section is included in total Stipulated Price.

1.03 DEFINITIONS

- A. Unsuitable Material: Unsuitable soil materials are the following:

1. Materials that are classified as ML, CL-ML, MH, PT, OH, and OL according to ASTMD 2487.
2. Materials that cannot be compacted to required density due to gradation, plasticity, or moisture content.
3. Materials that contain large clods, aggregates, stones greater than 4 inches in any dimension, debris, vegetation, waste or any other deleterious materials.
4. Materials that are contaminated with hydrocarbons or other chemical contaminants.

- B. Suitable Material: Suitable soil materials are those meeting specification requirements.

- C. Select Material: Material as defined in Section 02320 - Utility Backfill Materials.

- D. Backfill: Select material meeting specified quality requirements, placed and compacted under controlled conditions around structures.

- E. Foundation Backfill Materials: Natural soil or manufactured aggregate meeting Class I requirements and geotextile filter fabrics as required, to control drainage and material separation. Foundation backfill material is placed and compacted as backfill where needed to provide stable support for structure foundation base.

- F. Foundation Base: For foundation base material, use gravel aggregate with filter fabric as required. Foundation base provides smooth, level working surface for construction of concrete foundation.
- G. Foundation Subgrade: Foundation subgrade is surface of natural soil which has been excavated and prepared to support foundation base or foundation backfill, where needed.
- H. Ground Water Control Systems: Installations external to excavation such as well points, adductors, or deep wells. Ground water control includes dewatering to lower ground water, intercepting seepage which would otherwise emerge from side or bottom of excavation, and depressurization to prevent failure or heaving of excavation bottom. Refer to Section 01578 - Control of Ground Water and Surface Water.
- I. Surface Water Control: Diversion and drainage of surface water runoff and rain water away from excavation. Remove rain water and surface water which accidentally enters excavation as part of excavation drainage.
- J. Excavation Drainage: Removal of surface and seepage water in excavation by sump pumping and using French drains surrounding foundation to intercept water.
- K. Over-Excavation and Backfill: Excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials below foundation as shown on Drawings, and backfilled with foundation backfill material.
- L. Shoring System: Structure that supports sides of an excavation to maintain stable soil conditions and prevent cave-ins.

1.04 REFERENCES

- A. ASTM D 698 - Standard Test Methods for Laboratory Compaction of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600kN-m/m³)).
- B. ASTM D 1556 - Standard Test Method for Density of Soil in Place by Sand-Cone Method.
- C. ASTM D 2922 - Standard Test Methods for Density of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- D. ASTM D 3017 - Standard Test Method for Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depths).
- E. ASTM D 4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- F. TxDOT Tex-101-E - Preparing Soil and Flexible Base Materials for Testing.
- G. TxDOT Tex-110-E - Particle Size Analysis of Soils.
- H. Federal Regulations, 29 CFR, Part 1926, Standards - Excavation, Occupational Safety and Health Administration (OSHA).

1.05 SUBMITTALS

- A. Conform to requirements of Submittal Procedures Section of this Project Manual.

- B. Submit work plan for excavation and backfill for each structure with complete written description which identifies details of proposed method of construction and sequence of operations for construction relative to excavation and backfill activities. Use descriptions, with supporting illustrations, sufficiently detailed to demonstrate to Engineer that procedures meet requirements of Specifications and Drawings.
- A. bmit excavation safety system plan.
 - 1. Submit excavation safety system plan in accordance with applicable OSHA requirements for excavations.
 - 2. Submit excavation safety system plan in accordance with requirements of OSHA, for excavations that fall under State and Federal trench safety laws.
- B. bmit ground and surface water control plan if needed.
- C. bmit backfill material sources and product quality information in accordance with requirements of Section 02320 - Utility Backfill Materials.
- D. bmit project record documents. Record location of utilities, as installed, referenced to survey benchmarks. Include location of utilities encountered or rerouted. Give horizontal dimensions, elevations, inverts and gradients.

1.06 TESTS

- A. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory provided by Owner in accordance with requirements of Section 01454 - Testing Laboratory Services and as specified in this Section.
- B. Perform embedment and backfill material source qualification testing.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Perform excavation with equipment suitable for achieving requirements of this Specification.
- B. Use equipment which will produce degree of compaction specified. Compact backfill within 3 feet of walls with hand operated equipment. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to depth of fill at that time. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.

2.02 MATERIAL CLASSIFICATIONS

- A. Use backfill materials conforming to classifications and product descriptions of Section 02320 - Utility Backfill Materials. Use classification or product description for backfill applications as shown on Drawings and as specified.

PART 3 EXECUTION

3.01 PREPARATION

- A. Conduct an inspection to determine condition of existing structures and other permanent installations.
- B. Set up necessary street detours and barricades in preparation for excavation if construction will affect traffic. Maintain barricades and warning devices at all times for streets and intersections where work is in progress, or where affected by Work, and is considered hazardous to traffic movements.
- C. Perform work in accordance with OSHA standards. Employ an excavation safety system as specified by OSHA.
- D. Remove existing pavements and structures, including sidewalks and driveways.
- E. Install and operate necessary dewatering and surface water control measures if needed.

3.02 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within grading limits as designated on Drawings.
- B. Protect and support above-grade and below-grade utilities which are to remain.
- C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities is indicated on Drawings.
- D. Prevent erosion of excavations and backfill. Do not allow water to pond in excavations.
- E. Maintain excavation and backfill areas until start of subsequent work. Repair and re-compact slides, washouts, settlements, or areas with loss of density at no additional cost to the Owner.

3.03 EXCAVATION

- A. Perform excavation work so that underground structure can be installed to depths and alignments shown on Drawings. Use caution during excavation work to avoid disturbing surrounding ground and existing facilities and improvements. Keep excavation to absolute minimum necessary. No additional payment will be made for excess excavation not authorized by Engineer.
- B. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work at that location. Notify Engineer and obtain instructions before proceeding in such areas.
- C. Immediately notify agency or company owning any line which is damaged, broken or disturbed. Obtain approval from Engineer and agency for any repairs or relocations, either temporary or permanent.
- D. Avoid settlement of surrounding soil due to equipment operations, excavation procedures, vibration, dewatering, or other construction methods.

- E. Provide surface drainage during construction to protect work and to avoid nuisance to adjoining property. Where required, provide proper dewatering and piezo metric pressure control during construction.
- F. Conduct hauling operations so that trucks and other vehicles do not create dirt nuisance in streets. Verify that truck beds are sufficiently tight and loaded in such a manner such that objectionable materials will not spill onto streets. Promptly clear away any dirt, mud, or other materials that spill onto streets or are deposited onto streets by vehicle tires.
- G. Maintain permanent benchmarks, documentation, and other reference points. Unless otherwise directed, replace those which are damaged or destroyed by Work.
- H. Provide sheeting, shoring, and bracing where required to safely complete Work, to prevent excavation from extending beyond limits indicated on Drawings, and to protect Work and adjacent structures or improvements. Use sheeting, shoring, and bracing to protect workmen and public conforming to requirements of OSHA.
- I. Prevent voids from forming outside of sheeting. Immediately fill voids with grout, cement stabilized sand, or other material approved by Engineer and compact to 95 percent standard density.
- J. After completion of structure, remove sheeting, shoring, and bracing unless shown on Drawings to remain in place or directed by Engineer in writing that such temporary structures may remain. Remove sheeting, shoring and bracing in such a manner as to maintain safety during backfilling operations and to prevent damage to Work and adjacent structures or improvements.
- K. Immediately fill and compact voids left or caused by removal of sheeting with cement stabilized sand or other material approved by Engineer and compact to 95 percent standard density.

3.04 HANDLING EXCAVATED MATERIALS

- A. Classify excavated materials. Place material which is suitable for use as backfill in orderly piles at sufficient distance from excavation to prevent slides or cave-ins.
- B. Provide additional backfill material, if adequate quantities of suitable material are not available from excavation and trenching operations at site.

3.05 DEWATERING

- A. Provide ground water control if needed.
- B. Keep ground water surface elevation minimum of 2 feet below bottom of foundation base.
- C. Maintain ground water control and surface water until structure is sufficiently complete to provide required weight to resist hydrostatic uplift with minimum safety factor of 1.2.

3.06 FOUNDATION EXCAVATION

- A. Notify Engineer at least 48 hours prior to plan completion of foundation excavations. Do not place foundation base until excavation is accepted by Engineer.
- B. Excavate to elevations shown on Drawings, as needed to provide space for foundation base, forming level undisturbed surface, free of mud or soft material. Remove pockets of soft or otherwise unstable soils and replace with foundation backfill material or material as directed by Engineer. Prior to placing material over it, re-compact subgrade where indicated on Drawings, scarifying as

needed, to 95 percent of maximum Standard Dry Density according to ASTM D 698. If specified level of compaction cannot be achieved, moisture condition subgrade and re-compact until 95 percent is achieved, over-excavate to provide minimum layer of 24 inches of foundation backfill material, or other means acceptable to Engineer.

- C. Fill unauthorized excessive excavation with foundation backfill material or other material as directed by Engineer.
- D. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition. Keep excavations free of standing water and completely free of water during concrete placement.
- E. Remove soils which become unsuitable due to inadequate dewatering or other causes, after initial excavation to required subgrade, and replace with foundation backfill material, as directed by Engineer, at no additional cost to Owner.
- F. Place foundation base, or foundation backfill material where needed, over subgrade on same day that excavation is completed to final grade. Where base of excavations is left open for longer periods, protect them with seal slab or cement-stabilized sand.
- G. Use filter fabric to separate gravel aggregate, and other free draining Class I materials from native soils or select material backfill. Overlap fabric minimum of 12 inches beyond where another material stops contact with soil.
- H. Place gravel aggregate, and other Class I materials, in uniform layers of 8-inch maximum thickness. Perform compaction by means of at least two passes of vibratory compactor.

3.07 FOUNDATION BASE.

- A. Place foundation base after subgrade is properly prepared, including placement of foundation backfill where needed. Use foundation base consisting of 12-inch layer of gravel aggregate. Extend foundation base minimum of 12 inches beyond edge of structure foundation, unless shown otherwise on Drawings.
- B. Where foundation base and foundation backfill are of same material, both can be placed in one operation.

3.08 BACKFILL

- A. Complete backfill to surface of natural ground or to lines and grades shown on Drawings. Remove forms, lumber, trash and debris from structures. Use select fill for backfill. Existing material that qualifies as select material may be used, unless indicated otherwise on Drawings. Deposit backfill in uniform layers and compact each layer as specified.
- B. Do not place backfill against concrete walls or similar structures until laboratory test breaks indicate that concrete has reached minimum of 85 percent of specified compressive strength. Where walls are supported by slabs or intermediate walls, do not begin backfill operations until slab or intermediate walls have been placed and concrete has attained sufficient strength.
- C. Remove concrete forms before starting backfill and remove shoring and bracing as work progresses.
- D. Maintain backfill material at no less than 2 percent below no more than 2 percent above optimum moisture content, unless otherwise approved by Engineer. Place fill material in uniform 8-inch

maximum loose layers. Compact fill to at least 95 percent of maximum Standard Proctor Density according to ASTM D 698 below paved areas. Compact fill to at least 95 percent around structures below unpaved areas.

- E. Where backfill is placed against sloped excavation surface, run compaction equipment across boundary of cut slope and backfill to form compacted slope surface for placement of next layer of backfill.

3.09 FIELD QUALITY CONTROL

- A. Testing will be performed.
- B. Tests will be performed initially on minimum of one different sample of each material type for plasticity characteristics, in accordance with ASTM D 4318, and for gradation characteristics, in accordance with Tex-101-E and Tex-110-E. Additional classification tests will be performed whenever there is noticeable change in material gradation or plasticity.
- C. In-place density tests of compacted subgrade and backfill will be performed according to ASTM D 1556, or ASTM D 2922 and ASTM D 3017, and at following frequencies and conditions:
 - 1. Minimum of one test for every 50 to 100 cubic yards of compacted backfill material as directed by Engineer.
 - 2. A minimum of three density tests for each full work shift.
 - 3. Density tests will be performed in all placement areas.
 - 4. Number of tests will be increased when inspection determines that soil types or moisture contents are not uniform or when compacting effort is variable and not considered sufficient to attain uniform density.
 - 5. Identify elevation of test with respect to natural ground.
 - 6. Record approximate depth of lift tested.
- D. At least one test for moisture-density relationships will be initially performed for each type of backfill material in accordance with ASTM D 698. Perform additional moisture-density relationship test once a month or whenever there is noticeable change in material gradation or plasticity.
- E. When tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at Contractor's expense.

END OF SECTION

Section 02320

UTILITY BACKFILL MATERIALS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Material Classifications.
- B. Utility Backfill Materials:
 - Concrete sand
 - Gem sand
 - Pea gravel
 - Crushed stone
 - Crushed concrete
 - Bank run sand
 - Select backfill
 - Random backfill
- C. Material Handling and Quality Control Requirements.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No payment will be made for backfill material under this Section. Include payment in unit price for applicable utility installation.
 - 2. Payment for backfill material, when included as a separate pay item, is on a cubic yard basis for material placed and compacted within theoretical trench width limits and thickness of material according to Drawings.
 - 3. Refer to Section 01270 - Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 DEFINITIONS

- A. Unsuitable Material: Unsuitable soil materials are the following:
 - 1. Materials that are classified as ML, CL-ML, MH, PT, OH, and OL according to ASTM D 2487.
 - 2. Materials that cannot be compacted to the required density due to either gradation, plasticity, or moisture content.

3. Materials that contain large clods, aggregates, or stones greater than 4 inches in any dimension; debris, vegetation, and waste; or any other deleterious materials.

4. Materials that are contaminated with hydrocarbons or other chemical contaminants.

B. Suitable Material: Suitable soil materials are the following:

1. Those meeting specification requirements.

2. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement.

C. Foundation Backfill Materials: Natural soil or manufactured aggregate meeting Class I A requirements and geotextile filter fabrics as required, to control drainage and material separation. Foundation backfill material is placed and compacted as backfill where needed to provide stable support for the structure foundation base. Foundation backfill materials may include concrete fill and seal slabs.

D. Foundation Base: Crushed stone aggregate with filter fabric as required, cement stabilized sand, or concrete seal slab. The foundation base provides a smooth, level working surface for the construction of the concrete foundation.

E. Backfill Material: Classified soil material meeting specified quality requirements for the designated application as embedment or trench zone backfill.

F. Embedment Material: Soil material placed under controlled conditions within the embedment zone extending vertically upward from top of foundation to an elevation 12 inches above top of pipe, and including pipe bedding, hunching, and initial backfill.

G. Trench Zone Backfill: Classified soil material meeting specified quality requirements and placed under controlled conditions in the trench zone from top of embedment zone to base course in paved areas or to the surface grading material in unpaved areas.

H. Foundation: Either suitable soil of the trench bottom, or material placed as backfill of over-excavation for removal and replacement of unsuitable or otherwise unstable soils.

I. Source: A source selected by the Contractor for supply of embedment or trench zone backfill material. A selected source may be the project excavation, off-site borrow pits, commercial borrow pits, or sand and aggregate production or manufacturing plants.

J. Refer to Section 02317 - Excavation and Backfill for Utilities for other definitions regarding utility installation by trench construction.

1.04 REFERENCES

A. ASTM C 33 - Specification for Concrete Aggregate.

B. ASTM C 40 - Test Method for Organic Impurities in Fine Aggregates for Concrete.

C. ASTM C 123 - Test Method for Lightweight Pieces in Aggregate.

- D. ASTM C 131 - Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- E. ASTM C 136 - Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- F. ASTM C 142 - Test Method for Clay Lumps and Friable Particles in Aggregates.
- G. ASTM D 1140 - Test Method for Amount of Materials in Soils Finer Than No. 200 Sieve.
- H. ASTM D 2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- I. ASTM D 2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
- J. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- K. ASTM D 4643 - Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.
- L. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.
- M. TxDOT Tex-104-E - Test Method for Determination of Liquid Limit of Soils (Part 1)
- N. TxDOT Tex-106-E - Test Method - Methods of Calculating Plasticity Index of Soils.
- O. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.

1.05 SUBMITTALS

- A. Conform to requirements of Submittal Procedures Section of this Project Manual.
- B. Submit a description of source, material classification and product description, production method, and application of backfill materials.
- C. Submit test results for samples of off-site backfill materials to comply with Paragraph 2.03, Materials Testing.
- D. Before stockpiling materials, submit a copy of temporary easement or approval from landowner for stockpiling backfill material on private property.
- E. For each delivery of material, provide a delivery ticket which includes source location.

1.06 TESTS

- A. Perform tests of sources for backfill material in accordance with Paragraph 2.03.
- B. Verification tests of backfill materials may be performed by the Owner in accordance with Paragraph 3.03.

- C. Random fill obtained from the project excavation as source is exempt from pre-qualification requirements by Contractor but must be inspected by Owner's testing lab for unacceptable materials based on ASTM D 2488.

PART 2 P R O D U C T S

2.01 MATERIAL CLASSIFICATIONS

- A. Materials for backfill shall be classified for the purpose of quality control in accordance with the Unified Soil Classification Symbols as defined in ASTM D 2487. Material use and application is defined in utility installation specifications and Drawings either by class, as described in Paragraph 2.01B, or by product descriptions, as given in Paragraph 2.02.
- B. Class Designations Based on Laboratory Testing:
 - 1. Class IA. Class IA materials shall be manufactured aggregates with an open gradation. Materials shall consist of angular, crushed stone or rock, or crushed gravel. Class IA embedment material shall have a large void content and contain little or no fines. 100% of the material shall pass a 1 ½ "sieve, up to 10% shall pass a No. 4 sieve, and no more than 5% shall pass a No. 200 sieve. Class IA materials used for foundation, replacement of overexcavation, or in the pipe embedment zone shall be wrapped in one layer of geotextile filter cloth when groundwater is present in the excavated trench and the trench walls in the pipe embedment zone are composed of fine granular soils. Filter cloth shall be Poly-Filter GB, Nicolon 70/20, or Nicolon 40/30A.
 - 2. Class IB. Class IB materials shall be manufactured / processed aggregates with a dense gradation. Materials shall consist of angular, crushed stone (or other Class IA materials) and stone/sand mixtures and contain little or no fines. 100% of the material shall pass a 1 ½ "sieve, up to 50% shall pass a No. 4 sieve, and no more than 5% shall pass a No. 200 sieve.
 - 3. Class II. Class II materials shall be clean, coarse-grained soils classified as GW, GP, SW, or SP soil groups under ASTM D 2487 or coarse-grained soils which are borderline clean to with fines classified as GW-GC or SP-SM under ASTM D 2487. 100% of the GW, GP, SW, SP, GW-CC, and SP-SM soils shall pass a 1 ½ "sieve. Up to 50% of the GW and GP coarse fraction (material retained on a No. 200 sieve) shall pass a No. 4 sieve. Up to 5% of the GW, GP, SW, and SP soils shall pass a No. 200 sieve. Between 5% and 12% of the GW-CC and SP-SM soils shall pass a No. 200 sieve.
 - 4. Class III. Class III materials shall be coarse-grained soils with fines. The soils shall be classified as GM, GC, SM, or SC soil groups under ASTM D 2487. 100% of the GM, GC, SM, and SC soils shall pass a 1 ½ "sieve. Up to 50% of the GM and GC coarse fractions (material retained on a No. 200 sieve) shall pass a No. 4 sieve. At least 50% of the SM and SC coarse fractions shall pass a No. 4 sieve. Between 12% and 50% of the GM, GC, SM, and SC soils shall pass a No. 200 sieve.

2.02 PRODUCT DESCRIPTIONS

- A. Soils classified as silt (ML), elastic silt (MH), organic clay and organic silt (OL, OH), and organic matter (PT) are not acceptable as backfill materials. These soils may be used for site grading and restoration

in unimproved areas as approved by the Resident Project Representative. Soils in Class IVB, fat clay (CH) may be used as backfill materials where allowed by the applicable backfill installation specification. Refer to Section 02316 - Excavation and Backfill for Structures and Section 02317 - Excavation and Backfill for Utilities.

- B. Provide backfill material that is free of stones greater than 6 inches, free of roots, waste, debris, trash, organic material, unstable material, non-soil matter, hydrocarbon or other contamination, conforming to the following limits for deleterious materials:
1. Clay lumps: Less than 0.5 percent for Class I, and less than 2.0 percent for Class II, when tested in accordance with ASTM C 142.
 2. Lightweight pieces: Less than 5 percent when tested in accordance with ASTM C 123.
 3. Organic impurities: No color darker than standard color when tested in accordance with ASTM C 40.
- C. Manufactured materials, such as crushed concrete, may be substituted for natural soil or rock products where indicated in the product specification, and approved by Engineer, provided that the physical property criteria are determined to be satisfactory by testing.
- D. Bank Run Sand: Durable bank run sand classified as SP, SW, or SM by the Unified Soil Classification System (ASTM D 2487) meeting the following requirements:
1. Less than 15 percent passing the number 200 sieve when tested in accordance with ASTM D 1140. The amount of clay lumps or balls not exceeding 2 percent.
 2. Material passing the number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318:
 - a. Liquid limit: not exceeding 25 percent.
 - b. Plasticity index: not exceeding 7.
- E. Concrete Sand: Natural sand, manufactured sand, or a combination of natural and manufactured sand conforming to the requirements of ASTM C 33 and graded within the following limits when tested in accordance with ASTM C 136:

Sieve	Percent Passing
3/8"	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30

No. 100	2 to 10

- F. Gem Sand: Sand conforming to the requirements of ASTM C 33 for course aggregates specified for number 8 size and graded within the following limits when tested in accordance with ASTM C 136:

Sieve	Percent Passing
3/8"	95 to 100
No. 4	60 to 80
No. 8	15 to 40

- G. Pea Gravel: Durable particles composed of small, smooth, rounded stones or pebbles and graded within the following limits when tested in accordance with ASTM C 136:

Sieve	Percent Passing
1/2"	100
3/8"	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No.16	0 to 5

- H. Crushed Aggregates: Crushed aggregates consist of durable particles obtained from an approved source and meeting the following requirements:

1. Materials of one product delivered for the same construction activity from a single source.
2. Non-plastic fines.
3. Los Angeles abrasion test wear not exceeding 45 percent when tested in accordance with ASTM C 131.

4. Crushed aggregate shall have a minimum of 90 percent of the particles retained on the No. 4 sieve with 2 or more crushed faces as determined by Test Method Tex-460-A, Part I.
5. Crushed stone: Produced from oversize plant processed stone or gravel, sized by crushing to predominantly angular particles from a naturally occurring single source. Uncrushed gravel are not acceptable materials for embedment where crushed stone is shown on the applicable utility embedment drawing details.
6. Crushed Concrete: Crushed concrete is an acceptable substitute for crushed stone as utility backfill. Gradation and quality control test requirements are the same as crushed stone. Provide crushed concrete produced from normal weight concrete of uniform quality; containing particles of aggregate and cement material, free from other substances such as asphalt, reinforcing steel fragments, soil, waste gypsum (calcium sulfate), or debris.
7. Gradations, as determined in accordance with Tex-110-E.

Sieve	Percent Passing by Weight for Pipe Embedment by Ranges of Nominal Pipes Sizes		
	>15"	15" - 8"	<8"
1"	95 - 100	100	-
3/4"	60 - 90	90 - 100	100
1/2"	25 - 60	-	90 - 100
3/8"	-	20 - 55	40 - 70
No. 4	0 - 5	0 - 10	0 - 15
No. 8	-	0 - 5	0 - 5

- I. Select Backfill: Class III clayey gravel or sand or Class IV lean clay with a plasticity index between 7 and 20.
- J. Random Backfill: Any suitable soil or mixture of soils within Classes I, II, III and IV; or fat clay (CH) where allowed by the applicable backfill installation specification. Refer to Section 02316 - Excavation and Backfill for Structures and Section 02317 - Excavation and Backfill for Utilities.
- K. Cement Stabilized Sand: Conform to requirements of Section 02321 - Cement Stabilized Sand.
- L. Concrete Backfill: Conform to Class B concrete as specified in Section 03315 - Concrete for Utility Construction.

2.03 MATERIALS TESTING

- A. Ensure that material selected, produced and delivered to the project meets applicable specifications and is of sufficient uniform properties to allow practical construction and quality control.

- B. Source or Supplier Qualification. Perform testing, or obtain representative tests by suppliers, for selection of material sources and products. Provide test results for a minimum of three samples for each source and material type. Tests samples of processed materials from current production representing material to be delivered. Tests shall verify that the materials meet specification requirements. Repeat qualification test procedures each time the source characteristic changes or there is a planned change in source location or supplier. Qualification tests shall include, as applicable:

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1. Gradation. Complete sieve analyses shall be reported regardless of the specified control sieves. The range of sieves shall be from the largest particle through the No. 200 sieve.
2. Plasticity of material passing the No. 40 sieve.
3. Los Angeles abrasion wear of material retained on the No. 4 sieve.
4. Clay lumps.
5. Lightweight pieces
6. Organic impurities

- C. Production Testing. Provide reports to the Engineer from an independent testing laboratory that backfill materials to be placed in the Work meet applicable specification requirements.

- D. Deliver material samples for verification testing to the site of the Work.

PART 3 EXECUTION

3.01 SOURCES

- A. Use of material encountered in the trench excavations is acceptable, provided applicable specification requirements are satisfied. If excavation material is not acceptable, provide from other approved source.
- B. Identify off-site sources for backfill materials at least 14 days ahead of intended use and deliver samples for verification testing to the site of the Work.
- C. Obtain approval for each material source by the Engineer before delivery is started. If sources previously approved do not produce uniform and satisfactory products, furnish materials from other approved sources. Materials may be subjected to inspection or additional verification testing after delivery. Materials which do not meet the requirements of the specifications will be rejected. Do not use material which, after approval, has become unsuitable for use due to segregation, mixing with other materials, or by contamination. Once a material is approved by the Engineer, expense for sampling and testing required to change to a different material will be credited to the Owner through a change order.

- D. Bank run sand, select backfill, and random backfill, if available in the project excavation, may be obtained by selective excavation and acceptance testing. Obtain additional quantities of these materials and other materials required to complete the work from off-site sources.
- E. The Owner does not represent or guarantee that any soil found in the excavation work will be suitable or acceptable as backfill material.

3.02 MATERIAL HANDLING

- A. When backfill material is obtained from either a commercial or non-commercial borrow pit, open the pit to expose the vertical faces of the various strata for identification and selection of approved material to be used. Excavate the selected material by vertical cuts extending through the exposed strata to achieve uniformity in the product.
- B. Establish temporary stockpile locations for practical material handling and control, and verification testing in advance of final placement. Obtain approval from landowner for storage of backfill material on adjacent private property.

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- C. When stockpiling backfill material near the project site, use appropriate covers to eliminate blowing of materials into adjacent areas and prevent runoff containing sediments from entering the drainage system.
- D. Place stockpiles in layers to avoid segregation of processed materials. Load material by making successive vertical cuts through entire depth of stockpile.

3.03 FIELD QUALITY CONTROL

A. Quality Control

- 1. The Resident Project Representative may sample and test backfill at:
 - a. Sources including borrow pits, production plants and Contractor's designated off-site stockpiles.
 - b. On-site stockpiles.
 - c. Materials placed in the Work.
- 2. The Resident Project Representative may resample material at any stage of work or location if changes in characteristics are apparent.

- B. Production Verification Testing: The project testing laboratory will provide verification testing on backfill materials, as directed by the Resident Project Representative. Samples may be taken at the source or at the production plant, as applicable.

END OF SECTION

SPECIFICATIONS

CEMENT STABILIZED SAND

Section 02321

CEMENT STABILIZED SAND

1.0 GENERAL

1.01 SECTION INCLUDES

- A Cement stabilized sand for backfill and bedding.
- B References to Technical Specifications:
 - 1. Section 01330 – Submittals
 - 2. Section 02320 – Utility Backfill Materials
 - 3. Section 01454 – Testing Laboratory Services
- C Referenced Standards:
 - 1. American Society for Testing and Materials (ASTM)
 - a. ASTM D 558, "Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures"
 - b. ASTM D 1632, "Practice for Making and Curing Soil-Cement Compression and Flexure Test Specimens in the Laboratory"
 - c. ASTM D 1633, "Standard Test Method for Compressive Strength of Molded Soil-Cement Cylinders"
 - d. ASTM C 150, "Standard Specification for Portland Cement"
 - e. ASTM C 33, "Standard Specification for Concrete Aggregates"
 - f. ASTM D 2487, "Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)"
 - g. ASTM C 142, "Standard Test Method for Clay Lumps and Friable Particles in Aggregates"
 - h. ASTM C 123, "Standard Test Method for Lightweight Particles in Aggregate"
 - i. ASTM C 40, "Standard Test Method for Organic Impurities in Fine Aggregates for Concrete"
 - j. ASTM C 4318, "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"
 - k. ASTM C 94, "Standard Specification for Ready-Mixed Concrete"
 - l. ASTM C 31, "Standard Practice for Making and Curing Concrete Test Specimens in the Field"

1.02 MEASUREMENT AND PAYMENT

- A Unless indicated as an Extra Item, no separate payment will be made for cement stabilized sand under this Section. Include cost in Bid Items for applicable utility or structure installation.
- B If use of cement stabilized sand is allowed, based on the Engineer's direction, and indicated in Section 00405 – Schedule of Unit Price work as an Extra Item, measurement will be on a per ton basis. A conversion between volumes calculated based on theoretical limits and total weight will be made based on a ratio of 1.64 tons per cubic yard.

1.03 SUBMITTALS

- A Make Submittals required by this Section under the provisions of Section 01330 – Submittals.
- B Submit material qualification and design mix tests to include:
 - 1. Three series of tests of sand or fine aggregate material from the proposed source.
Tests shall include procedures defined in this Section, 2.01 “Materials”.
 - 2. Three moisture-density relationship tests prepared using the material qualified by the tests in this Section, 1.03B1. Blends of fine aggregate from crushed concrete and bank run sand shall be tested at the ratio to be used for the design mix testing. 3. Design mix report to meet the specifications of this Section, 1.04 “Design Requirements”. The design mix shall include compressive strength tests after 48-hours and 7 days curing.

1.04 DESIGN REQUIREMENTS

- A Design sand-cement mixture to produce a minimum unconfined compressive strength of 100 pounds per square inch in 48 hours when compacted to a minimum 95 percent in accordance with ASTM D 558 and when cured in accordance with ASTM D 1632, and tested in accordance with ASTM D 1633. Mix shall contain a minimum of 1-1/2 sacks of cement per cubic yard. Compact mix with moisture content on the dry side of optimum.

2.0 PRODUCTS

2.01 MATERIALS

- A Cement shall be Type 1 Portland cement conforming to ASTM C 150.
- B Sand shall be clean, durable, and meet grading requirements for fine aggregates of ASTM C 33 and the following requirements:
 - 1. Classified as SW, SP or SM by the United Soil Classification System of ASTM D 2487.
 - 2. Deleterious material content:
 - a. Clay lumps shall comprise less than 0.5 percent by ASTM C 142.
 - b. Lightweight pieces shall comprise less than 5.0 percent by ASTM C 123.
 - c. Organic impurities shall produce color no darker than the standard color by ASTM C 40 ASTM.
 - 3. Plasticity index of 4 or less when tested in accordance with ASTM D 4318.
- C Fine aggregate, manufactured from crushed concrete meeting the quality requirements for crushed rock material in Section 02320 - Utility Backfill Materials, may be used as a complete or partial substitute for Bank Sand. The blending ratio of fine aggregate from crushed concrete and Bank Sand shall be defined in the mix design report.
- D Water shall be potable, free of oils, acids, alkalies, organic matter, or other deleterious substances, meeting requirements of ASTM C 94.

2.02 MIXING MATERIALS

- A Thoroughly mix sand, cement and water in proportions of the mix design using a pugmill-type mixer. The plant shall be equipped with automatic weight controls to ensure correct mix proportions.
- B Stamp batch ticket at plant with time of loading directly after mixing. Material not placed and compacted within 4 hours after mixing shall be rejected.

3.0 EXECUTION

3.01 PLACEMENT AND COMPACTION

- A Place sand-cement mixture in 8-inch-thick loose lifts and compact to a minimum of 95 percent of ASTM D 558, unless otherwise specified on Plans. The moisture content during compaction shall be on the dry side of optimum but sufficient for hydration. Perform and complete compaction of sand-cement mixture within 4 hours after addition of water to mix at the plant.
- B Do not place or compact sand-cement mixture in standing or free water.

3.02 FIELD QUALITY CONTROL

- A Testing will be performed under provisions of Section 01454 - Testing Laboratory Services.
- B Mixing plant inspections will be performed periodically. Material samples will be obtained and tested in accordance with this Section, 2.01 "Materials", if there is evidence of change in material characteristic.
- C One sample of cement stabilized sand shall be obtained for each 150 tons of material placed per day with no less than one sample per day of production. Random samples of delivered cement stabilized sand shall be taken in the field at point of delivery in accordance with ASTM 3665. Obtain three individual samples of approximately 12 to 15 lb each from the first, middle, and last third of the truck and composite them into one sample for test purpose.
- D Prepare and mold four specimens (for each sample obtained) in accordance with ASTM D558, Method A, without adjusting moisture content. Samples will be molded at approximately same time material is being used, but no later than 4 hours after water is added to mix.
- E After molding, specimens will be removed from molds and cured in accordance with ASTM D 1632.
- F Specimens will be tested for compressive strength in accordance with ASTM D 1633, Method A. Two specimens will be tested at 48 hours plus or minus 2 hours and two specimens will be tested at 7 days plus or minus 4 hours.
- G A strength test will be average of strengths of two specimens molded from same sample of material and tested at same age. Average daily strength will be average of strengths of all specimens molded during one day's production and tested at same age.
- H Precision and Bias: Test results shall meet recommended guideline for precision in ASTM D 1633 Section 9.
- I Reporting: Test reports shall contain, as a minimum, the following information:

1. Supplier and plant number
2. Time material was batched
3. Time material was sampled
4. Test age (exact hours)
5. Average 48-hour strength
6. Average 7-day strength
7. Specification section number
8. Indication of compliance / non-compliance
9. Mixture identification
10. Truck and ticket numbers
11. The time of molding
12. Moisture content at time of molding
13. Required strength
14. Test method designations
15. Compressive strength data as required by ASTM D 1633
16. Supplier mixture identification
17. Specimen diameter and height, in.
18. Specimen cross-sectional area, sq. in.

- J The cement content will be checked on samples obtained in the field whenever there are apparent changes in the mix properties.

3.03 ACCEPTANCE

- A Strength level of material will be considered satisfactory if:
1. The average 48-hour strength is greater than 100 psi with no individual strength test below 70 psi.
 2. All 7-day individual strength tests (average of two specimens) are greater than or equal to 100 psi.
- B Material will be considered deficient when 7-day individual strength test (average of two specimens) is less than 100 psi but greater than 70 psi. See Paragraph 3.04 Adjustment for Deficient Strength.
- C The material will be considered unacceptable and subject to removal and replacement at Contractors expense when individual strength test (average of two specimens) has 7-day strength less than 70 psi
- D When moving average of three daily 48-hour averages falls below 100 psi, discontinue shipment to project until plant is capable of producing material, which exceeds 100 psi at 48 hours. Five 48-hour strength tests shall be made in this determination with no individual strength tests less than 100 psi.
- E Testing laboratory shall notify Contractor, Project Manager, and material supplier by facsimile of tests indicating results falling below specified strength requirements within 24 hours.
- F If any strength test of laboratory cured specimens falls below the specified strength, Contractor may, at his own expense, request test of cores drilled from the area in question in accordance with ASTM C42. In such cases, three (3) cores shall be taken for each strength test that falls below the values given in 3.03.A.

- G Cement stabilized sand in an area represented by core tests shall be considered satisfactory if the average of three (3) cores is equal to at least 100 psi and if no single core is less than 70 psi. Additional testing of cores extracted from locations represented by erratic core strength results will be permitted.

3.04 ADJUSTMENT FOR DEFICIENT STRENGTH

- A When mixture produces 7-day compressive strength greater than or equal to 100 psi, then material will be considered satisfactory and bid price will be paid in full.
- B When mixture produces 7-day compressive strength less than 100 psi and greater than or equal to 70 psi, material shall be accepted contingent on credit in payment. Compute credit by the following formula:

$$\text{Credit per Cubic Yard} = \$30.00 \times 2 (100 \text{ psi} - \text{Actual psi}) 100$$

- C When mixture produces 7-day compressive strength less than 70 pounds per square inch, then remove and replace cement-sand mixture and paving and other necessary work at no cost to City.

END OF SECTION

Section 02330

EMBANKMENT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Construction of embankments with excess excavated material and borrow.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No separate payment will be made for material embankment under this section. Include payment in unit price for excavation or borrow.
- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- B. ASTM D 2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- C. ASTM D 3017 – Standard Test Method for Water content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Refer to Section 02315 – Roadway Excavation for acceptable excess materials from roadway excavation.
- B. Refer to Section 02317 – Excavation and Backfill for Utilities for acceptable excess materials from utility excavation and trenching.

PART 3 E X E C U T I O N

3.01 EXAMINATION

- A. Verify borrow and excess excavated materials to be reused are approved.
- B. Verify removals and clearing and grubbing operations have been completed.

3.02 PREPARATION

- A. Backfill tests pits, stump holes, small swales and other surface irregularities. Backfill and compact in designated lift depths to requirements for embankment compaction.
- B. Record location and plug and fill inactive water and oil wells. Conform to Texas State Health Department, Texas Commission on Environmental Quality and Texas Railroad Commission requirements. Notify Project Manager prior to plugging wells.
- C. Excavate and dispose of unsuitable soil and other unsuitable materials which will not consolidate. Backfill and compact to requirements for embankment. Unsuitable soil is defined in Section 02316 – Excavation and Backfill for Structures and Section 02320 – Utility Backfill Materials.
- D. Backfill new utilities below future grade. Conform to requirements of each respective section.

3.03 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other features outside of embankment limits.
- B. Protect utilities above and below grade, which are to remain.
- C. Conform to protection requirements of Section 02315 – Roadway Excavation.

3.04 PLACING EMBANKMENT

- A. Do not conduct placement operations during inclement weather or when existing ground or fill materials exceed 3 percent of optimum moisture content. Contractor may manipulate wet material to facilitate drying, by disking or windrowing.
- B. Do not place embankment fill until density and moisture content of previously placed material comply with the specified requirements.
- C. Scarify areas to be filled to minimum depth of 4 inches to bond existing and new materials. Mix with first fill layer.
- D. Spread fill material evenly, from dumped piles or windrows, into horizontal layers approximately parallel to finished grade. Place to meet specified compacted thickness. Break clods and lumps and mix materials by blading, harrowing, disking or other approved method. Extend each layer across full width of fill.
- E. Each layer shall be homogenous and contain uniform moisture content before compaction. Mix dissimilar abutting materials to prevent abrupt changes in composition of fill.
- F. Layers shall not exceed the following compacted thickness:

1. Areas indicated to be under future paving or shoulders, to be constructed within 6 months: 6 inches when compacted with pneumatic rollers, or 8 inches when compacted with other rollers.
 2. Other areas: 12 inches
- G. For steep slopes, cut benches into slope and scarify before placing fill. Place increasingly wider horizontal layers of specified depth to level of each bench.
- H. Build embankment layers on back slopes, adjacent to existing roadbeds, to level of old roadbed. Scarify top of old roadbed to minimum depth of 4 inches and recompact with next fill layer.
- I. Construct to lines and grades shown on Drawings.
- J. Remove unsuitable material and excess soil not being used for embankment from site in accordance with requirements of Section 01576 – Waste Material Disposal.
- K. Maintain moisture content of embankment materials to attain required density.
- L. Compact to following minimum densities at moisture content of optimum to 3 percent above optimum as determined by ASTM D 698, unless otherwise indicated on Drawings:
1. Areas under future paving and shoulders: Minimum density of 95 percent of maximum dry density.
 2. Other areas: Minimum density of 90 percent of maximum dry density.

3.05 TOLERANCES

- A. Top of Compacted Surface: Plus or minus 1/2 inch in cross section or 16-foot length.

3.06 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM D 698 or ASTM D 2922 and ASTM D 3017 under provisions of Section 01454 - Testing Laboratory Services.
- B. A minimum of three tests will be taken for each 1000 linear feet per lane of roadway or 500 square yards of embankment per lift.
- C. If tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at no additional cost to the Owner.

END OF SECTION

SECTION 02516

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Furnish all labor, materials, services and equipment as required in conjunction with or properly incidental to placing of concrete as described herein and/or as shown on the drawings.
- B. Includes all cast-in-place concrete for paving, curbs, sidewalks, inlets, culverts and headwalls.

1.2 RELATED DOCUMENTS

- A. Drawing and general provisions of Contract and Division 2 Specification sections, apply to work of this Section.

1.3 CODES AND STANDARDS

- A. The work described in this Section, unless otherwise noted on the Drawings, or herein specified, shall be governed by the latest editions of the following codes or specifications.
 - 1. ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 - 2. ACI 305, "Hot Weather Concreting".
 - 3. ACI 306, "Cold Weather Concreting".
 - 4. ACI 309, "Standard Practice for Consolidation of Concrete.
 - 5. ACI 311, "ACI Manual of Concrete Inspection".
 - 6. ASTM C33, Standard Specification for Concrete Aggregate.
 - 7. ASTM C94, Standard Specification for Ready-Mix Concrete.
 - 8. ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 9. ASTM C150, Standard Specification for Portland Cement.
 - 10. ASTM C260, Standard Specification for Air-Entraining Admixtures.
 - 11. ASTM C494, Standard Specification for Chemical Admixtures for Concrete.
 - 12. ASTM C595, Standard Specification for Blended Hydraulic Cements.

1.4 QUALITY ASSURANCE

- A. Concrete production facilities shall meet the requirements for certification by the National Ready Mixed Concrete Association.
- B. Concrete batchers shall be completely interlocked semi-automatic or automatic batchers, as defined by the Concrete Plant Manufacturers Bureau.

- C. 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 Testing Laboratory.

1.5 CONCRETE MIX DESIGN

- A. Design concrete mixes in accordance with ACI 318.
- B. Submit proposed mix designs, including confirmation cylinder test results, in accordance with ACI 318 to the Engineer for evaluation a minimum of 14 days prior to placing concrete. Show:
 - 1. Proportions of cement, fine and coarse aggregates, and water.
 - 2. Combined aggregate gradation.
 - 3. Aggregate specific gravities and gradations.
 - 4. Water-cement ratio, design strength, slump and air content.
 - 5. Type of cement and aggregates.
 - 6. Type and dosage of admixtures.
 - 7. Type, color and dosage of integral coloring compounds, where applicable.
 - 8. Special requirements for pumping.
 - 9. Range of ambient temperature and humidity for which design is valid.
 - 10. Any special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product.

The use of fly ash is not permitted.

- C. Mix designs based on record of past performance in accordance with ACI 301 Method 2, may be submitted in lieu of mix designs required above, provided all necessary information is included.
- D. Check mix designs and revise if necessary wherever changes are made in aggregates or in surface water content of aggregate or workability of concrete. Slump shall be minimum to produce workable mix. Laboratory shall prescribe maximum quantity of water.

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.

1.7 JOB CONDITIONS

- A. Hot Weather Requirements:
 - 1. Follow ACI 301 and ACI 305.
 - 2. Provide retarding type admixture conforming to ASTM C494, Type A or D in accordance with manufacturer's recommendations.
 - 3. Maximum concrete temperature shall not exceed 95°F.
 - a. Maximum concrete temperature for concrete with a specified strength greater than 6000 psi shall not exceed 90°F.
- B. Cold Weather Concreting:
 - 1. Follow ACI 301 and ACI 306.
 - 2. When ambient temperature at site is below 40°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 60°F and 90°F at time of placement.
 - 3. Maintain temperature of deposited concrete above 32°F and for a minimum of seven days after placing.
- C. Temperature Changes: Maintain changes in concrete temperature as uniformly as possible, but in no case exceed change of 5°F per hour or 25°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 gases 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 specified. The use of calcium chloride is specifically prohibited.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cement:
 - 1. Portland Cement, Type I or III, conforming to the requirements of ASTM C150.
 - 2. Blended Hydraulic Cements, Type 1P, conforming to the requirements of ASTM C595.
- B. Aggregate:
 - 1. Fine: ASTM C33; clean, hard, durable, uncoated, natural sand, free from silt, loam or clay.

2. Coarse: ASTM C33; hard, durable, uncoated, crushed stone, gradation in accordance with Size No. 467 for piers and footings and Size No. 67 for all other concrete. Maximum aggregate size shall be in accordance with ACI 318.
 3. Grading shall be in accordance with "Standard Method for Sieve Analysis of Fine and Coarse Aggregates" (ASTM C136).
- C. ter: ASTM C94, Paragraph 4.1.3; potable, clean and free from oil, acid and injurious amounts of vegetable matter, alkalis, and other impurities.
- D. mixtures:
1. ment-dispersing, water-reducing types that follow water-cement ratio law. 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 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, may be used as required and shall be one of the following types or equal:
 1. Gifford-Hill PSI Super
 2. ster Builders Admixture LA-35
 3. KA Sikament
 4. R. Grace WRDA-19
 2. An air-entraining admixture conforming to ASTM C260 shall be used and shall be one of the following types or equal:
 - a. Gifford-Hill Air-Tite
 - b. Master Builders MB-VR
 - c. SIKA AER
 - d. W.R. Grace Darex AEA
 3. Use of calcium chloride is specifically prohibited.
- E. -Shrink Cement Grout:
1. alities: Premixed non-shrink grout requiring only addition of water. Non-metallic type grout where grout will be sight exposed.
 - a. Minimum compressive strength of 5000 psi at 7 days and 7500 psi at 28 days when placed at a plastic consistency of 115% flow factor.
 - b. Free of chlorides, sulphates or gas producing agents.

2. Standards:

- a. Overall product: CRD - C-621.
- b. Compressive Strength: ASTM C109, 2 inch cubes.
- c. Bleed Performance: CRD - C-611.
- d. Flow Factor: ASTM C230.

2.2 ETE MIXES

- A. Strength: Concrete is classified and specified by ultimate compressive strength (f'_c) at the age of 28 days.
- B. Design: Design concrete to yield strengths indicated on the Drawings.
- C. Air Content: Concrete permanently exposed to weather shall contain an air-entraining admixture to produce a range of 4.5% to 7.5% air by volume of concrete.
- D. Proportions: Proportions of cement, aggregate, and water to attain required plasticity and compressive strength shall be in accordance with ACI 318.

PART 3 - EXECUTION

3.1 GENERAL

- A. Inserts: Give the various trades and subcontractors ample notification and opportunity to furnish any and 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 installations of such items which are required to be placed in the forms.
- B. Slump: Concrete shall not be placed when its plasticity, as measured by slump tests, is outside the following limits: 5 inches maximum, 2 inches minimum.
- C. Classes of Concrete and Usage: Concrete of the several classes of concrete required shall have the characteristics shown on the Drawings.
- D. Mixing: Transit-mixed concrete conforming to the requirements of ASTM C94 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 ninety (90) minutes has elapsed after the introduction of water into the mixer. 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.

- E. 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 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.
- F. 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.

3.2 FIELD CONCRETE CONTROL AND TESTING

- A. Secure composite samples in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
- B. All concrete with required strength of 6000 psi or less shall be tested as follows:
 - 1. Mold and cure five (5) specimens from each sample in accordance with ASTM C31.
 - 2. Two (2) specimens shall be tested at seven days for information, two shall be tested at 28 days for acceptance, and the remaining cylinder shall be tested as directed.
- C. Any deviations from the requirements of ASTM Specifications shall be recorded in the test report. Test concrete specimens in accordance with ASTM C39.
- D. Make at least one strength test (five specimens) for each 100 cu. yd. or fraction thereof, of each mix design of concrete placed in any one day. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C143.
- E. Determine air content of air-entrained, normal weight and/or lightweight, concrete sample for each strength test, in accordance with either ASTM C231, ASTM C173, or ASTM C138. Determine temperature of concrete sample for each strength test.
- F. Inspect each batch of concrete, adjust amounts of mixing water to assure uniform consistency from truck to truck. Check mixing from mixers before mix begins to set and within time limits set forth in ASTM C94.
 - 1. Control addition of water to concrete at job site and length of time concrete is allowed to remain in truck during placement.
 - 2. Certify each delivery ticket indicating class of concrete delivered, amount of water added and time at which cement and aggregate was discharged into truck, and time at which concrete was discharged from truck.

- G. 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. The specified strength must be met at 28 days. If not, the concrete is considered not acceptable and must be removed and replaced. The .85 factor in ACI 318 will not be allowed.
- H. Test reports shall show concrete mix identification number or give proportions of ingredients, time test was made, truck ticket, number, slump and time of batching, and location of each placement.
- I. Report promptly to Engineer all details of reasons for rejection of any and all quantities of concrete. Give all information concerning locations of the concrete pours, quantities, date of pours, and other pertinent facts concerning concrete represented by the specimens.
- J. Grout: For every one third (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 at 7 days, and three cubes to be tested at 28 days.
 - 2. Test cubes shall be made and tested in accordance with ASTM C109, with the exception that the grout should be restrained from expansion by a top plate.

3.3 PLACING CONCRETE

- A. Place concrete in reasonably uniform layers, approximately horizontal, and not more than eighteen inches (18") 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.
- 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 or section, except as hereinafter specified.
- C. Do not permit concrete to drop freely any distance greater than five feet (5'). 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.
- F. Construction Joints: Except as otherwise specifically indicated on the drawings, each concrete member shall be considered as a single unit of operations, 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 engineer.
- 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. 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 thirty (30) minutes shall in no case be used upon any portion of the work.
- I. 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.
- J. 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 a clean and perfect condition, satisfactory to the owner. Sweep with an ordinary broom and remove all mortar, concrete droppings, loose dirt, mud, etc.

END OF SECTION

Section 02611

REINFORCED CONCRETE PIPE

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Reinforced concrete pipe for sanitary sewers and storm sewers.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. No separate payment will be made for reinforced concrete pipe under this Section. Include cost in unit price work as specified in the following Sections:

- a. Section 02426 - Sanitary Sewer Line in Tunnel.
- b. Section 02531 - Gravity Sanitary Sewers.
- c. Section 02631 - Storm Sewers.

2. Refer to Section 01270- Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM C 76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- B. ASTM C 443 - Joints for Circular Concrete Sewer and Culvert Pipe.
- C. ASTM C 497 - Method of Testing Concrete Pipe, Sections, or Tile.
- D. ASTM C 506 - Reinforced Concrete Arch Culvert, Storm Drain and Sewer Pipe
- E. ASTM C 507 - Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe.
- F. ASTM C 655 - Reinforced Concrete D-load Culvert, Storm Drain and Sewer Pipe.
- G. ASTM C 822 - Standard Definitions and Terms Relating to Concrete Pipe and Related Products.
- H. ASTM C 877 - Standard Specification for External Sealing Bands for Non circular Concrete Sewer, Storm Drain, and Culvert Pipe.

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit complete product data for pipe, fittings and gaskets for approval. Indicate conformance to appropriate reference standards.
- C. Submit certificates by a testing laboratory, hired and paid by the manufacturer, that concrete pipes meet applicable standards when tested in accordance with ASTM C 497.
- D. For jacking pipe, submit drawings and data describing grouting port design and closure procedures when required by Section 02431 - Tunnel Grout, including liner repair, as applicable.

PART 2 PRODUCTS

2.01 REINFORCED CONCRETE PIPE

- A. Circular reinforced concrete pipe shall conform to requirements of ASTM C 76, for Class III wall thickness. Joints shall be rubber gasketed conforming to ASTM C 443.
- B. Reinforced concrete arch pipe shall conform to the requirements of ASTM C 506 for Class A-III. Joints shall conform to ASTM C 877.
- C. Reinforced concrete elliptical pipe, either vertical or horizontal, shall conform to the requirements of ASTM C 507 for Class VE-III for vertical or Class HE-III for horizontal. Joints shall be rubber gaskets conforming to ASTM C 877.
- D. Reinforced concrete D-load pipe shall conform to the requirements of ASTM C 655.

2.02 GASKETS

- A. When no contaminant is identified, furnish rubber gasket conforming to ASTM C 443 for circular reinforced concrete pipe and rubber gasket conforming to ASTM C 877 for reinforced concrete elliptical pipe.
- B. Pipes to be installed in potentially contaminated areas, especially where free product is found near the elevation of the proposed sewer, shall have the following gasket materials for the noted contaminants:

CONTAMINANT	GASKET MATERIAL REQUIRED
Petroleum (diesel, gasoline)	Nitrile Rubber
Other Contaminants	As recommended by the pipe manufacturer

2.03 LINERS FOR SANITARY SEWER PIPE

- A. Reinforced concrete pipe for sanitary sewers shall be PVC lined and conform to Section 02752 - Plastic Liner for Large Diameter Concrete Sewers and Structures.

- B. Reinforced concrete pipes to be installed in potentially contaminated areas shall have liners that are recommended by the manufacturer as resistant to contaminants identified in the Phase II Environmental Site Assessment Report.

2.04 SOURCE QUALITY CONTROL

- A. Representatives of Resident Project Representatives will inspect manufacturer's plant and casting operations as deemed necessary.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Conform to requirements of the following Sections, as applicable:
 - 1. Section 02446 - Pipe and Casing Augering
 - 2. Section 02531 - Gravity Sanitary Sewers
 - 3. Section 02631 - Storm Sewers.
 - 4. Section 02441 - Microtunneling and Pipe Jacked Tunnels
- B. Install reinforced concrete pipe in accordance with manufacturer's recommendations.

END OF SECTION

Section 02740

ASPHALT OVERLAY AND BASE REPAIR

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. This item shall consist of repairing the existing pavement and base, installation of asphaltic concrete level-up course, and asphaltic concrete overlay as herein specified and in conformity with typical sections, lines and grades shown on the plans and established by the Engineer.

1.02 MEASUREMENT AND PAYMENT

- A. Tack Coat will be measured at the point of application to the street in gallons at the applied temperature. Hot mixed asphalt pavement shall be measured by the number of square yards complete in-place.
- B. Hot mixed asphalt will be measured by the number of square yards complete in-place.
- C. The work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for at the unit price bid for:
 - a. "Tack Coat"
 - b. "Hot Mixed Asphaltic Pavement, Type "D"

1.03 REFERENCES – Not Used

1.04 SUBMITTALS – Not Used

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Hot Mix Asphaltic Concrete: The hot mix asphaltic concrete shall conform to the requirements of the Texas Department of Transportation 1993 Specifications, Item 340. The paving mixture to be used shall be type designated on the plans. The Contractor shall provide appropriate documentation from the producer and a commercial laboratory that the hot mix asphaltic concrete used in the overlay meets these requirements. The asphalt to be used shall be A.C. 10.
- B. Tack Coat shall be AC-5

PART 3 E X E C U T I O N

3.01 PREPARATION

A. The pavement surface shall be dry free of dirt, grease and loose material. All "pot holes" shall be cleaned, primed and repaired with hot mix asphaltic concrete. Large cracks (greater than 1/4 inch) shall be filled with AC-5. Level-up course shall be applied as needed and as directed by the Engineer.

3.03 BASE REPAIR

A. The existing base and asphaltic mat to be scarified and reshaped shall first be cleaned of all dirt, vegetation or other objectionable materials, and then scarified to a minimum depth of 6 inches. In no case shall the underlying sub-grade be disturbed. The asphaltic mat may either be removed and disposed of by the Contractor or broken into particles not more than 2 inches in their greatest dimensions. Caliche base shall be added as necessary to bring the surface to finish shape and grade as shown on the plans. Such caliche added shall be subsidiary to the various pay items.

B. The reshaped surface and base shall be sprinkled as required and rolled as 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. 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 12 feet measured longitudinally shall be corrected by loosening, adding or removing material reshaping and re-compacting by sprinkling and rolling. 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.

C. The Contractor shall "proof roll" the finish surface and directed by the Engineer to determine any weak spots. The "proof rolling" will be done with a loaded water truck (2000 gallon maximum).

D. "Base Repair" is specified based on the assumption that the underlying courses have not failed and have adequate strength to support the loads applied to them during construction. The Contractor may "proof roll" the area designated for "scarify and reshape surface and base" before beginning work. If such "proof rolling" indicates failure in the underlying courses a "change order" will be made to pay for the additional work to repair the underlying courses. Once work has begun on an area, the Contractor shall be responsible for any failures in the underlying courses. Should the areas of "scarified and reshaped surface and base", due to any reason or cause, lose the required stability, density and finish before the surfacing is complete, it shall be re-compacted and refinished at the sole expense of the Contractor. Prime coat shall be subsidiary to "Scarify and Reshape Surface and Base".

3.04 TACK COAT

A. Tack coat shall be sprayed uniformly in one pass at a spray width of the existing roadway. The tack coat shall not be placed more than 1 inch onto the lip of the "Curb and Gutter", "Valley Gutter" or edge of pavement. The tack coat shall be uniformly metered at the rate specified on the plans with a tolerance of plus or minus 0.05 gallons per square yard. Any excessive spills shall be removed and any obvious deviation from the rate specified will be rejected by the Engineer.

3.05 HOT MIX ASPHALTIC CONCRETE (HMAC)

A. The prime coat, tack coat or the asphaltic mixture when placed with a spreading and finishing machine; shall not be placed when the air temperature is below 50° F and is falling, but it may be placed when the air temperature is above 50°F and is rising.

B. The air temperature shall be taken in the shade away from artificial heat. It is further provided that the prime coat, tack coat, or asphaltic mixture shall be placed only when the humidity, general weather conditions, and temperature and moisture condition of the base, in the opinion of the Engineer, are suitable.

C. If the temperature of the asphaltic mixture of a load or any part of a load becomes less than 225°F or more than 350°F after being dumped from the mixer and prior to passing through the lay-down machine, all or any part of the load may be rejected.

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- a. Prime Coat: A prime coat shall be applied at the rate shown on the plans. The application temperature shall be as provided above. The tack coat or asphaltic concrete shall not be applied on a previously primed flexible base until the primed base has completely cured to the satisfaction of the Engineer.
 - b. Tack Coat: Before the asphaltic mixture is laid, the surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The surface shall be given a uniform application of tack coat using asphaltic materials specified in the plans. This tack coat shall be applied, as directed by the Engineer, with an approved sprayer at a rate not to exceed 0.10 gallons per square yard or surface. All contact surfaces of curbs and structures and all joints shall be painted with a thin uniform coat of the asphaltic material meeting the requirements for tack coat. The tack coat shall be rolled with a pneumatic tire roller when directed by the Engineer.
 - c. Transporting Asphaltic Concrete: The asphaltic mixture, prepared as specified above, shall be hauled to the work in tight vehicles previously cleaned of all foreign material. The dispatching of the vehicles shall be arranged so that all material delivered may be placed, and all rolling shall be completed during daylight hours. In cool weather or for long hauls, canvas covers and insulating of the truck bodies may be required. The inside of the truck body may be given a light coating of oil, lime slurry or other material satisfactory to the Engineer, if necessary, to prevent mixture from adhering to the body.
 - d. Placing:
 - i. Generally, the asphaltic mixture shall be dumped and spread on the approved prepared surface with specified spreading and finishing machine, in such manner that when properly compacted the finished pavement will be smooth, of uniform density and will meet the requirement of the typical cross sections and the surface tests. During the application of asphaltic materials, care shall be taken to prevent splattering of adjacent pavement; curb and gutter and structures.
 - ii. In placing a level-up course with the spreading and finishing machine, binder twine or cord shall be set to line and grade established by the Engineer. If approved by the Engineer, level-up courses may be spread with a motor grader.
 - iii. When the asphaltic mixture is placed in a narrow strip along the edge of an existing pavement, or used to level up small areas of an existing pavement or placed in small irregular areas where the use of a finishing machine is not practical, the finishing machine may be eliminated when authorized by the Engineer, provided a satisfactory surface can be obtained by other approved methods.

- iv. Flush Structures. Adjacent to flush curbs, gutters, liners and structures, the surface shall be finished uniformly high so that when compacted it will be slightly above the edge of the curb or flush structure.

e. Compacting:

- i. Rolling with the three wheel and tandem rollers shall start longitudinally at the sides and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the rear wheel unless otherwise directed by the Engineer. Alternate trips of the roller shall be slightly different in length. On super-elevated curves, rolling shall begin at the low side and progress toward the high side unless otherwise directed by the Engineer. Rolling with pneumatic-tire roller shall be done as needed. Rolling shall be continued until no further compression can be obtained and all roller marks are eliminated. One tandem roller, one pneumatic-tire roller and at least one three wheel roller, as specified above shall be provided for each job. If the Contractor elects, he may substitute the three axle tandem roller for the two axle tandem roller and/or the three wheel roller; but in no case shall less than three roller be in use on each job. Additional rollers shall be provided if needed. The motion of the roller shall be slow enough at all times to avoid displacement of the mixture. If any displacement occurs, it shall be corrected at once by the use of rakes and of fresh mixtures where required. The roller shall not be allowed to stand on pavement which has not been fully compacted. To prevent adhesion of the surface mixture to the roller, the wheels shall be kept thoroughly moistened with water, but an excess of water will not be permitted. All rollers must be in good mechanical condition. Necessary precautions shall be taken to prevent the dropping of gasoline, oil, grease or other foreign matter on the pavement, either when the rollers are in operation or when standing.
- ii. 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 as the specified equipment. If the substituted compaction equipment fails to produce the desired compaction as would be expected of the specified equipment, as determined by the Engineer, its use shall be discontinued.
- iii. Hand Tamping: The edges of the pavement along curbs, headers and similar structures, and all places not accessible to the roller, or in such positions as will not allow thorough compaction with the rollers, shall be thoroughly compacted with lightly oiled tamps.

f. Opening to Traffic:

- i. The pavement shall be opened to traffic when directed by the Engineer. The Contractor's attention is directed to the fact that all construction traffic allowed on pavement open to the public will be subject to the laws governing traffic on Public Roads and Streets.
- ii. If the surface ravels, it will be the Contractor's responsibility to correct this condition at this expense.

g. Density Test - Acceptance Sampling and Testing of Hot Mix Asphaltic Concrete (Compaction):

- i. Hot Mix Asphaltic Concrete will be accepted for density on a lot basis. A lot will consist of one day's production or 1,200 tons, whichever is less and shall be divided into four equal sublots. One test shall be made for each subplot.

- ii. Each lot of pavement will be accepted, with respect to density, when the average field density is equal to or greater than 92 percent of the average maximum theoretical density as determined in accordance with ASTM D2041, and when no individual determination is less than 91.0 percent of the average maximum theoretical density. Four field density determinations will be made for each lot. Cores or sawed samples taken from the pavement will be used to determine the field density. The density of the cored or sawed samples shall be determined in accordance with ASTM D2726.
 - iii. The same specimen shall be used for determining both the maximum theoretical density and field density. Specimens used for field density determination shall be carefully crumbled, using heat if necessary, and maximum theoretical density determined in accordance with ASTM D2041. If heating is necessary, the specimen shall be heated to the lowest temperature required for proper preparation of the sample.
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- iv. The use of nuclear field density determination shall not be used as the basis for acceptance with respect density.

(Table to be used as a means to determine acceptance of asphalt)

Table 8

Sliding Scale Pay Factors

(Density Based on Percent of Maximum Theoretical)

	<u>Average Percent Density*</u>	<u>Recommended Percent Payment</u>
92 or above	100	
	91.0 - 91.9	90
Below 91.0	Reject **	

* Average of 4 samples.

** If the Owner agrees to accept densities below 91.0%, the pay factor for density shall be 50%.

h. Surface Tests:

- i. Tests for conformity with the specified crown and grade shall be made by the Contractor immediately after final rolling. Any variation exceeding the specified tolerances shall immediately be corrected by removing the defective work and replacing with new material, as directed by the Engineer. Any correction required shall be at the sole expense of the Contractor.
- ii. For surface course, the finished surface shall not vary more than ¼ inch (6.35 mm) when tested with a 16-foot straightedge applied parallel with, or at right angles to, the centerline.
- iii. The finished surfaces of hot mix asphaltic concrete shall not vary from the grade line, elevations and cross sections shown on the plans by more than ½ inch (12.7 mm). The Contractor shall correct pavement areas varying in excess of this amount by removing and replacing the defective work. Skin patching shall not be permitted for correction of low areas nor shall planning be permitted for correction of high areas.

i. Sampling Pavement:

- i. Samples for determination of thickness and density of completed pavements shall be obtained by the Contractor at no extra cost. The size, number and locations of the samples will be as directed by the Engineer. Samples shall be neatly cut with a saw, core drill or other approved equipment. The Contractor shall furnish all tools, labor and materials for cutting samples and replacing pavement.
- ii. All tests necessary to determine conformance with the specified requirements will be performed without cost to the Contractor; however, any required retests shall be performed at the Contractor's cost.

END OF SECTION

Section 02741

ASPHALTIC CONCRETE PAVEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface courses of compacted mixture of coarse and fine aggregates and asphaltic material.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Payment for asphaltic concrete pavement is on square yard basis. Separate pay items reused for each different required thickness of pavement.
2. Payment for asphaltic concrete pavement includes payment for associated work performed in accordance with Section 02743 - Tack Coat.
3. Payment for asphaltic concrete in miscellaneous areas is on a square yard basis. Miscellaneous areas include tie-in to existing driveways.
4. No separate payment will be made under this section for asphaltic concrete provided for Section 02951-Pavement Replacement for Utility Construction
5. Refer to Section 01270 - Measurement and Payment for unit price procedures.
6. Refer to Paragraph 3.08 for unit price adjustments.

- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM C 33 - Standard Specification for Concrete Aggregates.
- B. ASTM C 131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- C. ASTM C 136 - Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. TxDOT Tex-126-E - Molding, Testing, and Evaluation of Bituminous Black Base Material.
- E. TxDOT Tex-106-E - Method of Calculating the Plasticity Index of Soils.
- F. TxDOT Tex-203-F - Sand Equivalent Test.

- G. TxDOT Tex-204-F - Design of Bituminous Mixtures.
 - H. TxDOT Tex-207-F - Determination of Density of Compacted Bituminous Mixtures.
 - I. TxDOT Tex-208-F - Test for Stabilometer Value of Bituminous Mixtures.
 - J. TxDOT Tex-217-F - Determination of Deleterious Material and Decantation Test for Coarse Aggregates.
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- K. TxDOT Tex-227-F - Theoretical Maximum Specific Gravity of Bituminous Mixtures

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit certificates that asphaltic materials and aggregates meet requirements of Article 2.01, Materials, of this Section.
- C. Submit proposed design mix and test data for each type and strength of surface course in Work.
- D. Submit manufacturer's description and characteristics of mixing plant for approval.
- D. Submit manufacturer's description and characteristics of spreading and finishing machine for approval.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coarse Aggregate: Gravel or crushed stone, or combination thereof, that is retained on No. 10 sieve, uniform in quality throughout and free from dirt, organic or other injurious matter occurring either free or as coating on aggregate. Aggregate shall conform to ASTM C 33 except for gradation. Furnish rock or gravel with Los Angeles abrasion loss not to exceed 40 percent by weight when tested in accordance with ASTM C 131.
- B. Fine Aggregate: Sand or stone screenings or combination of both passing No. 10 sieve. Aggregate shall conform to ASTM C 33 except for gradation. Use sand composed of sound, durable stone particles free from loams or other injurious foreign matter. Furnish screenings of same or similar material as specified for coarse aggregate. Plasticity index of that part of fine aggregate passing No. 40 sieve shall be not more than 6 when tested by Tex-106-E. Sand equivalent shall have a minimum value of 45 when tested by Tex-203-F.
- C. Composite Aggregate: Conform to following limits when graded in accordance with ASTM C 136.

GRADUATION OF COMPOSITE AGGREGATE	
Sieve Size	Percent Passing
1/2"	100
3/8"	85 to 100
#4	50 to 70
#10	32 to 42
#40	11 to 26
#80	4 to 14
#200	1 to 6*
*2 to 8 when Test Method Tex – 200 - F, Part II (Washed Sieve Analysis) is used	

- D. Asphaltic Material: Moisture-free homogeneous material which will not foam when heated to 347 degrees F, meeting following requirements:

VISCOSITY GRADE				
TEST	AC-10		AC-20	
	Min.	Max.	Min.	Max.
Viscosity, 140° F stokes	1000	± 200	2000	± 400
Viscosity, 275° F stokes	1.9	-	2.5	-
Penetration, 77° F, 100g, 5 sec.	85	-	55	-
Flash Point, C.O.C., F.	450	-	450	-
Solubility in trichloroethylene, percent	99.0	-	99.0	-
Tests on residues from thin film oven tests:				
Viscosity, 140° F stokes		3000	-	6000
Ductility, 77° F, 5 cms per min., cms	100	-	70	-
Spot tests	Negative for all grades			

1. Material shall not be cracked.

2.02 EQUIPMENT

- A. Mixing Plant: Weight-batching or drum mix plant with capacity for producing Continuously mixtures meeting specifications. Plant shall have satisfactory conveyors, power units, aggregate handling equipment, hot aggregate screens and bins, and dust collectors. Provide equipment to supply materials adequately in accordance with rated capacity of plant and produce finished material within specified tolerances. Following equipment is essential:

1. Cold aggregate bins and proportioning device.
2. Dryer.

3. Screens.
4. Aggregate weight box and batching scales.
5. Mixer.
6. Asphalt storage and heating devices.
7. Asphalt measuring devices.
8. Truck scales.

B. Bins: Separate aggregate into minimum of four bins to produce consistently uniform grading and asphalt content in completed mix.

2.03 MIXES

- A. Employ a certified testing laboratory to prepare design mixes. Test in accordance with Tex-126E or Tex-204-F and Tex-208-F.
- B. Density and Stability Requirements:

Percent Density		Percent	HVEEM Stability Percent
<u>Min.</u>	<u>Max.</u>	<u>Optimum</u>	<u>Not Less Than</u>
94.5	97.5	96	35

-
- C. Proportions for Asphaltic Material: Provide 4 to 8 percent of mixture by weight. Aggregate by weight shall not contain more than 1.0 percent by weight of fine dust, clay-like particles, or silt when tested in accordance with Tex-217-F, Part II.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted base course is ready to support imposed loads.
- B. Verify lines and grades are correct.

3.02 PREPARATION

- A. Prime Coat: If indicated on the Drawings, apply a prime coat conforming to requirements of Section 02742 - Prime Coat. Do not apply a tack coat until primed base has cured to satisfaction of Resident Project Representative.
- B. Tack Coat: Conform to requirements of Section 02743 - Tack Coat.
- C. Prepare subgrade in advance of asphaltic concrete paving operation.

- D. Do not use cutback asphalt during the period of April 16 to September 15.

3.03 PLACEMENT

- A. Do not place asphaltic mixture when air temperature is below 50 degrees F and falling. Mixture may be placed when air temperature taken in shade and away from artificial heat is above 40 degrees F and rising.
- B. Haul prepared and heated asphaltic concrete mixture to the project in tight vehicles previously cleaned of foreign material. Mixture shall be at temperature between 250 degrees F and 325 degrees F when laid.
- C. Spread material into place with approved mechanical spreading and finishing machine of screening or tamping type.
- D. Surface Course Material: Surface course 2 inches or less in thickness may be spread in one lift. Spread lifts in such manner that, when compacted, finished course will be smooth, of uniform density, and will be to section, line and grade as shown. Place construction joints on surface courses to coincide with lane lines or as directed by Resident Project Representative.
- E. Place courses as nearly continuously as possible. Pass roller over unprotected ends of Freshly laid mixture only when mixture has cooled. When work is resumed, cut back laid material to produce slightly beveled edge for full thickness of course. Remove old material which has been cut away and lay new mix against fresh cut.
- F. When new asphalt is laid against existing or old asphalt, existing or old asphalt shall be saw cut full depth to provide straight smooth joint.
- G. In restricted areas where use of paver is impractical, spread and finish asphalt by Mechanical compactor. Use wood or steel forms, rigidly supported to assure correct grade and cross section. Carefully place materials to avoid segregation of mix. Do not broadcast material. Remove any lumps that do not break down readily. Place asphalt courses in same sequence as if placed by machine.

3.04 COMPACTION

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- A. Begin rolling while pavement is still hot and as soon as it will bear roller without undue displacement or hair cracking. Keep wheels properly moistened with water to prevent adhesion of surface mixture. Do not use excessive water.
 - B. Compress surface thoroughly and uniformly, first with power-driven, 3-wheel, or tandem rollers weighing from 8 to 10 tons. Obtain subsequent compression by starting at side and rolling longitudinally toward center of pavement, overlapping on successive trips by at least one-half width of rear wheels. Make alternate trips slightly different in length. Continue rolling until no further compression can be obtained and rolling marks are eliminated. Complete rolling before mixture temperature drops below 175 degrees F.
 - C. Use tandem roller for final rolling. Double coverage with approved pneumatic roller on asphaltic concrete surface is acceptable after flat wheel and tandem rolling has been completed.

- D. Along walls, curbs, headers and similar structures, and in locations not accessible to rollers, compact mixture thoroughly with lightly oiled tamps.
- E. Compact binder courses and surface course to density not less than 94 percent nor more than 98 percent of the maximum possible density of voidless mixture composed of same materials in like proportions.

3.05 TOLERANCES

- A. Furnish templates for checking surface in finished sections. Maximum deflection of templates, when supported at center, shall not exceed 1/8 inch.
- B. Completed surface, when tested with 10-foot straightedge laid parallel to center line of pavement, shall show no deviation in excess of 1/8 inch in 10 feet. Correct any surface not meeting this requirement.

3.06 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01454 - Testing Laboratory Services.
- B. Minimum of one core will be taken at random locations per 1000 feet per lane of roadway or 500 square yards of base to determine in-place depth and density.
- C. In-place density will be determined in accordance with Tex-207-F and Tex-227-F from cores or sections. Other methods of determining in-place density, which correlate satisfactorily with results obtained from roadway specimens, may be used when approved by Engineer.
- D. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths. In-place depth at these locations shall be average depth of four cores.
- E. Fill cores and density test sections with new compacted asphaltic concrete.

3.07 NONCONFORMING PAVEMENT

- A. Remove and replace any non – conforming pavement.
- B. Remove and replace areas of asphalt found deficient in thickness by more than 10 percent. Use new asphaltic base of thickness shown on Drawings.
- C. Replace nonconforming pavement sections.

3.08 UNIT PRICE ADJUSTMENT

-
- A. Unit price adjustments shall be made for in-place depth determined by cores as follows:

1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price bid.
2. Adjustment shall apply to lower limit of 90 percent and upper limit of 105 percent of unit price.
3. Average depth below 90 percent may be rejected by Engineer.

3.09 PROTECTION

- A. Do not open pavement to traffic until 12 hours after completion of rolling, or as shown on Drawings.
- B. Maintain asphaltic concrete pavement in good condition until completion of Work.
- C. Repair defects immediately by replacing asphaltic concrete pavement to full depth.

END OF SECTION

Section 02742

PRIME COAT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Prime coat for asphaltic concrete paving

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.

1. No separate payment will be made for prime coat under this Section. Include payment in unit price for material being primed.
2. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit product data for proposed prime coat.
- C. Submit report of recent calibration of distributor.

PART 2 P R O D U C T S

- A. Cutback Asphalt
- B. Provide moisture-free homogeneous material which will not foam when heated to 347 degrees F and which meets following requirements:
- C. Asphalt material for prime coat shall be MC-30 or MC-70 and shall meet following requirements:

PROPERTIES	TYPE - GRADE			
	MC-30		MC-70	
	MIN.	MAX.	MIN.	MAX.

Water, Percent	---	0.2	---	0.2
Flash Point, T.O.C., °F	100	---	100	---
Kinematic Viscosity at 140°F, cst	30	60	70	140

2. Distillate shall be as follows, expressed as percent by volume of total distillate to 680 degrees F:

TEMPERATURE	TYPE-GRADE			
	MC-30		MC-70	
	MIN.	MAX.	MIN.	MAX.
to 437°F	---	25	---	20
to 500°F	40	70	20	60
to 600°F	75	93	65	90
Residue from 680°F Distillation, Volume, Percent	50	---	55	---

3. Tests on Distillation Residue:

TEST	TYPE-GRADE			
	MC-30		MC-70	
	MIN.	MAX.	MIN.	MAX.
Penetration at 77°F, 100g, 5 sec., cm	120	250	120	250
Ductility at 77°F, 5 cm/min., cm	100*	---	100*	---
Solubility in Trichloroethylene, %	99	---	99	---
Spot Test	All Negative			

*If penetration of residue is more than 200 and ductility at 77 degrees F is less than 100 cm, material will be acceptable if its ductility at 60 degrees F is more than 100 cm.

2.02 EMULSIFIED PETROLEUM RESIN

- A. EPR-1 Prime: Slow curing emulsion of petroleum resin and asphalt cement conforming to the following requirements:

PROPERTIES	MIN.	MAX.
Fural Viscosity at 77°F, Sec	14	40
Residue by Evaporation, % by Weight	60	-
Sieve Test, %	-	0.1
Particle Charge Test	Positive	
Tests on the Distillation Residue:		
Flash Point, COC (F)	400	-
Kinematic Viscosity @ 140 F (cst)	190	350

- B. For use, EPR-1 may be diluted with water up to a maximum three parts water to one part EPR-1 in order to achieve desired concentration of residual resin/asphalt to facilitate application.

PART 3 EXECUTION

1.01 EXAMINATION

- A. Verify base is ready to support imposed loads.
- B. Verify lines and grades are correct.

1.02 PREPARATION

- A. Thoroughly clean base course surface of loose material by brooming prior to application of prime coat.
- B. Prepare sufficient base in advance of paving for efficient operations.

1.03 APPLICATION, BASIC

- A. Apply prime coat with approved type of self-propelled pressure distributor. Distribute prime coat evenly and smoothly under pressure necessary for proper distribution.
- B. Keep storage tanks, piping, retorts, booster tanks, and distributors used in handling asphaltic materials clean and in good operating condition. Conduct operations so that asphaltic material does not become contaminated.

- C. If yield of asphaltic material appears to be in error, recalibrate distributor prior to continuing work.
- D. Maintain the surface until Work is accepted by Owner.

1.04 APPLICATION, CUTBACK ASPHALT

- A. Do not place prime coat when air temperature is below 60 degrees F and falling. Materials may be placed when air temperature taken in shade and away from artificial heat is above 50 degrees F and rising.
- B. Distribute at rate of 0.25 to 0.35 gallons per square yard.
- C. Equipment shall be capable of reporting temperature of asphaltic material in heating equipment and in distributor, for determining rate of application, and for obtaining uniformity at junction of two distributor loads. Maintain in accurate working order, including recording thermometer at storage heating unit at all times.
- D. Temperature of application shall be based on temperature-viscosity relationship that will permit application of asphalt with viscosity of 100 to 125 centistokes. Maintain asphalt within 15 degrees F of temperature required to meet viscosity. Selected temperature shall be within following range.

<u>Prime Coat Type</u>		<u>Minimum (°F)</u>	
<u>Maximum (°F)</u>			
150	MC-30	70	
	MC-70		125
175			

- E. Do not allow temperature of MC-30 to exceed 175 degrees F at any time.
- F. Do not allow temperature of MC-70 to exceed 200 degrees F at any time.

1.05 APPLICATION, EMULSIFIED PETROLEUM RESIN

- A. Do not place prime coat when air temperature is below 36 degrees F and falling.
- B. Distribute at rate of 0.15 to 0.25 gallons per square yard.

1.06 PROTECTION

- A. Prevent traffic or placement of subsequent courses over freshly applied prime coat until authorized by Resident Project Representative.

END OF SECTION

Section 02751

CONCRETE PAVING

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Portland cement concrete paving.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.

1. Payment for concrete paving is on square yard basis. Separate pay items are used for each different required thickness of pavement.
2. Payment for concrete paving, high early strength, is on square yard basis.
3. Measurement for utility projects: Match actual pavement replaced but no greater than maximum pavement replacement limits shown on Drawings.
 - a. When removed pavement is greater than one-half of pavement lane width or within 18 inches of longitudinal joint, replace pavement for full lane width or to nearest longitudinal joint.
 - b. No payment will be made for work outside pavement limits or in areas removed or replaced for Contractor's convenience. Maximum payment limits are shown on Drawings. When extent of pavement replacement is increased to full lane width or to nearest longitudinal joint, maximum payment limits are increased to same extent.
4. Refer to Section 01270 - Measurement and Payment for unit price procedures.
5. Refer to Paragraph 3.15, Unit Price Adjustment.

- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 REFERENCES

- A. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- B. ASTM A 185 - Standard Specifications for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- C. ASTM A 615 - Standard Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
- D. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

- E. ASTM C 33 - Standard Specifications for Concrete Aggregates.
- F. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- G. ASTM C 40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
- H. ASTM C 42 - Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- I. ASTM C 78 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third Point Loading).
- J. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- K. ASTM C 131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- L. ASTM C 136 - Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- M. ASTM C 138 - Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- N. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- O. ASTM C 150 - Standard Specification for Portland Cement.
- P. ASTM C 174 - Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores.
- Q. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- R. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- S. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
- T. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
- U. TxDOT Tex-203-F - Sand Equivalent Test.
- V. TxDOT Tex-406-A - Material Finer than 75 Fm (No. 200) Sieve In Mineral Aggregates (Decantation Test for Cement Aggregates).

1.04 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.

- B. Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual flexural strength obtained from design mixes at required test ages.
- C. Submit for approval manufacturer's description and characteristics for mixing equipment, and for traveling form paver, when proposed for use.
- D. Submit manufacturer's certificates giving properties of reinforcing steel. Include certificate of compliance with ASTM A 82. Provide specimens for testing when required by Engineer.

1.05 HANDLING AND STORAGE

- A. Do not mix different classes of aggregate without written permission of Engineer.
- B. Class of aggregate being used may be changed before or during Work with written permission of Engineer. Comply new class with specifications.
- C. Reject segregated aggregate. Before using aggregate whose particles are separated by size, mix them uniformly to grading requirements.
- D. Reject aggregates mixed with dirt, weeds, or foreign matter.
- E. Do not dump or store aggregate in road bed.

PART 2 P R O D U C T S

2.01 MATERIALS

A. Portland Cement:

- 1. Sample and test cement to verify compliance with Standards of ASTM C 150, Type I or Type III.
- 2. Bulk cement which meets referenced standards may be used when method of handling is approved by Engineer. When using bulk cement, provide satisfactory weighing devices.
- 3. Fly ash, which meets standards of ASTM C 618, may be used as mineral fill when method of handling is approved by Engineer.

B. Water: Conform to requirements for water in ASTM C 94.

C. Coarse Aggregate: Crushed stone, gravel, or combination thereof, which is clean, hard, durable, conforms to requirements of ASTM C 33, and has abrasion loss not more than 45 percent by weight when subjected to Los Angeles Abrasion Test (ASTM C 131).

- 1. Maximum percentage by weight of deleterious substances shall not exceed following values:

<u>Item</u>	<u>Percent by Weight of Total Sample</u> <u>Maximum</u>

Clay lumps and friable particles	3.0
Material finer than 75-µm (No. 200) sieve:	
Concrete subject to abrasion	3.0*
All Other concrete	5.0*
Coal and lignite:	
Where surface appearance of concrete	0.5
All other concrete	1.0

* In case of manufactured sand, when material finer than 75-µm (No. 200) sieve consists of dust of fracture, essentially free from clay or shale, these limits may be increased to 5 and 7 percent, respectively.

2. Conform coarse aggregate (size 12 inch to No. 4 sieve) to requirements of ASTM C 33. Use gradation within following limits when graded in accordance with ASTM C 136:

Sieve Designation (Square Openings)	Percentage by Weight
Retained on 1:" sieve	0
Retained on 12"sieve	0 to 5
Retained on : " sieve	30 to 65
Retained on d" sieve	70 to 90
Retained on No. 4 sieve	95 to 100
Loss by Decantation Test	
*Method Tex-406-A	1.0 maximum

* In case of aggregates made primarily from crushing of stone, when material finer than 200 sieve is dust of fracture essentially free from clay or shale as established by Part III of TxDOT Tex-406-A, percent may be increased to 1.5.

- D. Fine Aggregate: Sand, manufactured sand, or combination thereof, composed of clean, hard, durable, uncoated grains, free from loams or other injurious foreign matter. Conform fine aggregate for concrete to requirements of ASTM C 33. Use gradation within following limits when graded in accordance with ASTM C 136:

Sieve Designation (Square Openings)	Percentage by Weight
Retained on 3/8" sieve	0
Retained on No. 4 sieve	0 to 5
Retained on No. 8 sieve	0 to 20
Retained on No. 16 sieve	15 to 50
Retained on No. 30 sieve	35 to 75
Retained on No. 50 sieve	65 to 90
Retained on No. 100 sieve	90 to 100
Retained on No. 200 sieve	97 to 100

1. When subjected to color test for organic impurities (ASTM C 40), fine aggregate shall not show color darker than standard color. Fine aggregate shall be subjected to Sand Equivalent Test (Tex-203-F). Sand equivalent value shall not be less than 80, unless higher value is shown on Drawings.

- E. Mineral Filler: Class C fly ash of acceptable quality and meeting requirements of ASTM C 618 may be used as mineral admixture in concrete mixture. When fly ash mineral filler is used, store and

inspect in accordance with ASTM C 618. Do not use fly ash in amounts to exceed 30 percent by absolute volume of cementitious material in mix design. Cement content may be reduced when strength requirements can be met. Note: When fly ash is used, term "cement" is defined as cement plus fly ash.

F. Air Entraining Agent: Furnish air-entraining agent conforming to requirements of ASTM C 260.

G. Water Reducer: Water reducing admixture conforming to requirements of ASTM C 494 may be used when required to improve workability of concrete. Amount and type of admixture subject to approval by Engineer.

H. Reinforcing Steel:

1. Provide new billet steel manufactured by open hearth process and conforming to ASTM A 615, Grade 60. Store steel to protect it from mechanical injury and rust. At time of placement, steel shall be free from dirt, scale, rust, paint, oil, or other injurious materials.
2. Cold bend reinforcing steel to shapes shown. Once steel has been bent, it may not be rebent.
3. Provide wire fabric conforming to ASTM A 82. Use fabric in which longitudinal and transverse wires have been electrically welded at points of intersection. Welds shall have sufficient strength not to be broken during handling or placing. Conform welding and fabrication of fabric sheets to ASTM A 185.

I. ~~Fibrous Reinforcing: Conform to requirements of Section 03240—Fibrous Reinforcing.~~

2.02 EQUIPMENT

A. Conform Equipment to requirements of ASTM C 94.

2.03 MIXING

A. Flexural strength shall be as specified using test specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C78 (using simple beam with third-point loading). Compressive strength shall be as specified using test specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Determine and measure batch quantity of each ingredient, including water for batch designs and all concrete produced for Work. Mix shall conform to these specifications and other requirements indicated on Drawings.

B. Mix design to produce concrete, which will have flexural strength of 500 psi at 7 days and 600 psi at 28 days. Slump of concrete shall be at least 2 inches but no more than 4 inches, when tested in accordance with ASTM C 143.

1. Concrete pavement, including curb, curb and gutter, and saw-tooth curb, shall contain at least 52 sacks (94 pounds per sack) of cement per cubic yard, with not more than 6.5 gallons of water, net, per sack of cement (water-cement ratio maximum 0.57). Determine cement content in accordance with ASTM C 138. Addition of mineral filler may be used to improve workability or plasticity of concrete to limits specified.
2. Coarse dry aggregate shall not exceed 85 percent of loose volume of concrete.

3. Add air-entraining admixture to ensure uniform distribution of agent throughout batch. Base air content of freshly mixed air-entrained concrete upon trial mixes with materials to be used in Work, adjusted to produce concrete of required plasticity and workability.
Percentage of air entrainment in mix shall be 42 percent plus or minus 12 percent.
Determine air content by testing in accordance with ASTM C 231.
4. Use retardant when temperature exceeds 90 degrees F. Proportion as recommended by manufacturer. Use same brand as used for air-entraining agent. Add and batch material using same methods as used for air-entraining agent.

C. Use high early strength concrete pavement to limits shown on Drawings. Design to meet following:

1. Concrete Mix: Flexural strength greater than or equal to 500 psi at 72 hours.
2. Cement: Minimum of 7 sacks of cement per cubic yard of concrete.
3. Water-Cement Ratio: Less than or equal to 5 gallons per sack. Changes in watercement ratio and mix design including increase in cement factor when necessary, will be made when 72-hour flexural strength does not meet minimum value of 500 psi.
4. Other requirements for proportioning, mixing, execution, testing, etc., shall be in accordance with this Section 02751 - Concrete Paving.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted base is ready to support imposed loads and meets compaction requirements.
- B. Verify lines and grades are correct.

3.02 PREPARATION

- A. Properly prepare, shape and compact each section of sub grade before placing forms, reinforcing steel or concrete. After forms have been set to proper grade and alignment, use sub grade planer to shape sub grade to its final cross section. Check contour of sub grade with template.
- B. Remove sub grade that will not support loaded form. Replace and compact sub grade to required density.

3.03 EQUIPMENT

- A. Alternate equipment and methods, other than those required by this Section, may be used provided equal or better results will be obtained. Maintain equipment for preparing sub grade and for finishing and compacting concrete in good working order.
- B. Sub grade Planer and Template:

1. Use sub grade planer with adjustable cutting blades to trim sub grade to exact section shown on Drawings. Select planer mounted on visible rollers, which ride on forms. Planer frame must have sufficient weight so that it will remain on form, and have strength and rigidity that, under tests made by changing support from wheels to center, planer will not develop deflection of more than c inch. Tractors used to pull planer shall not produce ruts or indentations in sub grade. When slip form method of paving is used, operate sub grade planer on prepared track grade or have it controlled by electronic sensor system operated from string line to establish horizontal alignment and elevation of subbase.
 2. Provide template for checking contour of sub grade. Template shall be long enough to rest upon side forms and have strength and rigidity that, when supported at center, maximum deflection shall not exceed c inch. Fit template with accurately adjustable rods projecting downward at 1-foot intervals. Adjust these rods to gauge cross sections of slab bottom when template is resting on side forms.
- C. Machine Finisher: Provide power-driven, transverse finishing machine designed and operated to strike off and consolidate concrete. Machine shall have two screeds accurately adjusted to crown of pavement and with frame equipped to ride on forms. Use finishing machine with rubber tires when it operates on concrete pavement.
- D. Hand Finishing:
1. Provide mechanical strike and tamping template 2 feet longer than width of pavement to be finished. Shape template to pavement section.
 2. Provide two bridges to ride on forms and span pavement for finishing expansion and dummy joints. Provide floats and necessary edging and finishing tools.
- E. Burlap Drag for Finishing Slab: Furnish four plies of 10-ounce burlap material fastened to bridge to form continuous strip of burlap full width of pavement. Maintain contact 3-foot width of burlap material with pavement surface. Keep burlap drags clean and free of encrusted mortar.
- F. Vibrators: Furnish mechanically operated, synchronized vibrators mounted on tamping bar which rides on forms and hand-manipulated mechanical vibrators. Furnish vibrators with frequency of vibration to provide maximum consolidation of concrete without segregation.
- G. Traveling Form Paver: Approved traveling form paver may be used in lieu of construction methods employing forms, consolidating, finishing and floating equipment. Meet requirements of this specification for sub grade, pavement tolerances, pavement depth, alignments, consolidation, finishing and workmanship. When traveling form paver does not provide concrete paving that meets compaction, finish, and tolerance requirements of this Specification, immediately discontinue its use and use conventional methods.
1. Equip traveling paver with longitudinal transangular finishing float adjustable to crown and grade. Use float long enough to extend across pavement to side forms or edge of slab.
 2. Ensure that continuous deposit of concrete can be made at paver to minimize starting and stopping. Use conventional means of paving locations inaccessible to traveling paver, or having horizontal or vertical curvature that traveling paver cannot negotiate.
 3. Where Drawings require tie bars for adjacent paving, securely tie and support bars to prevent displacement. Tie bars may be installed with approved mechanical bar inserter mounted on

traveling-form paver. Replace pavement in which tie bars assume final position other than that shown on Drawings.

3.04 FORMS

- A. Side Forms: Use metal forms of approved shape and section. Preferred depth of form equal to required edge thickness of pavement. Forms with depths greater or less than required edge thickness of pavement will be permitted, provided difference between form depth and edge thickness when not greater than 1 inch, and further provided that forms of depth less than pavement edge are brought to required edge thickness by securely attaching wood or metal strips to bottom of form, or by grouting under form. Bottom flange of form shall be same size as thickness of pavement. Aluminum forms are not allowed. Forms shall be approved by Engineer. Length of form sections shall be not less than 10 feet and each section shall provide for staking in position with not less than 3 pins. Flexible or curved forms of wood or metal of proper radius shall be used for curves of 200-foot radius or less. Forms shall have ample strength and shall be provided with adequate devices for secure setting so that when in-place they will withstand, without visible springing or settlement, impact and vibration of finishing machine. In no case shall base width be less than 8 inches for form 8 inches or more in height. Forms shall be free from warp, bends or kinks and shall be sufficiently true to provide straight edge on concrete. Top of each form section, when tested with straight edge, shall conform to requirements specified for surface of completed pavement. Provide sufficient forms for satisfactory placement of concrete. For short radius curves, forms less than 10 feet in length or curved forms may be used. For curb returns at street intersections and driveways, wood forms of good grade and quality may be used.
- B. Form Setting:
1. Rest forms directly on sub grade. Do not shim with pebbles or dirt. Accurately set forms to required grade and alignment and, during entire operation of placing, compacting and finishing of concrete, do not deviate from this grade and alignment more than $\frac{1}{8}$ inch in 10 feet of length. Do not remove forms for at least 8 hours after completion of finishing operations. Provide supply of forms that will be adequate for orderly and continuous placing of concrete. Set forms and check grade for at least 300 feet ahead of mixer or as approved by Engineer.
 2. Adjacent slabs may be used instead of forms, provided that concrete is well protected from possible damage by finishing equipment. Do not use adjacent slabs for forms until concrete has aged at least 7 days.

3.05 REINFORCING STEEL AND JOINT ASSEMBLIES

- A. Place reinforcing steel and joint assemblies and position securely as indicated on Drawings. Wire reinforcing bars securely together at intersections and splices. Bars and coatings shall be free of rust, dirt or other foreign matter when concrete is placed. Secure reinforcing steel to chairs.
- B. Position pavement joint assemblies at required locations and elevations, and rigidly secure in position. Install dowel bars in joint assemblies, each parallel to pavement surface and to centerline of pavement, as shown.
- C. Cut header boards, joint filler, and other material used for forming joints to receive each dowel bar.

- D. Secure in required position to prevent displacement during placing and finishing of concrete.
- E. Drill dowels into existing pavement, secure with epoxy, and provide paving headers as required to provide rigid pavement sections.
- F. Use sufficient number of chairs for steel reinforcement bars to maintain position of bars within allowable tolerances. Place reinforcement as shown on Drawings. In plane of steel parallel to nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of spacing between bars. In plane of steel perpendicular to nearest surface of concrete, bars shall not vary from plan placement by more than 3 inch.

3.06 FIBROUS REINFORCING

- A. Do not use fibrous reinforcing to replace structural, load-bearing, or moment-reinforcing steel.
- B. ~~Mix and place in accordance with requirements of Section 03240.~~

3.07 PLACEMENT

- A. Place concrete when air temperature taken in shade and away from artificial heat is above 35 degrees F and rising. Do not place concrete when temperature is below 40 degrees F and falling.
- B. Place concrete within 90 minutes after initial water had been added. Remove and dispose of concrete not placed within this period.
- C. Concrete slump during placement shall be 1 to 4 inches, except when using traveling-form paver, slump shall be maximum of 2 inches.
- D. Deposit concrete continuously in successive batches. Distribute concrete in manner that will require as little rehandling as possible. Where hand spreading is necessary, distribute concrete with shovels or by other approved methods. Use only concrete rakes in handling concrete. At placement interruption of more than 30 minutes, place transverse construction joint at stopping point. Remove and replace sections less than 10 feet long.
- E. Take special care in placing and spading concrete against forms and at longitudinal and transverse joints to prevent honeycombing. Voids in edge of finished pavement will be cause for rejection.

3.08 COMPACTION

- A. Consolidate concrete using mechanical vibrators as specified herein. Extend vibratory unit across pavement, not quite touching side forms. Space individual vibrators at close enough intervals to vibrate and consolidate entire width of pavement uniformly. Mount mechanical vibrators to avoid contact with forms, reinforcement, transverse or longitudinal joints.
- B. Furnish enough hand-manipulated mechanical vibrators for proper consolidation of concrete along forms, at joints and in areas not covered by mechanically controlled vibrators.

3.09 FINISHING

- A. Finish concrete pavement with power-driven transverse finishing machines or by hand finishing methods.
 - 1. Use transverse finishing machine to make at least two trips over each area. Make last trip continuous run of not less than 40 feet. After transverse screeding, use hand-operated longitudinal float to test and level surface to required grade.
 - 2. Hand finish with mechanical strike and tamping template in same width as pavement to be finished. Shape template to pavement section shown on Drawings. Move strike template forward in direction of placement, maintaining slight excess of material in front of cutting edge. Make minimum of two trips over each area. Screed pavement surface to required section. Work screed with combined transverse and longitudinal motion in direction work is progressing. Maintain screed in contact with forms. Use longitudinal float to level surface.
- B. On narrow strips and transitions, finish concrete pavement by hand. Thoroughly work concrete around reinforcement and embedded fixtures. Strike off concrete with strike-off screed. Move strike-off screed forward with combined transverse and longitudinal motion in direction work is progressing, maintaining screed in contact with forms, and maintaining slight excess of materials in front of cutting edge. Tamp concrete with tamping template. Use longitudinal float to level surface.
- C. After completion of straightedge operation, make first pass of burlap drag as soon as construction operations permit and before water sheen has disappeared from surface. Follow with as many passes as required to produce desired texture depth. Permit no unnecessary delays between passes. Keep drag wet, clean and free from encrusted mortar during use.

3.10 JOINTS AND JOINT SEALING

- A. Conform to requirements of Section 02752 - Concrete Pavement Joints.

3.11 CONCRETE CURING

- A. Conform to requirements of Section 02753 - Concrete Pavement Curing.

3.12 TOLERANCES

- A. Test entire surface before initial set and correct irregularities or undulations. Bring surface within requirements of following test and then finish. Place 10-foot straightedge parallel to center of roadway to bridge depressions and touch high spots. Do not permit ordinates measured from face of straight edge to surface of pavement to exceed 1/16 inch per foot from nearest point of contact. Maximum ordinate with 10-foot straightedge shall not exceed c inch. Grind spots in excess of required tolerances to meet surface test requirements. Restore texture by grooving concrete to meet surface finishing specifications.

3.13 FIELD QUALITY CONTROL

- A. ~~Perform testing under provisions of Section 01454—Testing Laboratory Services.~~
- B. Compressive Strength Test Specimens: Make four test specimens for compressive strength test in accordance with ASTM C 31 for each 150 cubic yards or less of

pavement that is placed in one day. Test two specimens at 7 days. Test remaining two specimens at 28 days. Test specimens in accordance with ASTM C 39. Minimum compressive strength shall be 3000 pounds per square inch at 7 days and 3500 pounds per square inch at 28 days.

C. When compressive test indicates failure, make yield test in accordance with ASTM C 138 for cement content per cubic yard of concrete. When cement content is found to be less than that specified per cubic yard, increase batch weights until amount of cement per cubic yard of concrete conforms to requirements.

D. Minimum of one 4-inch core will be taken at random locations per 375 feet per 12 feet lane or 500 square yards of pavement to measure in-place depth. Measure depth in accordance with ASTM C 174. Each core may be tested for 28-day compressive strength according to methods of ASTM C 42. 28-day compressive strength of each core tested shall be minimum of 3000 pounds per square inch.

E. Request, at option, three additional cores in vicinity of cores indicating nonconforming in-place depths at no cost to City. In-place depth at these locations shall be average depth of four cores.

F. Fill cores and density test sections with new concrete paving or non-shrink grout.

3.14 NONCONFORMING PAVEMENT

- A. Remove and replace areas of pavement found deficient in thickness by more than 10 percent, or that fail compressive strength tests, with concrete of thickness shown on Drawings.
- B. When measurement of any core is less than specified thickness by more than 10 percent, actual thickness of pavement in this area will be determined by taking additional cores at 10-foot intervals parallel to centerline in each direction from deficient core until, in each direction, core is taken which is not deficient by more than 10 percent. Exploratory cores for deficient thickness will not be used in averages for adjusted unit price. Exploratory cores are to be used only to determine length of pavement in unit that is to be removed and replaced. Replace nonconforming pavement sections at no additional cost to City.

3.15 UNIT PRICE ADJUSTMENT

- A. Unit price adjustments shall be made for in-place depth determined by cores as follows:
 - 1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price.
 - 2. Apply adjustment to lower limit of 95 percent and upper limit of 100 percent of unit price.
 - 3. Average depth below 95 percent but greater than 90 percent may be accepted by Engineer at adjusted Unit Price of :

$$\text{Unit Price Bid} - [2 \times (1 - \text{ratio}) \times \text{Unit Price Bid}]$$

- 4. Average depth below 90 percent will be rejected by Engineer.

3.16 PAVEMENT MARKINGS

- A. Restore pavement markings to match those existing in accordance with standard specifications and details and Engineer's requirements.

3.17 PROTECTION

- A. Barricade pavement section to prevent use until concrete has attained minimum design strength. Cure barricade pavement section for minimum 72 hours before use. Do not open pavement to traffic until concrete is at least 10 days old. Pavement may be open to traffic earlier provided Contractor pays for testing and additional beam once 7 day specified flexural strength is obtained. Pavement may be opened when high early strength concrete is used meeting specified 72-hour strength.
- B. High early strength concrete may be used to provide access at driveways, street intersections, esplanades and other locations approved by Engineer.
- C. On those sections of pavement to be opened to traffic, seal joints, clean pavement, and place earth against pavement edges before permitting use by traffic. Opening of pavement to traffic shall not relieve responsibility for Work.
- D. Maintain concrete paving in good condition until completion of Work.
- E. Repair defects by replacing concrete to full depth.

END OF SECTION

Section 02752

CONCRETE PAVEMENT JOINTS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Joints for concrete paving; concrete sidewalks; concrete driveways, curbs, and curb and gutters.
- B. Saw-cutting existing concrete or asphalt pavements for new joints.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. Payment for saw-cutting existing concrete or asphalt pavement for new joints is on linear foot basis. Saw-cutting existing standard concrete curb will be measured as 1-1/2 linear feet and existing standard concrete curb and gutter will be measured as 3 linear feet.
 - 2. No separate payment will be made for expansion joints, formed or sawed street pavement contraction joints and longitudinal weakened plane joints. Include payment in unit price for Concrete Paving.
 - 3. No separate payment will be made for joints for Curb, Curb and Gutter, Saw-tooth Curb, Concrete Sidewalks, and Concrete Driveways. Include payment in unit price for Curb and Gutter, Concrete Sidewalks, and Concrete Driveways.
 - 4. Refer to Section 01270 - Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- B. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- C. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- D. ASTM D 3405 - Standard Specification for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements.

1.04 SUBMITTALS

- A. Submit product data and samples in accordance with requirements of Section 01330 - Submittal Procedures.
- B. Submit product data for joint sealing compound and proposed sealing equipment for approval.
- C. Submit samples of dowel cup, metal supports, and deformed metal strip for approval.

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Board Expansion Joint Material: Filler board of selected stock. Use wood of density and type as follows:
 - 1. Clear, all-heart cypress weighing no more than 40 pounds per cubic foot, after being oven dried to constant weight.
 - 2. Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.
- B. Preformed Expansion Joint Material: Bituminous fiber and bituminous mastic composition material conforming to ASTM D 994 and ASTM D 1751.
- C. Joint Sealing Compound: Hot-poured rubber-asphalt compound conforming to ASTM D 3405.
- D. Load Transmission Devices:
 - 1. Smooth, steel dowel bars conforming to ASTM A 615, Grade 60. When indicated on Drawings, encase one end of dowel bar in approved cap having inside diameter 1/16 inch greater than diameter of dowel bar.
 - 2. Deformed steel tie bars conforming to ASTM A 615, Grade 60.
- E. Metal Supports for Reinforcing Steel and Joint Assembly: Employ metal supports of approved shape and size that will secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete.

PART 3 E X E C U T I O N

3.01 PLACEMENT

- A. When new work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.
- B. If the limit of removal of existing concrete or asphaltic pavement does not fall on existing joint, saw cut existing pavement minimum of 2 inches deep to provide straight, smooth joint surface without chipping, spalling or cracks.

3.02 CONSTRUCTION JOINTS

- A. Place transverse construction joint wherever concrete placement must be stopped for more than 30 minutes. Place longitudinal construction joints at interior edges of pavement lanes using No. 6 deformed tie bars, 30 inches long and spaced 18 inches on centers.

3.03 EXPANSION JOINTS

- A. Place 3/4-inch expansion joints at radius points of curb returns for cross street intersections, or as located in adjacent pavement but no further than 80 feet apart. Use no boards shorter than 6 feet. When pavement is 24 feet or narrower, use not more than 2 lengths of board. Secure pieces to form straight joint. Shape board filler accurately to cross section of concrete slab. Use load transmission devices of type and size shown on Drawings unless otherwise specified or shown as "No Load Transfer Device". Seal with joint sealing compound.

3.04 CONTRACTION JOINTS

- A. Place contraction joints at same locations as in adjacent pavement or at spaces indicated on Drawings. Place smoothed, painted and oiled dowels accurately and normal to joint. Seal groove with joint sealing compound.

3.05 LONGITUDINAL WEAKENED PLANE JOINTS

- A. Place longitudinal weakened plane joints at spaces indicated on Drawings. Seal groove with joint sealing compound.

3.06 SAWED JOINTS

- A. Use sawed joints as an alternate to contraction and weakened plane joints. Circular cutter shall be capable of cutting straight line groove minimum of 1/2 inch wide. Depth shall be one quarter of pavement thickness plus 1/2 inch. Commence sawing as soon as concrete has hardened sufficiently to permit cutting without chipping, spalling or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing within 24 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.
- B. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Provide at least one standby saw in good working order. Maintain an ample supply of saw blades at work site at all times during sawing operations. Sawing equipment shall be on job at all times during concrete placement.

3.07 JOINTS FOR CURB, CURB AND GUTTER

- A. Place 3/4-inch preformed expansion joints through curb and gutters at locations of expansion and contraction joints in pavement; at end of radius returns at street intersections and driveways; and at curb inlets. Maximum spacing shall be 120-foot centers.

3.08 JOINTS FOR CONCRETE SIDEWALKS

- A. Provide 3/4-inch expansion joints conforming to ASTM A 1751 along and across sidewalk at back of curbs, at intersections with driveways, steps, and walls; and across walk at intervals not to exceed 36 feet. Provide expansion joint material conforming to ASTM D 994 for small radius curves and around fire hydrants and utility poles. Extend the expansion joint material full depth of the slab.

3.09 JOINTS FOR CONCRETE DRIVEWAYS

- A. Provide 3/4-inch expansion joints conforming to ASTM D 1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. Extend expansion joint material full depth of slab.

3.10 JOINT SEALING

- A. Seal joints only when surface and joints are dry, ambient temperature is above 50 degrees F and less than 85 degrees F, and weather is not foggy or rainy.
- B. Joint sealing equipment shall be in like new working condition throughout the joint sealing operation, and be approved by Resident Project Representative. Use concrete grooving machine or poweroperated wire brush and other equipment such as plow, brooms, brushes, blowers or hydro or abrasive cleaning as required to produce satisfactory joints.
- C. Clean joints of loose scale, dirt, dust and curing compound. The term joint includes wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.
- D. Fill joints neatly with joint sealer to depth shown. Pour sufficient joint sealer into joints so that, upon completion, surface of sealer within joint will be 1/4 inch above level of adjacent surface or at elevation as directed.

3.11 PROTECTION

- A. Maintain joints in good condition until completion of Work.
- B. Replace damaged joints material with new material as required by this Section.

END OF SECTION

CONCRETE PAVEMENT CURING

Section 02753

CONCRETE PAVEMENT CURING

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Curing of Portland cement concrete paving.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.

1. No separate payment will be made for concrete curing under this Section. Include payment in unit price for Concrete Paving, Concrete Sidewalks, Curbs, and Curb and Gutters.
2. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM C 171 - Standard Specifications for Sheet Materials for Curing Concrete.
- B. ASTM C 309 - Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete.

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit manufacturer's product data for cover materials and liquid membrane-forming compounds.

PART 2 P R O D U C T S

2.01 COVER MATERIALS FOR CURING

- A. Curing materials shall conform to one of the following:

1. Polyethylene Film: Opaque pigmented white film conforming to requirements of ASTM C 171.
2. Waterproofed Paper: Paper conforming to requirements of ASTM C 171.

3. Cotton Mats: Single layer of cotton filler completely enclosed in cover of cotton cloth. Mats shall contain not less than 3/4 of a pound of uniformly distributed cotton filler per square yard of mat. Cotton cloth used for covering materials shall weigh not less than 6 ounces per square yard. Mats shall be stitched so that mat will contact surface of pavement at all points when saturated with water.

2.02 LIQUID MEMBRANE-FORMING COMPOUNDS

- A. Liquid membrane-forming compounds shall conform to ASTM C 309. Membrane shall restrict loss of water to not more than 0.55 kg/m² of surface in 72 hours.

PART 3 EXECUTION

CONCRETE PAVEMENT CURING

3.01 CURING REQUIREMENT

- A. Concrete pavement shall be cured by protecting it against loss of moisture for period of not less than 72 hours immediately upon completion of finishing operations. Do not use membrane curing for concrete pavement to be overlaid by asphaltic concrete.
- B. Failure to provide sufficient cover material shall be cause for immediate suspension of concreting operations.

3.02 POLYETHYLENE FILM CURING

- A. Immediately after finishing surface, and after concrete has taken its initial set, apply water in the form of a fine spray. Cover surface with polyethylene film so film will remain in direct contact with surface during specified curing period.
- B. Cover entire surface and both edges of pavement slab. Joints in film sheets shall overlap minimum of 12 inches. Immediately repair tears or holes occurring during curing period by placing acceptable moisture-proof patches or by replacing.

3.03 WATERPROOFED PAPER CURING

- A. Immediately after finishing surface, and after concrete has taken its initial set, apply water in form of fine spray. Cover surface with waterproofed paper so paper will remain in direct contact with surface during specified curing period.
- B. Prepare waterproofed paper to form blankets of sufficient width to cover entire surface and both edges of pavement slab, and not be more than 60 feet in length. Joints in blankets caused by joining paper sheets shall lap not less than 5 inches and shall be securely sealed with asphalt cement having melting point of approximately 180 degrees F. Place blankets to secure an overlap of at least 12 inches. Tears or holes appearing in paper during curing period shall be immediately repaired by cementing patches over defects.

3.04 COTTON MAT CURING

- A. Immediately after finishing surface, and after concrete has taken its initial set, completely cover surface with cotton mats, thoroughly saturated before application, in such manner that they will contact surface of pavement equally at all points.
- B. Mats shall remain on pavement for specified curing period. Keep mats saturated so that, when lightly compressed, water will drip freely from them. Keep banked earth or cotton mat covering edges saturated.

3.05 LIQUID MEMBRANE-FORMING COMPOUNDS

- A. Immediately after finishing surface, and after concrete has taken its initial set, apply liquid membraneforming compound in accordance with manufacturer's instructions.

END OF SECTION

Section 02771

CURB, CURB AND GUTTER, AND HEADERS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Reinforced concrete curb, reinforced monolithic concrete curb and gutter, and mountable curb.
- B. Paving headers and railroad headers poured monolithically with concrete base or pavement.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. Payment for curbs and for curbs and gutter is on linear foot basis measured along face of curb.
 - 2. Payment for headers is on linear foot basis measured between lips of gutters adjacent to concrete base and measured between backs of curbs adjacent to streets.
 - 3. Refer to Section 01270 - Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit details of proposed formwork for approval.

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Concrete: Conform to material and proportion requirements for concrete of Section 02751 - Concrete Pavement.
- B. Reinforcing Steel: Conform to material requirements for welded wire fabric of Section 02751 - Concrete Pavement.
- C. Grout: Nonmetallic, nonshrink grout containing no chloride producing agents conforming to the following requirements.
 - 1. Compressive strength

- a. at 7 days: 3500 psi
 - b. at 28 days: 8000 psi
- 2. Initial set time: 45 minutes
- 3. Final set time: 1.5 hours
- D. Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 02752 - Concrete Pavement Joints.
- E. Expansion Joint Filler: Conform to material requirements for expansion joint filler of Section 02752 - Concrete Pavement Joints.
- F. Mortar: Mortar finish composed of one part Portland cement and 1-1/2 parts of fine aggregate. Use only when approved by Resident Project Representative.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare subgrade in accordance with applicable portions of sections on excavation and fill, embankment, and subgrade and roadbed.

3.02 PLACEMENT

- A. Guideline: Set to follow top line of curb. Attach indicator to provide constant comparison between top of curb and guideline. Ensure flow lines for monolithic curb and gutters conform to slopes indicated on Drawings.
- B. Forms: Brace to maintain position during pour. Use metal templates cut to section shown on Drawings.
- C. Reinforcement: Secure in position so that steel will remain in place throughout placement. Reinforcing steel shall remain at approximate center of base or pavement as indicated on Drawings.
- D. Joints: Place in accordance with Section 02752 - Concrete Pavement Joints. Place dummy groove joints at 6-foot centers at right angles to curb lines. Cut dummy grooves 1/4 inch deep using an approved edging tool.
- E. Place concrete in forms to required depth. Consolidate thoroughly. Do not permit rock pockets in form. Entirely cover top surfaces with mortar.

3.03 MANUAL FINISHING

- A. After concrete is in place, remove front curb forms. Form exposed portions of curb, and of curb and gutter, using mule which conforms to curb shape, as shown on Drawings.
- B. Thin coat of mortar may be worked into exposed face of curb using mule and two-handled wooden darby at least 3 feet long.

- C. Before applying final finish move 10-foot straightedge across gutter and up curb to back form of curb. Repeat until curb and gutter are true to grade and section. Lap straightedge every 5 feet.
- D. Steel trowel finish surfaces to smooth, even finish. Make face of finished curb true and straight.
- E. Edge outer edge of gutter with 1/4-inch edger. Finish edges with tool having 1/4-inch radius.
- F. Finish visible surfaces and edges of finished curb and gutter free from blemishes, form marks and tool marks. Finished curb or curb and gutter shall have uniform color, shape and appearance.

3.04 MECHANICAL FINISHING

- A. Mechanical curb forming and finishing machines may be used instead of, or in conjunction with, previously described methods. Use of mechanical methods shall provide specified curb design and finish.

3.05 CURING

- A. Immediately after finishing operations, cure exposed surfaces of curbs and gutters in accordance with Section 02753 - Concrete Pavement Curing.

3.06 TOLERANCES

- A. Top surfaces of curb and gutter shall have uniform width and shall be free from humps, sags or other irregularities. Surfaces of curb top, curb face and gutter shall not vary more than 1/8 inch from edge of straightedge laid along them.

3.07 PROTECTION

- A. Maintain curbs and gutters in good condition until completion of the Work.
- B. Replace damaged curbs and gutters to comply with this Section.

END OF SECTION

Section 02775

CONCRETE SIDEWALKS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Reinforced concrete sidewalks.
- B. Wheelchair Ramps.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. Payment for concrete sidewalks is on square foot basis.
 - 2. Payment for wheelchair ramps of each type specified is on a per ramp basis. The removal of existing sidewalk and curb or curb and gutter is included in the cost of the ramp.
 - 3. Refer to Section 01270 - Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- B. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- C. ASTM C 42 - Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- D. ASTM C 138 - Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- E. ASTM C 143 - Test Method for Slump of Hydraulic Cement Concrete.
- F. ASTM C 172 - Practice for Sampling Freshly Mixed Concrete.
- G. ASTM D 698 - Standard Test Methods for Moisture - Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-Pound Rammer and 12-inch Drop.

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of Submittal Procedures Section of this Project Manual.

- B. Submit certified testing results and certificates of compliance.

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Concrete: Conform to material and proportion requirements for concrete paving.
- B. Reinforcing Steel: Conform to material requirements for welded wire fabric of Section 02751 - Concrete Paving.
- C. Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 02752 - Concrete Pavement Joints.
- D. Expansion Joint Filler: Conform to material requirements for expansion joint material of Section 02752 - Concrete Pavement Joints.
- E. Forms: Use straight, unwarped wood or metal forms with nominal depth equal to or greater than the proposed sidewalk thickness. The use of 2" by 4" lumber as forms will not be allowed.
- F. Sand Bed: Conform to material requirements for bank run sand of Section 02320 - Utility Backfill Materials.
- G. Sodding: Conform to material requirements for sodding of Section 02922 - Sodding.

PART 3 E X E C U T I O N

3.01 REPLACEMENT

- A. Replace sidewalks which are removed or damaged during construction with sidewalk of thickness and width equivalent to those removed or damaged.
- B. Provide replaced and new sidewalks with wheelchair ramps if sidewalk intersects curb at street or driveway.

3.02 PREPARATION

- A. Identify and protect utilities which are to remain.
- B. Protect living trees, other plant growth, and features designated to remain.
- C. Conduct clearing and grubbing operations in accordance with Section 02233 - Clearing and Grubbing.
- D. Excavate subgrade to the line, grade, and cross section shown on Drawings. Remove soft spots and pumping soils and replace with select fill material in accordance with the applicable portions of Item

02317 - Excavation and Backfill for Utilities.

- E. Immediately after subgrade is prepared, cover with compacted sand bed to depth as shown on Drawings. Pour concrete when sand is moist but not saturated.

3.03 PLACEMENT

- A. Setting Forms: Securely stake forms to line and grade. Maintain position during concrete placement.
- B. Reinforcement: Install 6x6, W2.9 x W2.9 welded wire fabric or No. 3 reinforcing steel bars on 18-inch centers longitudinally and transversely. Lay longitudinal bars in walk continuously, except through expansion joints. Support reinforcement in manner to maintain reinforcement in center of slab vertically during placement.
- C. Expansion Joints: Install expansion joints in accordance with Section 02752 - Concrete Pavement Joints.
- D. ~~Colored Concrete: Apply coloring agent in accordance with Section 02761 - Colored Concrete for Medians and Sidewalks if called for on the Drawings.~~
- E. Place concrete in forms to specified depth and consolidate with immersion type vibrator or manual tamping device. Manual tamping devices shall only be used with approval of the Resident Project Representative. Bring mortar to surface.
- F. Strike off to smooth finish with wood strike board. Finish smoothly with wood hand float. Brush across sidewalk lightly with fine-haired brush.
- G. Unless otherwise indicated on Drawings, mark off joints 1/8 inch deep, at spacing equal to width of walk. Use joint tool equal in width to edging tool.
- H. Finish edges with tool having 1/4-inch radius.
- I. After concrete has set sufficiently, refill space along sides of sidewalk to top of walk with suitable material. Tamp until firm and solid. Dispose of excess material in accordance with Waste Material Disposal. Repair driveways and parking lots damaged by sidewalk excavation.

3.04 CURING

- A. Conform to requirements of concrete pavement curing.

3.05 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of the testing laboratory services.
- B. Compressive Strength Test Specimens: Four test specimens for compressive strength test will be made in accordance with ASTM C 31 for each 30 cubic yards or less of sidewalk that is placed in one day. Two specimens will be tested at 7 days. The remaining two specimens will be tested at 28 days. Specimens will be tested in accordance with ASTM C 39.

- C. Yield test for cement content per cubic yard of concrete will be made in accordance with ASTM C 138. If such cement content is found to be less than that specified per cubic yard, reduce batch weights until amount of cement per cubic yard of concrete conforms to requirements.
- D. If the Contractor places concrete without notifying the laboratory, the Owner will have the concrete tested by means of a core test as specified in ASTM C 42. If the concrete does not meet the specification, the cost of the test will be deducted from payment due the Contractor.
- E. Sampling of fresh concrete shall be in accordance with ASTM C 172.
- F. Take slump tests when cylinders are made and when concrete slump appears excessive.
- G. If any 28-day laboratory test indicates that concrete of low strength has been placed, the concrete in question shall be tested by taking cores as directed by the Resident Project Representative. At least three representative cores shall be taken and tested as specified in ASTM C 42 and the cost deducted from payment due the Contractor.

3.06 NONCONFORMING PAVEMENT

- A. Remove and replace areas of sidewalk that fail compressive strength tests, with concrete of thickness shown on Drawings.
- B. Nonconforming sidewalk sections shall be replaced at no additional cost to the Owner.

3.07 PROTECTION

- A. Maintain sidewalks in good condition until completion of the Work.
- B. Replace damaged sidewalks in accordance with Paragraph 3.01, Replacement.

END OF SECTION

SPECIFICATIONS
GRADING

TOPSOILING AND FINISHED

SECTION 02920

TOPSOILING AND FINISHED GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish all labor, materials, tools, equipment, and services for all topsoiling and finished grading, as indicated, in accord with provisions of contract documents.
- B. Completely coordinate with work of all other trades.
- C. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.2 LOCATION OF WORK

- A. All areas within limits of construction, areas of surplus material disposal, and all areas which are disturbed in the course of the work.

1.3 RELATED SECTIONS

- A. Section 02200 - Earthwork and Site Grading
- B. Section 02233 - Clearing and Grubbing

1.4 QUALITY ASSURANCE

- A. Finish Grading Tolerance:
 - 1. 0.1 ft. (30 mm) plus/minus from required elevations.

1.5 JOB CONDITIONS:

- A. Verify amount of topsoil stockpiled and determine amount of additional topsoil, if necessary to complete work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil:

1. Original fertile, friable surface soil typical of the area, capable of supporting native plant growth, reasonably free of subsoil, clay, weeds, roots, and stones larger than 1 inch.
 - a. Use existing topsoil stockpiled under Section 02100.
 - b. If amount of topsoil stockpiled is less than amount necessary for the work, furnish all additional topsoil required at no additional cost to the Owner.
 - c. Contractor may import topsoil to the site with prior review and approval by the Owner's Representative.
- B. Surplus Material:
 1. Legally dispose of surplus material offsite.

SPECIFICATIONS
GRADING

TOPSOILING AND FINISHED

PART 3 - EXECUTION

3.1 ROUGH GRADE REVIEW

- A. Rough grading shall be inspected and approved by owner's representative before site work proceeds.

3.2 PREPARATION

- A. Correct, adjust and/or repair rough graded areas.
 1. Cut off mounds and ridges.
 2. Fill gullies and depressions.
 3. Perform other necessary repairs.
 4. Bring all sub-grades to specified contours, even and properly compacted.
- B. Remove all stones and debris over 2 in. (50 mm) in any dimension.

3.3 PLACING TOPSOIL

- A. Do not place topsoil when subgrade is either wet or frozen enough to cause clodding.
- B. Spread topsoil to minimum compacted depth of 6 in. (100 mm) for all disturbed earth areas.
- C. Make finished surface free of stones, sticks, dirt clods or other material 1 in. (25 mm) or more in any dimension.
- D. Drag finish with harrow (or hand rake) to insure smooth finish to the lines and grades indicated.

- E. Restore areas occupied by stockpiles to condition of rest of finished work.

3.4 ACCEPTANCE

- A. Upon completion of topsoiling, obtain owner's representative acceptance of grade and surface.

END OF SECTION

DIVISION 03 – CONCRETE

<u>Section</u>	<u>Title</u>
03211	REINFORCING STEEL
03315	CONCRETE
03350	CONCRETE FINISHING
03390	CONCRETE CURING

Section 03211

REINFORCING STEEL

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Structural concrete reinforcement and grouting of reinforcement dowel bars into hardened concrete.

1.02 REFERENCES

- A. ACI 315 - Details and Detailing of Concrete Reinforcement.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ASTM A 36 - Standard Specification for Structural Steel.
- D. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- F. ASTM A 497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
- G. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- H. ASTM A 675 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
- I. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- J. ASTM C 881 - Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- K. AWS D 1.4 - Structural Welding Code - Reinforcing Steel.
- L. WRI - Manual of Standard Practice for Welded Wire Fabric.
- M. CRSI MSP-1 - Manual of Standard Practice.

1.03 SUBMITTALS

- A. Shop Drawings:

1. Submit shop drawings detailing reinforcement fabrication, bar placement location, splices, spacing, bar designation, bar type, length, size, bending, number of bars, bar support type and other pertinent information, including dimensions. Provide sufficient detail for placement of reinforcement without use of Contract Drawings. Information shall correspond directly to data listed on bill of materials.
 2. Use of reproductions of Contract Drawings by Contractor, Subcontractor, erector, fabricator or material supplier in preparation of shop drawings (or in lieu of preparation of shop drawings) signifies acceptance by that party of information shown thereon as correct, and acceptance of obligation to pay for any job expense, real or implied, arising due to errors that may occur thereon. Remove references to Design Engineer, including seals, when reproductions of Contract Drawings are used as shop drawings.
 3. Detail shop drawings in accordance with ACI 315, Figure 6.
 4. Submit shop drawings showing location of proposed additional construction joints as required under Section 03351 - Joints in Concrete Structures, and obtain approval of Engineer, prior to submitting reinforcing steel shop drawings.
- B. Bill of Materials: Submit with shop drawings.
- C. Product Data:
1. Mechanical Bar Splices: Submit manufacturer's technical literature, including specifications and installation instructions.
 2. Epoxy grout proposed for anchoring reinforcing dowels to hardened concrete: Submit manufacturer's technical literature including recommended installation procedures.
- D. Certificates:
1. Submit steel manufacturer's certificates of mill tests giving properties of steel proposed for use. List manufacturer's test number, heat number, chemical analysis, yield point, tensile strength and percentage of elongation. Identify proposed location of steel in work.
 2. Foreign-manufactured reinforcing bars shall be tested for conformance to ASTM requirements by a certified independent testing laboratory located in United States. Certification from any other source is not acceptable. Submit test reports for review. Do not begin fabrication of reinforcement until material has been approved.

1.04 HANDLING AND STORAGE

- A. Store steel reinforcement above ground on platforms, skids or other supports. Protect reinforcing from mechanical injury, surface deterioration and formation of excessive, loose or flaky rust caused by exposure to weather. Protect epoxy-coated reinforcing from formation of any amount of rust.

1.05 QUALITY ASSURANCE

A. Notify Resident Project Representative at least 48 hours before concrete placement so that reinforcement may be inspected, and errors corrected, without delaying Work. PART 2 P R O D U C T S

2.01 MATERIAL

- A. Reinforcing Bars: Deformed bars conforming to ASTM A 615, grade as indicated on Drawings, except column spirals and those shown on Drawings to be smooth bars. Where grade is not shown on Drawings, use Grade 60.
- B. Smooth Bars: Where indicated on Drawings, use smooth bars conforming to ASTM A 36; ASTM A 615, Grade 60; or ASTM A 675, Grade 70.
- C. Column Spirals: Bars conforming to ASTM A 615, Grade 60, or wire conforming to ASTM A 82.
- D. Epoxy-Coated Deformed Bars, Column Spirals and Smooth Bars: Conform to ASTM A 775/A 775M.
- E. Welded Wire Fabric:
 - 1. Welded Smooth Wire Fabric: Conform to ASTM A 185.
 - 2. Welded Deformed Wire Fabric: Conform to ASTM A 497.
 - 3. Provide wire size, type and spacing as shown. Where type is not shown on Drawings, use welded smooth wire fabric.
 - 4. Furnish welded wire fabric in flat sheets only.
- F. Tie Wire: 16-1/2 gage or heavier annealed steel wire. Use plastic-coated tie wire with epoxycoated reinforcing steel.
- G. Bar Supports: Provide chairs, riser bars, ties and other accessories made of plastic or metal, except as otherwise specified. Use bar supports and accessories of sizes required to provide required concrete cover. Where concrete surfaces are exposed to weather, water or wastewater, provide plastic accessories only; do not use galvanized or plastic-tipped metal in such locations. Provide metal bar supports and accessories rated Class 1 or 2 conforming to CRSI MSP-1 Manual of Standard Practice. Use epoxy-coated bar supports with epoxy-coated reinforcing bars.
- H. Slabs on Grade: Provide chairs with sheet metal bases or provide precast concrete bar supports 3 inches wide, 6 inches long, and thick enough to allow required cover. Embed tie wires in 3-inch by 6-inch side.
- I. Mechanical Bar Splices:
 - 1. Conform to ACI 318; use where indicated on Drawings.

- a. Compression splices shall develop ultimate stress of reinforcing bar.
 - b. Tension splices shall develop 125 percent of minimum yield point stress of reinforcing bar.
- 2. Regardless of chemical composition of steel, any heat effect shall not adversely affect performance of reinforcing bar.
- J. Welded Splices:
 - 1. Provide welded splices where shown and where approved by the Engineer. Welded splices of reinforcing steel shall develop a tensile strength exceeding 125 percent of the yield strength of the reinforcing bars connected.
 - 2. Provide materials for welded splices conforming to AWS D1.4.
- K. Epoxy Grout: High-strength rigid epoxy adhesive, conforming to ASTM C 881, Type IV, manufactured for purpose of anchoring dowels into hardened concrete and the moisture condition, application temperature and orientation of the hole to be filled. Unless otherwise shown, depth of embedment shall be as required to develop the full tensile strength (125 percent of yield strength) of dowel, but not less than 12 diameters.

2.02 FABRICATION

- A. Bending: Fabricate bars to shapes indicated on Drawings by cold bending. Bends shall conform to minimum bend diameters specified in ACI 318. Do not straighten or rebend bars. Fabricate epoxy-coated reinforcing steel to required shapes in a manner that will not damage epoxy coating. Repair any damaged epoxy coating with patching material conforming to Item 4.4 of ASTM A 775/A 775M.
- B. Splices:
 - 1. Locate splices as indicated on Drawings. Do not locate splices at other locations without approval of Engineer. Use minimum number of splices located at points of minimum stress. Stagger splices in adjacent bars.
 - 2. Length of lap splices: As shown on Drawings.
 - 3. Prepare ends of bars at mechanical splices in accordance with splice manufacturer's requirements.
- C. Construction Joints: Unless otherwise shown, continue reinforcing through construction joints.
- D. Bar Fabrication Tolerances: Conform to tolerances listed in ACI 315, Figures 4 and 5.
- E. Standard Hooks: Conform to the requirements of ACI 318.
- F. Marking: Clearly mark bars with waterproof tags showing number of bars, size, mark, length and yield strength. Mark steel with same designation as member in which it occurs.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean reinforcement of scale, loose or flaky rust and other foreign material, including oil, mud or coating that will reduce bond to concrete.

3.02 INSTALLATION

- A. Placement Tolerances: Place reinforcement within tolerances of Table 03210A at the end of this Section. Bend tie wire away from forms to maintain the specified concrete coverage.
- B. Interferences: Maintain 2-inch clearance from embedded items. Where reinforcing interferes with location of other reinforcing steel, conduit or embedded items, bars may be moved within specified tolerances or one bar diameter, whichever is greater. Where greater movement of bars is required to avoid interference, notify Engineer. Do not cut reinforcement to install inserts, conduit, mechanical openings or other items without approval of Engineer.
- C. Concrete Cover: Provide clear cover measured from reinforcement to face of concrete as listed in Table 03210B at the end of this Section, unless otherwise indicated on Drawings.
- D. Placement in Forms: Use spacers, chairs, wire ties and other accessory items necessary to assemble, space and support reinforcing properly. Provide accessories of sufficient number, size and strength to prevent deflection or displacement of reinforcement due to construction loads or concrete placement. Use appropriate accessories to position and support bolts, anchors and other embedded items. Tie reinforcing bars at each intersection, and to accessories. Blocking reinforcement with concrete or masonry is prohibited.
- E. Placement for Concrete on Ground: Support bar and wire reinforcement on chairs with sheet metal bases or precast concrete blocks spaced at approximately 3 feet on centers each way. Use minimum of one support for each 9 square feet. Tie supports to reinforcing bars and wires.
- F. Vertical Reinforcement in Columns: Offset vertical bars by at least one bar diameter at splices. Provide accurate templates for column dowels to ensure proper placement.
- G. Splices:
 - 1. Do not splice bars, except at locations indicated on Drawings or reviewed shop drawings, without approval of Engineer.
 - 2. Lap Splices: Unless otherwise shown or noted, Class B, conforming to ACI 318-89, Section 12.15.1. Tie securely with wire prior to concrete placement, to prevent displacement of splices during concrete placement.
 - 3. Mechanical Bar Splices: Use only where indicated on Drawings or approved by the Engineer. Install in accordance with manufacturer's instructions.
 - a. Couplers located at a joint face shall be of a type which can be set either flush or recessed from the face as shown. Seal couplers prior to concrete placement to completely eliminate concrete or cement paste from entering.

- b. Couplers intended for future connections: Recess 1/2 inch minimum from concrete surface. After concrete is placed, plug coupler and fill recess with sealant to prevent contact with water or other corrosive materials.
 - c. Unless noted otherwise, match mechanical coupler spacing and capacity to that shown for the adjacent reinforcing.
 - H. Construction Joints: Place reinforcing continuous through construction joints, unless noted otherwise.
 - I. Welded Wire Fabric: Install wire fabric in as long lengths as practicable. Unless otherwise indicated on Drawings, lap adjoining pieces at least 6 inches or one full mesh plus 2 inches, whichever is larger. Lace splices with wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps. Conform to WRI - Manual of Standard Practice for Welded Wire Fabric.
 - J. Field Bending: Shape reinforcing bent during construction operations to conform to Drawings. Bars shall be cold-bent; do not heat bars. Closely inspect reinforcing for breaks. When reinforcing is damaged, replace, Cadweld, or otherwise repair, as directed by Engineer. Do not bend reinforcement after it is embedded in concrete.
 - K. Epoxy-coated Reinforcing Steel: Install in accordance with Paragraph 3.02J, Field Bending, and in a manner that will not damage epoxy coating. Repair damaged epoxy coating with patching material as specified in Paragraph 2.02A, Bending.
 - L. Field Cutting: Cut reinforcing bars by shearing or sawing. Do not cut bars with cutting torch.
 - M. Welding of reinforcing bars is prohibited, except where shown on Drawings.
- 3.03 GROUTING OF REINFORCING AND DOWEL BARS
- A. Use epoxy grout for anchoring reinforcing and dowel steel to existing concrete in accordance with epoxy manufacturer's instructions. Drill hole not more than 1/4 inch larger than steel bar diameter (including height of deformations for deformed bars) in existing concrete. Just before installation of steel, blow hole clean of all debris using compressed air. Partially fill hole with epoxy, using enough epoxy so when steel bar is inserted, epoxy grout will completely fill hole around bar. Dip end of steel bar in epoxy and twist bar while inserting into partially-filled hole.

Table 03210A
REINFORCEMENT PLACEMENT TOLERANCES

PLACEMENT	TOLERANCE IN INCHES

Clear Distance - To formed soffit: To other formed surfaces: Minimum spacing between bars:	-1/4 "1/4 -1/4
Clear distance from unformed surface to top reinforcement - Members 8 inches deep or less: Members more than 8 inches deep but less than 24 inches deep: Members 24 inches deep or greater: Uniform spacing of bars (but the required number of bars shall not be reduced): Uniform spacing of stirrups and ties (but the required number of stirrups and ties shall not be reduced):	"1/4 -1/4, +1/2 -1/4, +1 "2 "1
Longitudinal locations of bends and ends of reinforcement - General: Discontinuous ends of members: Length of bar laps:	"2 "1/2 -1-1/2
Embedded length - For bar sizes No. 3 through 11: For bar sizes No. 14 and 18:	-1 -2

Table 03210B
MINIMUM CONCRETE COVER FOR REINFORCEMENT

SURFACE	MINIMUM COVER IN INCHES
Slabs and Joists - Top and bottom bars for dry conditions - No. 14 and No. 18 bars: No. 11 bars and smaller:	1-1/2 1
Formed concrete surfaces exposed to earth, water or weather; over, or in contact with, sewage; and for bottoms bearing on work mat, or slabs supporting earth cover - No. 5 bars and smaller: No. 6 through No. 18 bars:	1-1/2 2

Beams and Columns - For dry conditions - Stirrups, spirals and ties: Principal reinforcement: Exposed to earth, water, sewage or weather - Stirrups and ties: Principal reinforcement:	 1-1/2 2 2 2-1/2
SURFACE	MINIMUM COVER IN INCHES
Walls - For dry conditions - No. 11 bars and smaller: No. 14 and No. 18 bars: Formed concrete surfaces exposed to earth, water, sewage or weather, or in contact with ground - Circular tanks with ring tension: All others:	 1 1-1/2 2 2
Footings and Base Slabs - At formed surfaces and bottoms bearing on concrete work mat: At unformed surfaces and bottoms in contact with earth: Over top of piles: Top of footings -- same as slabs	 2 3 2

SECTION 03315 CONCRETE

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Cast-in-place concrete work for utility construction or rehabilitation, such as slabs on grade, small vaults, site-cast bases for precast units, and in-place liners for manhole rehabilitation.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. No payment will be made for concrete for utility construction under this Section. Include cost in applicable utility structure.
2. Obtain services of and pay for certified testing laboratory to prepare design mixes.
3. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for work in this Section is included in total Stipulated Price.

1.03 REFERENCES

- A. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- E. ACI 308 - Standard Practice for Curing Concrete.
- F. ACI 309R - Guide for Consolidation of Concrete.
- G. ACI 311 - Guide for Concrete Plant Inspection and Field Testing of Ready-Mix Concrete.
- H. ACI 315 - Details and Detailing of Concrete Reinforcement.
- I. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary.
- J. ACI 544 - Guide for Specifying, Mixing, Placing, and Finishing Steel Fiber Reinforced Concrete.
- K. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- L. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

- M. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- N. ASTM A 767 - Standard Specifications for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
- O. ASTM A 775 - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- P. ASTM A 820 - Standard Specification for Steel Fibers for Fiber-Reinforced Concrete.
- Q. ASTM A 884 - Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
- R. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- S. ASTM C 33 - Standard Specification for Concrete Aggregates.
- T. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- U. ASTM C 42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- V. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- W. ASTM C 138 - Standard Test Method for Unit Weight Yield and Air Content (Gravimetric) of Concrete.
- X. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- Y. ASTM C 150 - Standard Specification for Portland Cement.
- Z. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete.
- AA. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method.
- AB. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- AC. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- AD. ASTM C 309 - Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete.
- AE. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
- AF. ASTM C 595 - Standard Specification for Blended Hydraulic Cements.
- AG. ASTM C 685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

- AH. ASTM C 1064 - Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete.
- AI. ASTM C 1077 - Standard Practice for Laboratory Testing of Concrete and Concrete Aggregate for Use in Construction and Criteria for Laboratory Evaluation.
- AJ. CRSI MSP-1 - Manual of Standard Practice.
- AK. CRSI - Placing Reinforcing Bars.
- AL. Federal Specification SS-S-210A - Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints
- AM. NRMCA - Concrete Plant Standards.

1.04 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit proposed mix design and test data for each type and strength of concrete in Work.
- C. Submit laboratory reports prepared by independent testing laboratory stating that materials used comply with requirements of this Section.
- D. Submit manufacturer's mill certificates for reinforcing steel. Provide specimens for testing when required by Engineer.
- E. Submit certification from concrete supplier that materials and equipment used to produce and deliver concrete comply with this Specification.
- F. Submit shop drawings showing reinforcement type, quantity, size, length, location, spacing, bending, splicing, support, fabrication details, and other pertinent information.
- G. For waterstops, submit product information sufficient to indicate compliance with this Section, including manufacturer's descriptive literature and specifications.

1.05 HANDLING AND STORAGE

- A. Cement: Store cement off of ground in well-ventilated, weatherproof building.
- B. Aggregate: Prevent mixture of foreign materials with aggregate and preserve gradation of aggregate.
- C. Reinforcing Steel: Store reinforcing steel to protect it from mechanical injury and formation of rust. Protect epoxy-coated steel from damage to coating.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS A. Cementitious Material:

1. Portland Cement: ASTM C 150, Type II, unless use of Type III is authorized by Engineer; or ASTM C 595, Type IP. For concrete in contact with sewage use Type II cement.
 2. When aggregates are potentially reactive with alkalis in cement, use cement not exceeding 0.6 percent alkali content in form of $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$.
- B. Water: Clean, free from harmful amounts of oils, acids, alkalis, or other deleterious substances, and meeting requirements of ASTM C 94.
- C. Aggregate:
1. Coarse Aggregate: ASTM C 33. Unless otherwise indicated, use following ASTM standard sizes: No. 357 or No. 467; No. 57 or No. 67, No. 7. Maximum size: Not larger than 1/5 of narrowest dimension between sides of forms, nor larger than 3/4 of minimum clear spacing between reinforcing bars.
 2. Fine Aggregate: ASTM C 33.
 3. Determine potential reactivity of fine and coarse aggregate in accordance with Appendix to ASTM C 33.
- D. Air Entraining Admixtures: ASTM C 260.
- E. Chemical Admixtures:
1. Water Reducers: ASTM C 494, Type A.
 2. Water Reducing Retarders: ASTM 494, Type D.
 3. High Range Water Reducers (Superplasticizers): ASTM C 494, Types F and G.
- F. Prohibited Admixtures: Admixtures containing calcium chloride, thiocyanate, or materials that contribute free chloride ions in excess of 0.1 percent by weight of cement.
- G. Reinforcing Steel:
1. Use new billet steel bars conforming to ASTM A 615, ASTM A 767, or ASTM A 775, grade 40 or grade 60, as shown on Drawings. Use deformed bars except where smooth bars are specified. When placed in work, keep steel free of dirt, scale, loose or flaky rust, paint, oil or other harmful materials.
 2. Where shown, use welded wire fabric with wire conforming to ASTM A 185 or ASTM A884. Supply gauge and spacing shown, with longitudinal and transverse wires electrically welded together at points of intersection with welds strong enough not to be broken during handling or placing.
 3. Wire: ASTM A 82. Use 16 1/2 gauge minimum for tie wire, unless otherwise indicated.
- H. Fiber:

1. Fibrillated Polypropylene Fiber:
 - a. Addition Rate: 1.5 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties:
 1. Material: Polypropylene
 2. Length: 1/2 inch or graded
 3. Specific Gravity: 0.9l
 - c. Acceptable Manufacturer: W. R. Grace Company, Fibermesh, or approved equal.
2. Steel Fiber: Comply with applicable provisions of ACI 544 and ASTM A 820.
 - a. Ratio: 50 to 200 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties
 1. Material: Steel
 2. Aspect Ratio (for fiber lengths of 0.5 to 2.5 inch, length divided by diameter or equivalent diameter): 30:1 to 100:1
 3. Specific Gravity: 7.8
 4. Tensile Strength: 40-400 ksi.
 5. Young's Modulus: 29,000 ksi
 6. Minimum Average Tensile Strength: 50,000 psi
 7. Bending Requirements: Withstand bending around 0.125-inch diameter mandrel to angle of 90 degrees, at temperatures not less than 60 degrees F, without breaking
- I. Curing Compounds: Type 2 white-pigmented liquid membrane-forming compounds conforming to ASTM C 309.

2.02 FORM WORK MATERIALS

- A. Lumber and Plywood: Seasoned and of good quality, free from loose or unsound knots, knot holes, twists, shakes, decay and other imperfections which would affect strength or impair finished surface of concrete. Use S4S lumber for facing or sheathing. Forms for bottoms of caps: At least 2 inch (nominal) lumber or 3/4 inch form plywood backed adequately to prevent misalignment. For general use, provide lumber of 1-inch nominal thickness or form plywood of approved thickness.

- B. Form work for Exposed Concrete Indicated to Receive Rubbed Finish: Form or form-lining surfaces free of irregularities; plywood of 1/4 inch minimum thickness, preferably oiled at mill.
- C. Chamfer Strips and Similar Moldings: Redwood, cypress, or pine that will not split when nailed and which can be maintained to true line. Use mill-cut molding dressed on all faces.
- D. Form Ties: Metal or fiberglass of approved type with tie holes not larger than 7/8 inch in diameter. Do not use wire ties or snap ties.
- E. Metal Forms: Clean and in good condition, free from dents and rust, grease, or other foreign materials that tend to disfigure or discolor concrete in gauge and condition capable of supporting concrete and construction loads without significant distortion. Countersink bolt and rivet heads on facing sides. Use only metal forms which present smooth surface and which line up properly.

2.03 PRODUCTION METHODS

- A. Use either ready-mixed concrete conforming to requirements of ASTM C 94, or concrete produced by volumetric batching and continuous mixing in accordance with ASTM C 685.

2.04 MEASUREMENT OF MATERIALS

- A. Measure dry materials by weight, except volumetric proportioning may be used when concrete is batched and mixed in accordance with ASTM C 685.
- B. Measure water and liquid admixtures by volume.

2.05 DESIGN MIX

- A. Use design mixes prepared by certified testing laboratory in accordance with ASTM C 1077 and conforming to requirements of this section.
- B. Proportion concrete materials based on ACI 211.1 to comply with durability and strength requirements of ACI 318, Chapters 4 and 5, and this specification. Prepare mix design of Class A concrete so minimum cementitious content is 564 pounds per cubic yard. Submit concrete mix designs to Engineer for review.
- C. Proportioning on basis of field experience or trial mixtures in accordance with requirements at Section 5.3 of ACI 318 may be used, when approved by Engineer.
- D. Classification:

Class	Cement Sks Per CY	Minimum Strength, psi (MPa)		Maximum W/C Ratio ¹	Air Entrain.
		28 Days	7 Days		
A	5.0 (280 kg/m ³)	3000 (20.6)	2100 (14.5)	0.6	Yes
B	4.0 (225 kg/m ³)	2000 (13.8)	1400 (9.7)	0.6	No
C	6.0 (335 kg/m ³)	3600(24.8)	2520 (17.4)	0.45	Yes
D	4.5 (252 kg/m ³)	2500 (17.2)	1750 (12.1)	0.6	No
H	6.0 (335 kg/m ³)	As indicated	As Indicated	0.45	Yes

I	5.5 (308 kg/m ³)	3500 (24.1)	2450 (16.9)	0.45	Yes
J	2.0 (112 kg/m ³)	800 (5.5)	560 (3.9)	N/A	No
S	6.0 (335 kg/m ³)	4000 (27.6)	2800 (19.3)	0.45	Yes

- E. Add steel or polypropylene fibers only when called for on Drawings or in another section of these Specifications.
- F. Determine air content in accordance with ASTM C 138, ASTM C 173 or ASTM C 231.
- G. Use of Concrete Classes: Use classes of concrete as indicated on Drawings and other Specifications. Use Class B for unreinforced concrete used for plugging pipes, seal slabs, thrust blocks, trench dams, tunnel inverts and concrete fill unless indicated otherwise. Use Class A for all other applications.

2.06 PVC WATERSTOPS

- A. Extrude from virgin polyvinyl chloride elastomer. Use no reclaimed or scrap material. Submit waterstop manufacturer's current test reports and manufacturer's written certification that material furnished meets or exceeds Corps of Engineers Specification CRD-C572 and other specified requirements.
- B. Flat Strip and Center-Bulb Waterstops:
 - 1. Thickness: not less than 3/8 inch
 - 2. Acceptable Manufacturers:
 - a. Kirkhill Rubber Co., Brea, California
 - b. Water Seals, Inc., Chicago, Illinois
 - c. Progress Unlimited, Inc., New York, New York
 - d. Greenstreak Plastic Products Co., St. Louis, Missouri
 - e. Approved equal.

PART 3 EXECUTION

3.01 FORMS AND SHORING

- A. Provide mortar-tight forms sufficient in strength to prevent bulging between supports. Set and maintain forms to lines designated such that finished dimensions of structures are within tolerances specified in ACI 117. Construct forms to permit removal without damage to concrete. Forms may be given slight draft to permit ease of removal. Provide adequate clean out openings. Before placing concrete, remove extraneous matter from within forms.
- B. Install rigid shoring having no excessive settlement or deformation. Use sound timber in shoring centering. Shim to adjust and tighten shoring with hardwood timber wedges.

- C. Design Loads for Horizontal Surfaces of Forms and Shoring: Minimum fluid pressure, 175 pounds per cubic foot; live load, 50 pounds per square foot. Maximum unit stresses: 125 percent of allowable stresses used for form materials and for design of support structures.
- D. Back form work with sufficient number of studs and wales to prevent deflection.
- E. Re-oil or lacquer liner on job before using. Facing may be constructed of 3/4 inch plywood made with waterproof adhesive backed by adequate studs and wales. In such cases, form lining will not be required.
- F. Unless otherwise indicated, form outside corners and edges with triangular 3/4 inch chamfer strips (measured on sides).
- G. Remove metal form ties to depth of at least 3/4 inch from surface of concrete. Do not burn off ties. Do not use pipe spreaders. Remove spreaders which are separate from forms as concrete is being placed.
- H. Treat facing of forms with approved form coating before concrete is placed. When directed by Engineer, treat both sides of face forms with coating. Apply coating before reinforcement is placed. Immediately before concrete is placed, wet surface of forms which will come in contact with concrete.

3.02 PLACING REINFORCEMENT

- A. Place reinforcing steel accurately in accordance with approved Drawings. Secure steel adequately in position in forms to prevent misalignment. Maintain reinforcing steel in place using approved concrete and hot-dip galvanized metal chairs and spacers. Place reinforcing steel in accordance with CRSI Publication "Placing Reinforcing Bars." Request inspection of reinforcing steel by Engineer and obtain acceptance before concrete is placed.
- B. Minimum spacing center-to-center of parallel bars: 2 1/2 times nominal bar diameter. Minimum cover measured from surface of concrete to face of reinforcing bar unless shown otherwise on Drawings: 3 inches for surfaces cast against soil or subgrade, 2 inches for other surfaces.
- C. Detail bars in accordance with ACI 315. Fabricate reinforcing steel in accordance with CRSI Publication MSP-1, "Manual of Standard Practice." Bend reinforcing steel to required shape while steel is cold. Excessive irregularities in bending will be cause for rejection.
- D. Do not splice bars without written approval of Engineer. Approved bar bending schedules or placing drawings constitute written approval. Splice and development length of bars shall conform to ACI 318, Chapters 7 and 12, and as shown on Drawings. Stagger splices or locate at points of low tensile stress.

3.03 EMBEDDED ITEMS

- A. Install conduit and piping as shown on Drawings. Accurately locate and securely fasten conduit, piping, and other embedded items in forms.
- B. Install waterstops as specified in other sections and according to manufacturer's instructions. Securely position waterstops at joints as indicated on Drawings. Protect waterstops from damage or displacement during concrete placing operations.

3.04 BATCHING, MIXING AND DELIVERY OF CONCRETE

- A. Measure, batch, mix, and deliver ready-mixed concrete in accordance with ASTM C 94, Sections 8 through 11. Produce ready-mixed concrete using automatic batching system as described in NRMCA Concrete Plant Standards, Part 2 - Plant Control Systems.
- B. Measure, mix and deliver concrete produced by volumetric batching and continuous mixing in accordance with ASTM C 685, Sections 6 through 8.
- C. Maintain concrete workability without segregation of material and excessive bleeding. Obtain approval of Engineer before adjustment and change of mix proportions.
- D. Ready-mixed concrete delivered to site shall be accompanied by batch tickets providing information required by ASTM C 94, Section 16. Concrete produced by continuous mixing shall be accompanied by batch tickets providing information required by ASTM C 685, Section 14.
- E. When adverse weather conditions affect quality of concrete, postpone concrete placement. Do not mix concrete when air temperature is at or below 40 degrees F and falling. Concrete may be mixed when temperature is 35 degrees F and rising. Take temperature readings in shade, away from artificial heat. Protect concrete from temperatures below 32 degrees F until concrete has cured for minimum of 3 days at 70 degrees F or 5 days at 50 degrees F.
- F. Clean, maintain and operate equipment so that it thoroughly mixes material as required.
- G. Hand-mix only when approved by Engineer.

3.05 PLACING CONCRETE

- A. Give sufficient advance notice to Engineer (at least 24 hours prior to commencement of operations) to permit inspection of forms, reinforcing steel, embedded items and other preparations for placing concrete. Place no concrete prior to Engineer's approval.
- B. Schedule concrete placing to permit completion of finishing operations in daylight hours. However, when necessary to continue after daylight hours, light site as required. When rainfall occurs after placing operations are started, provide covering to protect work.
- C. Use troughs, pipes and chutes lined with approved metal or synthetic material in placing concrete so that concrete ingredients are not separated. Keep chutes, troughs and pipes clean and free from coatings of hardened concrete. Allow no aluminum material to be in contact with concrete.
- D. Limit free fall of concrete to 4 feet. Do not deposit large quantities of concrete at one location so that running or working concrete along forms is required. Do not jar forms after concrete has taken initial set; do not place strain on projecting reinforcement or anchor bolts.
- E. Use tremies for placing concrete in walls and similar narrow or restricted locations. Use tremies made in sections, or provide in several lengths, so that outlet may be adjusted to proper height during placing operations.
- F. Place concrete in continuous horizontal layers approximately 12 inches thick. Place each layer while layer below is still plastic.

G. Compact each layer of concrete with concrete spading implements and mechanical vibrators of approved type and adequate number for size of placement. When immersion vibrators cannot be used, use form vibrators. Apply vibrators to concrete immediately after depositing. Move vibrator vertically through layer of concrete just placed and several inches into plastic layer below. Do not penetrate or disturb layers previously placed which have partially set. Do not use vibrators to aid lateral flow concrete. Closely supervise consolidation to ensure uniform insertion and duration of immersion.

H. Handling and Placing Concrete: Conform to ACI 302.1R, ACI 304R and ACI 309R.

3.06 WATERSTOPS

A. Embed waterstops in concrete across joints as shown. Waterstops shall be continuous for extent of joint; make splices necessary to provide continuity in accordance with manufacturer's instructions. Support and protect waterstops during construction operations; repair or replace waterstops damaged during construction.

B. Install waterstops in concrete on one side of joints, leaving other side exposed until next pour. When waterstop will remain exposed for 2 days or more, shade and protect exposed waterstop from direct rays of sun during entire exposure and until exposed portion of waterstop is embedded in concrete.

3.07 CONSTRUCTION JOINTS

A. Definitions:

1. Construction joint: Contact surface between plastic (fresh) concrete and concrete that has attained initial set.
2. Monolithic: Manner of concrete placement to reduce or eliminate construction joints; joints other than those indicated on Drawings will not be permitted without written approval of Engineer. Where so approved, make additional construction joints with details equivalent to those indicated for joints in similar locations.
3. Preparation for Construction Joints: Roughen surface of concrete previously placed, leaving some aggregate particles exposed. Remove laitance and loose materials by sandblasting or high-pressure water blasting. Keep surface wet for several hours prior to placing of plastic concrete.

3.08 CURING

A. Comply with ACI 308. Cure by preventing loss of moisture, rapid temperature change and mechanical injury for period of 7 curing days when Type II or IP cement has been used and for 3 curing days when Type III cement has been used. Start curing as soon as free water has disappeared from concrete surface after placing and finishing. A curing day is any calendar day in which temperature is above 50 degrees F for at least 19 hours. Colder days may be counted when air temperature adjacent to concrete is maintained above 50 degrees F. In continued cold weather, when artificial heat is not provided, removal of forms and shoring may be permitted at end of calendar days equal to twice required number of curing days. However, leave soffit forms and shores in place until concrete has reached specified 28 day strength, unless directed otherwise by Engineer.

B. Cure formed surfaces not requiring rubbed-finished surface by leaving forms in place for full curing period. Keep wood forms wet during curing period. Add water as needed for other types of

forms. Or, at Contractor's option, forms may be removed after 2 days and curing compound applied.

C. Rubbed Finish:

1. At formed surfaces requiring rubbed finish, remove forms as soon as practicable without damaging surface.
2. After rubbed-finish operations are complete, continue curing formed surfaces by using either approved curing/sealing compounds or moist cotton mats until normal curing period is complete.

D. Unformed Surfaces: Cure by membrane curing compound method.

1. After concrete has received final finish and surplus water sheen has disappeared, immediately seal surface with uniform coating of approved curing compound, applied at rate of coverage recommended by manufacturer or as directed by Engineer. Do not apply less than 1 gallon per 180 square feet of area. Provide satisfactory means to properly control and check rate of application of compound.
2. Thoroughly agitate compound during use and apply by means of approved mechanical power pressure sprayers equipped with atomizing nozzles. For application on small miscellaneous items, hand-powered spray equipment may be used. Prevent loss of compound between nozzle and concrete surface during spraying operations.
3. Do not apply compound to dry surface. When concrete surface has become dry, thoroughly moisten surface immediately prior to application. At locations where coating shows discontinuities, pinholes or other defects, or when rain falls on newly coated surface before film has dried sufficiently to resist damage, apply additional coat of compound at specified rate of coverage.

3.09 REMOVAL OF FORMS AND SHORING

- A. Remove forms from surfaces requiring rubbing only as rapidly as rubbing operation progresses. Remove forms from vertical surfaces not requiring rubbed-finish when concrete has aged for required number of curing days. When curing compound is used, do not remove forms before 2 days after concrete placement.
- B. Leave soffit forms and shores in place until concrete has reached specified 28-day strength, unless directed otherwise by Engineer.

3.10 DEFECTIVE WORK

- A. Immediately repair defective work discovered after forms have been removed. When concrete surface is bulged, uneven, or shows excess honeycombing or form marks which cannot be repaired satisfactorily through patching, remove and replace entire section.

3.11 FINISHING

- A. Patch honeycomb, minor defects and form tie holes in concrete surfaces with cement mortar mixed one part cement to two parts fine aggregate. Repair defects by cutting out unsatisfactory material and replacing with new concrete, securely keyed and bonded to existing concrete. Finish to make

junctures between patches and existing concrete as inconspicuous as possible. Use stiff mixture and thoroughly tamp into place. After each patch has stiffened sufficiently to allow for greatest portion of shrinkage, strike off mortar flush with surface.

- B. Apply rubbed finish to exposed surfaces of formed concrete structures as noted on Drawings. After pointing has set sufficiently, wet surface with brush and perform first surface rubbing with No. 16 carborundum stone, or approved equal. Rub sufficiently to bring surface to paste, to remove form marks and projections, and to produce smooth, dense surface. Add cement to form surface paste as necessary. Spread or brush material, which has been ground to paste, uniformly over surface and allow to reset. In preparation for final acceptance, clean surfaces and perform final finish rubbing with No. 30 carborundum stone or approved equal. After rubbing, allow paste on surface to reset; then wash surface with clean water. Leave structure with clean, neat and uniform-appearing finish.
- C. Apply wood float finish to concrete slabs.

3.12 FIELD QUALITY CONTROL

- A. Testing shall be performed under provisions of Section 01454 - Testing Laboratory Services.
- B. Unless otherwise directed by Engineer, following minimum testing of concrete is required. Testing shall be performed by qualified individuals employed by approved independent testing agency, and conform to requirements of ASTM C 1077.
 - 1. Take concrete samples in accordance with ASTM C 172.
 - 2. Make one set of four compression test specimens for each mix design at least once per day and for each 150 cubic yards or fraction thereof. Make, cure and test specimens in accordance with ASTM C 31 and ASTM C 39.
 - 3. When taking compression test specimens, test each sample for slump according to ASTM C 143, for temperature according to ASTM C 1064, for air content according to ASTM C 231, and for unit weight according to ASTM C 138.
 - 4. Inspect, sample and test concrete in accordance with ASTM C 94, Section 13, 14, and 15, and ACI 311-5R.
- C. Test Cores: Conform to ASTM C 42.
- D. Testing High Early Strength Concrete: When Type III cement is used in concrete, specified 7 day and 28 day compressive strengths shall be applicable at 3 and 7 days, respectively.
- E. If 7-day or 3-day test strengths (as applicable for type of cement being used) fail to meet established strength requirements, extended curing or resumed curing on those portions of structure represented by test specimens may be required. When additional curing fails to produce required strength, strengthening or replacement of portions of structure which fail to develop required strength may be required by Engineer, at no additional cost to Owner.

3.13 PROTECTION

- A. Protect concrete against damage until final acceptance by Owner.

- B. Protect fresh concrete from damage due to rain, hail, sleet, or snow. Provide protection while concrete is still plastic, and whenever precipitation is imminent or occurring.
- C. Do not backfill around concrete structures or subject them to design loadings until components of structure needed to resist loading are complete and have reached specified 28 day compressive strength, except as authorized otherwise by Engineer.

END OF SECTION

Section 03350

CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Repairing surface defects.
- B. Finishing concrete surfaces including both formed and unformed surfaces.
- C. Sealing concrete surfaces.

1.02 UNIT PRICES

- A. No separate payment will be made for concrete finishing under this Section. Include payment in unit price for structural concrete.

1.03 REFERENCES

- A. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
- B. ASTM C 881 - Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- C. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- D. ASTM D 4587 - Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light-and Water-Exposure Apparatus.
- E. ASTM E 1155 - Standard Test Method for Determining Floor Flatness and Levelness Using the F Number System.

1.04 SUBMITTALS

- A. Conform to Section 01330 - Submittal Procedures

- B. Submit manufacturer's technical literature on the following products proposed for use. Include manufacturer's installation and application instructions and, where specified, manufacturer's certification of conformance to requirements and suitability for use in the applications indicated.

1. Floor hardener.
2. Sealer.
3. Epoxy floor topping.
4. Epoxy penetrating sealer.
5. Latex bonding agent.
6. Epoxy adhesive.
7. Abrasive aggregate.
8. Evaporation retardant.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sealer/Dustproofer (VOC Compliant): Water-based acrylic sealer; non-yellowing under ultraviolet light after 200-hour test in accordance with ASTM D 4587. Conform to local, state and federal solvent emission requirements.
- B. Epoxy Floor Topping: Two-component epoxy resin meeting ASTM C 881 Type III, resistant to wear, staining and chemical attack, blended with granite, sand, trap rock or quartz aggregate, trowel-applied over concrete floor. Topping thickness, 1/8 inch; color, gray.
- C. Abrasive Aggregate for Nonslip Finish: Fused aluminum oxide grit, or crushed emery aggregate containing not less than 40 percent aluminum oxide and not less than 25 percent ferric oxide. Material shall be factory graded, packaged, rustproof and nonglazing, and unaffected by freezing, moisture and cleaning materials.
- D. Epoxy Penetrating Sealer: Low-viscosity, two-component epoxy system designed to give maximum penetration into concrete surfaces. Sealer shall completely seal concrete surfaces from penetration of water, oil and chemicals; prevent dusting and deterioration of concrete surfaces caused by heavy traffic; and be capable of adhering to floor surfaces subject to hydrostatic pressure from below. Color, transparent amber or gray; surface, nonslip.
- E. Latex Bonding Agent: Non-redispersable latex base liquid conforming to ASTM C 1059. When used in water and wastewater treatment structures, bonding agent shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required.
- F. Bonding Grout: Prepare bonding grout by mixing approximately one part cement to one part fine sand meeting ASTM C 144 but with 100 percent passing No. 30 mesh sieve. Mix with water to consistency of thick cream. At Contractor's option, a commercially-prepared bonding agent used in accordance with manufacturer's recommendations and instructions may be used. When used in water and

wastewater treatment structures, bonding agent shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required. Submit manufacturer's technical information on proposed bonding agent.

G. Patching Mortar:

1. Make patching mortar of same materials and of approximately same proportions as concrete, except omit coarse aggregate. Substitute white Portland cement for part of gray Portland cement on exposed concrete in order to match color of surrounding concrete. Determine color by making trial patch. Use minimum amount of mixing water required for handling and placing. Mix patching mortar in advance and allow to stand. Mix frequently with trowel until it has reached stiffest consistency that will permit placing. Do not add water.
2. Proprietary compounds for adhesion or specially formulated cementitious repair mortars may be used in lieu of or in addition to foregoing patching materials provided that properties of bond and compressive strength meet or exceed the foregoing and color of surrounding concrete can be matched where required. Use such compounds according to manufacturer's recommendations. When used in water and wastewater treatment structures, material shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required.

H. Epoxy Adhesive: Two-component, 100 percent solids, 100 percent reactive compound developing 100 percent of strength of concrete, suitable for use on dry or damp surfaces. Epoxy used to inject cracks and as a binder in epoxy mortar shall meet ASTM C 881, Type VI. Epoxy used as a bonding agent for fresh concrete shall meet ASTM C 881, Type V.

I. Non-shrink Grout: See Section 03600 - Structural Grout.

J. Spray-Applied Coating: Acceptable products are Thoro System Products "Thoroseal Plaster Mix" or equal. Color: Gray.

K. Concrete Topping: Class H concrete with 3/8-inch maximum coarse aggregate size, as specified in Section 03310 - Structural Concrete.

L. Concrete Fill: Class H concrete with 3/8-inch maximum coarse aggregate size, (Class C where fill thickness exceeds 3 inches throughout a placement), as specified in Section 03310 - Structural Concrete.

M. Evaporation Retardant: Confilm, manufactured by Master Builders; Eucobar, manufactured by Euclid Chemical Company; or equal.

PART 3 EXECUTION

3.01 AGGREGATE CONCEALMENT

- A. Unless indicated otherwise on Drawings or approved by Engineer, all surfaces to be finished shall be free of exposed aggregate.

3.02 REPAIRING SURFACE DEFECTS

- A. Defective Areas: Repair immediately after removal of forms. Remove honeycombed and other defective concrete down to sound concrete but in no case to a depth less than one inch. Make edges of cuts perpendicular to concrete surface. Thoroughly work bonding grout into the surface with a brush as that the entire surface is covered. Alternatively, a proprietary bonding agent may be used. Use bonding agent in accordance with manufacturer's instructions. While bonding coat is still tacky, apply premixed patching mortar. Thoroughly consolidate mortar into place and strike off to leave patch slightly higher than surrounding surface. To permit initial shrinkage, leave undisturbed for at least 1 hour before final finishing. Keep patched area damp for 7 days. Alternatively, a proprietary cementitious repair mortar may be used and placed in accordance with manufacturer's instructions. Do not use metal tools in finishing patches in formed walls which will be exposed.
- B. Tie Holes: Patch holes immediately after removal of forms. After cleaning and roughening with a wire brush on a rotary drill, thoroughly dampen tie hole and fill solid with patching mortar. Taper tie holes shall have the plug, specified in Section 03100 - Concrete Formwork, driven into the hole to the center of the wall before grouting. Completely fill taper tie holes with patching mortar except that non-shrink grout shall be used for all walls in contact with soil or liquid. On wall faces exposed to view, fill the outer 2 inches of the taper tie hole with patching mortar blended to match adjacent concrete.
- C. Cracks: Repair cracks in excess of 0.01 inch by pressure injection of moisture-insensitive epoxy-resin system. Submit proposed material and method of repair for approval prior to making repairs.
- D. Structural Repair: When required, make structural repairs after prior approval of Engineer as to method and procedure, using specified epoxy adhesive or approved epoxy mortar.

3.03 FINISHING OF FORMED SURFACES

- A. Unfinished Surfaces: Finish is not required on surfaces concealed from view in completed structure by earth, ceilings or similar cover, unless indicated otherwise on Drawings.
- B. Rough Form Finish:
 - 1. No form facing material is required on rough form finish surfaces.
 - 2. Patch tie holes and defects. Chip off fins exceeding 1/4 inch in height.
 - 3. Rough form finish may be used on concrete surfaces which will be concealed from view by earth in completed structure, except concealed surfaces required to have smooth form finish, as shown on Drawings.
- C. Smooth Form Finish:
 - 1. Form facing shall produce smooth, hard, uniform texture on concrete. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.
 - 2. Patch tie holes and defects. Rub fins and joint marks with wooden blocks to leave smooth, unmarred finished surface.

3. Provide smooth form finish on the wet face of formed surfaces of water-holding structures, and of other formed surfaces not concealed from view by earth in completed structure, except where otherwise indicated on Drawings. Walls that will be exposed after future construction, at locations indicated on Drawings, shall have smooth form finish. Smooth form finish on exterior face of exterior walls shall extend 2 feet below final top of ground elevation. Exterior face of all perimeter grade beams shall have smooth form finish for full depth of grade beam.

D. Rubbed Finish:

1. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.
2. Remove forms as soon as practicable, repair defects, wet surfaces, and rub with No. 16 carborundum stone or similar abrasive. Continue rubbing sufficiently to bring surface paste, remove form marks and fins, and produce smooth, dense surface of uniform color and texture. Do not use cement paste other than that drawn from concrete itself. Spread paste uniformly over surface with brush. Allow paste to reset, then wash surface with clean water.
3. Use rubbed finish at locations indicated on Drawings, except where rubbed finish is indicated for a wall which will be containing a liquid, use spray-applied coating.

- E. Spray-applied Coating: At Contractor's option, in lieu of rubbed finish, spray-applied coating may be applied after defects have been repaired and fins removed. Remove form oil, curing compound and other foreign matter that would prevent bonding of coating. Apply coating in uniform texture and color in accordance with coating manufacturer's instructions.

- F. Related Unformed Surfaces: Tops of piers, walls, bent caps, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed. Float unformed surfaces to texture reasonably consistent with that of formed surfaces. Continue final treatment on formed surfaces uniformly across unformed surfaces.

3.04 HOT WEATHER FINISHING

- A. When hot weather conditions exist, as defined by Section 03310 - Structural Concrete and as judged by the Engineer, apply evaporation retardant to the surfaces of slabs, topping and concrete fill placements immediately after each step in the finishing process has been completed.

3.05 FINISHING SLABS AND SIMILAR FLAT SURFACES TO CLASS A, B, AND C TOLERANCES

- A. Apply Class A, B, and C finishes at locations indicated on Drawings.
- B. Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. See Section 03100 - Concrete Formwork for edge forms and screeds.
- C. Consolidation and Leveling: Concrete to be consolidated shall be as stiff as practicable Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge

screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not permit manipulation of surfaces prior to finishing operations.

- D. Tolerances for Finished Surfaces: Check tolerances by placing straightedge of specified length anywhere on slab. Gap between slab and straightedge shall not exceed tolerance listed for specified class.

<u>Class</u>	<u>Straightedge Length in Feet</u>		<u>Tolerance in Inches</u>
A	10	1/8	
B	10	1/4	
C	2	1/4	

- E. Raked Finish: After concrete has been placed, struck off, consolidated and leveled to Class C tolerance, roughen surface before final set. Roughen with stiff brushes or rakes to depth of approximately 1/4 inch. Notify Engineer prior to placing concrete requiring initial raked surface finish so that acceptable raked finish standard may be established for project. Protect raked, base-slab finish from contamination until time of topping. Provide raked finish for following:

1. Surfaces to receive bonded concrete topping or fill.
2. Steep ramps, as noted on Drawings.
3. Additional locations as noted on Drawings.

- F. Float Finish:

1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.
2. After initial floating, re-check tolerance of surface with 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots to Class B tolerance. Immediately re-float slab to a uniform, smooth, granular texture.
3. Provide float finish at locations not otherwise specified and not otherwise indicated on Drawings.

- G. Trowel Finish:

1. Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional troweling by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.
2. Produce finished surface free of trowel marks, uniform in texture and appearance and conforming to Class A tolerance. On surfaces intended to support floor coverings, remove defects which might show through covering by grinding.

3. Provide trowel finish for floors which will receive floor covering and additional locations indicated on Drawings.

H. Broom or Belt Finish:

1. Apply float finish as previously specified. Immediately after completing floated finish, draw broom or burlap belt across surface to give coarse transverse scored texture.
2. Provide broom or belt finish at locations indicated on Drawings.

3.06 FINISHING SLABS AND SIMILAR FLAT SURFACES TO "F-NUMBER SYSTEM" FINISH

- A. Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. Edge forms and screeds: Conform to Section 03100 - Concrete Formwork.
- B. Consolidation and Leveling: Concrete to be consolidated shall be as dry as practicable. Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not manipulate surfaces prior to finishing operations.
- C. Tolerances for Finished Surfaces: Independent testing laboratory will check floor flatness and levelness in accordance with Paragraph 3.12, Field Quality Control.
- D. Float Finish:
 1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.
 2. Check tolerance of surface after initial floating with a 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots. Immediately refloat slab to uniform, smooth, granular texture to F_F20/F_L17 tolerance, unless shown otherwise on Drawings.
 3. Provide "F-Number System" float finish at locations indicated on Drawings.

E. Trowel Finish:

1. Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional trowelings by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.
2. Produce finished surface free of trowel marks, uniform in texture and appearance and

conforming to an F_F25/F_L20 tolerance for slabs on grade and F_F25/F_L17 for elevated slabs, unless shown otherwise on Drawings. On surfaces intended to support floor coverings, remove defects, which might show through covering, by grinding.

3. Provide "F-Number System" trowel finish at locations indicated on Drawings.

3.07 BONDED CONCRETE TOPPING AND FILL

A. Surface Preparation:

1. Protect raked, base-slab finish from contamination until time of topping. Mechanically remove oil, grease, asphalt, paint, clay stains or other contaminants, leaving clean surface.
2. Prior to placement of topping or fill, thoroughly dampen roughened slab surface and leave free of standing water. Immediately before topping or fill is placed, scrub coat of bonding grout into surface. Do not allow grout to set or dry before topping or fill is placed.

A. crete Fill:

1. Where concrete fill intersects a wall surface at an angle steeper than 45 degrees from vertical, provide a 1.5-inch deep keyway in the wall at the point of intersection; size keyway so that no portion of the concrete fill is less than 1.5 inches thick. Form keyway in new walls; create by saw cutting the top and bottom lines and chipping in existing walls.
2. Apply wood float finish to surfaces of concrete fill.
3. Provide concrete fill at locations shown on Drawings.

B. nded Concrete Topping in Bottom of Clarifiers and Thickeners:

1. minimum thickness of concrete topping: 1 inch. Maximum thickness when swept in by clarifier and thickener equipment: 3 inches.
2. pack topping and fill by rolling or tamping, bring to established grade, and float. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. Coat surface with evaporation retardant as needed between finishing operations to prevent plastic shrinkage cracks.
3. screed topping to true surface using installed equipment. Protect equipment from damage during sweeping-in process. Perform sweeping-in process under supervision of equipment manufacturer's factory representative. After topping has been screeded, apply wood float finish. During finishing, do not apply water, dry cement or mixture of dry cement and sand to the surface.
4. soon as topping or fill finishing is completed, coat surface with curing compound. After the topping is set and sufficiently hard in clarifiers and where required by the Engineer, fill the tank with sufficient water to cover the entire floor for 14 days.
5. provide bonded concrete topping in bottom of all clarifiers and thickeners.

3.08 EPOXY PENETRATING SEALER

- A. Surfaces to receive epoxy penetrating sealer: Apply wood float finish. Clean surface and apply sealer in compliance with manufacturer's instructions.
- B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: Apply minimum 2-inch-high coverage of floor coating on vertical surface.
- C. Mask walls, doors, frames and similar surface to prevent floor coating contact.
- D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.
- E. Provide epoxy penetrating sealer at locations indicated on Drawings.

3.09 EPOXY FLOOR TOPPING

- A. Surfaces to receive epoxy floor topping: Apply wood float finish unless recommended otherwise by epoxy floor topping manufacturer. Clean surface and apply epoxy floor topping in compliance with manufacturer's recommendations and instructions. Thickness of topping: 1/8 inch.
- B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: apply 2-inch-high coverage of floor coating on vertical surface.
- C. Mask walls, doors, frames and similar surfaces to prevent floor coating contact.
- D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.
- E. Finished surface shall be free of trowel marks and dimples.
- F. Provide epoxy floor topping at locations indicated on Drawings.

3.10 SEALER/DUSTPROOFER

- A. Where sealer or sealer/dustproofers is indicated on Drawings, just prior to completion of construction, apply coat of specified clear sealer/dustproofing compound to exposed interior concrete floors in accordance with manufacturer's instructions.

3.11 NONSLIP FINISH

- A. Apply float finish as specified. Apply two-thirds of required abrasive aggregate by method that ensures even coverage without segregation and re-float. Apply remainder of abrasive aggregate at right angles to first application, using heavier application of aggregate in areas not sufficiently covered by first application. Re-float after second application of aggregate and complete operations with troweled finish. Perform finishing operations in a manner that will allow the abrasive aggregate to be exposed and not covered with cement paste.

- B. Provide nonslip finish at locations indicated on Drawings.

3.12 FIELD QUALITY CONTROL

- A. Flatness and levelness of slabs and similar flat surfaces that are indicated on Drawings to receive "F-Number System" finish will be checked by independent testing laboratory employed by Owner in accordance with Section 01454 - Testing Laboratory Services.

- B. Tolerances for "F-Number System" finished surfaces:

1. Floor tolerance shall be determined in accordance with ASTM E 1155.

2. Floor flatness and levelness tolerances:

a F_F defines maximum floor curvature allowed over 24 inches. Computed on the basis of successive 12-inch elevation differentials, F_F is commonly referred to as the "flatness F-Number."

b $F_F = \frac{4.57}{\text{Maximum difference in elevation, in decimal inches, between successive 12inch elevation differences.}}$

Maximum difference in elevation, in decimal inches, between successive 12inch elevation differences.

- c F_L defines relative conformity of floor surface to horizontal plane as measured over 10foot distance. F_L is commonly referred to as "levelness F-number."

d $F_L = \frac{12.5}{\text{Maximum difference in elevation, in inches, between two points separated by 10 feet.}}$

Maximum difference in elevation, in inches, between two points separated by 10 feet.

1. Achieve specified overall slab tolerance. Minimum local tolerance (1/2 bay, unless otherwise designated by Engineer): 2/3 of specified tolerance.
2. Tolerance for floated finish: F_F20/F_L17 , unless otherwise shown on Drawings.
3. Tolerance for troweled finish: F_F25/F_L20 for slabs on grade, and F_F25/F_L17 for elevated slabs, unless otherwise shown on Drawings.

3.13 CURING

- A. Conform to requirements of Section 03390 - Concrete Curing.

END OF SECTION

Hidalgo Co. Pct.4 Head Start Parking Lot and Safety Improvements
RO Engineering, PLLC
Project No. 2011B

Mar 2023

Section 03390

CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Curing of structural concrete.

1.02 UNIT PRICES

- A. No separate payment will be made for concrete curing under this Section. Include payment in unit price for structural concrete.

1.03 REFERENCES

- A. ACI 308 - Standard Practice for Curing Concrete.
- B. ASTM C 171 - Standard Specifications for Sheet Materials for Curing Concrete.
- C. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- D. ASTM D 44587 - Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light-and Water-Exposure Apparatus.

1.04 DEFINITIONS

- A. Mass Concrete: Concrete sections 4 feet or more in least dimension.

1.05 SUBMITTALS

- A. Conform to Section 01330 - Submittal Procedures.
- B. Product Data: Submit description of proposed curing method for concrete. When use of membrane-forming compound is proposed, submit manufacturer's technical information including material specifications, installation instructions and recommendations, and evidence that compound is satisfactory for intended application. State locations where curing compound will be used.
- C. When membrane-forming compounds are to be used, submit certification by the manufacturer of compliance with specified requirements and compatibility with toppings, coatings, finishes, and adhesives to be applied.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Membrane-forming Curing Compound: Conform to ASTM C 309, Type 1D, and following requirements.
 - 1. Minimum solids content: 30 percent.
 - 2. Compound shall not permanently discolor concrete. When used for liquid- containing structures, curing compound shall be white-pigmented.
 - 3. When used in areas that are to be coated, or that will receive topping or floor covering, material shall not reduce bond of coating, topping, or floor covering to concrete. Curing compound manufacturer's technical information shall state conditions under which compound will not prevent bond.
 - 4. Conform to local, state and federal solvent emission requirements.
- B. Clear Curing and Sealing Compound (VOC Compliant): Conform to ASTM C 309, Type 1, Class B, and the following requirements: 30 percent solids content minimum; non-yellowing under ultraviolet light after 500-hour test in accordance with ASTM D 4587. Sodium silicate compounds are not permitted. Conform to local, state and federal solvent emission requirements.
- C. Sheet Material for Curing Concrete: ASTM C 171; waterproof paper, polyethylene film or white burlap-polyethylene sheeting.
- D. Curing Mats (for use in Curing Method 2): Heavy shag rugs or carpets, or cotton mats quilted at 4 inches on center; 12 ounce per square yard minimum weight when dry.
- E. Water for curing: Clean and potable.

PART 3 EXECUTION

3.01 CURING PROCEDURES

- A. Comply with ACI 308 and the requirements specified herein. Protect freshly-deposited concrete from premature drying and excessively hot or cold temperatures. Maintain minimal moisture loss and relatively constant temperature during time necessary for hydration of cement and proper hardening of concrete.
- B. Unformed Surfaces: For concrete surfaces not in contact with forms, use one of following procedures immediately after completion of placement and finishing.
 - 1. Ponding or continuous sprinkling.

2. Absorptive mat or fabric kept continuously wet.
 3. Sand or other covering kept continuously wet.
 4. Continuous steam bath (not exceeding 150 degrees F at surface of concrete).
 5. Vapor mist bath.
 6. Membrane-forming curing compound applied according to manufacturer's recommendations. After the curing compound has dried, wet slab surfaces and cover with waterproof paper, polyethylene film, or white burlap-polyethylene sheeting after the application of the curing compound. Tape sheet seams together and provide sufficient weights to keep the sheeting in place. Wet the slab surface again if the sheeting becomes dislodged, and replace the sheeting.
 7. Other moisture-retaining coverings as approved by Engineer.
- C. Restrictions on Use of Curing Compounds: Unless curing compound manufacturer certifies that curing compound will not prevent bond to cured surface, do not use curing compound on surfaces that will be rubbed or receive additional concrete, mortar, topping, terrazzo or other cementitious finishing materials, on slabs under resilient floors or built-up roofing, or on surfaces to be waterproofed, sealed, hardened or painted.
- D. Curing and Sealing Compounds: At locations indicated, cure exposed interior slabs and troweled slabs receiving mastic-applied adhesives with specified clear curing and sealing compound in accordance with manufacturer's recommendations. Do not store materials directly on curing membranes. Use plywood to protect curing membrane from damage. Immediately repair membranes damaged by foot traffic or other operations.
- E. Duration of Curing: Continue curing until cumulative number of days or fractions of days during which ambient temperature is above 50 degrees F has totaled 7. Continue curing of water-retaining structures for a total of 14 days. When high-early-strength concrete has been used, continue curing for total of 3 days. Prevent rapid drying at end of curing period.
- F. Formed Surfaces: During the curing period keep wet steel forms heated by sun and wood forms in contact with concrete. When forms are to be removed during curing period, employ curing materials or methods immediately. Continue such curing for remainder of curing period.
- G. Temperature:
1. Cold Weather. When mean daily temperature of atmosphere is less than 40 degrees F, maintain temperature of concrete between 50 and 70 degrees F for required curing period. When necessary, make arrangements for heating, covering, insulating or housing concrete work in advance of placement to maintain required temperature and moisture conditions. Prevent damage or injury due to concentration of heat. When combustion heaters are necessary in enclosed or protected area where concrete slabs are being placed, vent heaters.

2. Hot Weather. In advance of placement make arrangements for shading, fog spraying, sprinkling, ponding or installation of windbreaks or wet covering of light color. Take such protective measures as quickly as concrete hardening and finishing operations will allow.
 3. Temperature Changes. Control so rate of change in temperature of concrete is as uniform as possible. Do not permit temperature change to exceed 5 degrees F in any one hour or 50 degrees F in any 24-hour period.
- H. Protection from Mechanical Injury. During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water. Do not load self-supporting structures in a way that over stresses concrete.

3.02 CURING MASS CONCRETE

- A. Observe the following additional restrictions when curing mass concrete.
1. Minimum curing period: 2 weeks.
 2. When ambient air temperature falls below 32 degrees F, protect surface of concrete against freezing.
 3. Do not use steam or other curing methods that will add heat to concrete.
 4. Keep forms and exposed concrete continuously wet for at least the first 48 hours after placing, and whenever surrounding air temperature is above 90 degrees F during final curing period.
 5. During 2-week curing period, provide necessary controls to prevent ambient air temperature immediately adjacent to concrete from falling more than 30 degrees F in 24 hours.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel items.
- B. Downspout boots.
- C. Cast iron trench castings.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 01 - Masonry Veneer: Placement of metal fabrications in masonry.
- C. Section 05 52 13 - Pipe and Tube Railings.
- D. Section 09 91 13 - Exterior Painting: Paint finish.

1.3 REFERENCE STANDARDS

- A. AISC (COMM) - Commentary on the Specification for Structural Steel Buildings; 2005.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
 - a. Include the following, as applicable:
 - 1) Design criteria.
 - 2) Engineering analysis depicting stresses and deflections.
 - 3) Member sizes and gauges.
 - 4) Details of connections.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Design load bearing items under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, reflective tape, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; galvanized finish.
- C. Lintels: As detailed; galvanized finish.

2.4 DOWNSPOUT BOOTS

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
 - 1. Configuration: Angular.
 - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.

2.5 CAST IRON TRENCH CASTINGS

- A. Cast Iron Trench Castings:
 - 1. Material: Cast iron; ASTM A48/A48M, Class 35 B (heavy duty).
 - 2. Grate Type: Manufacturer's standard Type A.

2.6 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Neenah Foundry, a division of Neenah Enterprises, Inc: www.nfco.com.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.7 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 05 50 00

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall mounted handrails.
- B. Stair railings and guardrails.
- C. Free-standing railings at steps.
- D. Balcony railings and guardrails.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of anchors in masonry.
- C. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
- D. Section 05 51 00 - Metal Stairs: Attachment plates for handrails specified in this section.
- E. Section 09 91 13 - Exterior Painting: Paint finish.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2020.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013, with Editorial Revision.
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- C. Samples: Submit two, 24 inch long samples of handrail. Submit two samples of elbow, wall bracket, and end stop.

1.5 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
 2. Intermediate Rails: 1-1/2 inches diameter, round.
 3. Intermediate Rails: 1-1/4 by 1 inch rectangular.
 4. Posts: 1-1/2 inches diameter, round.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 1. For anchorage to concrete, provide inserts to be cast into concrete, for welding anchors.
 2. For anchorage to masonry, provide brackets to be embedded in masonry, for welding anchors.
 3. For anchorage to stud walls, provide backing plates, for welding anchors.
 4. Posts: Provide adjustable flanged brackets.

- G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
- H. Hot-Dip Galvanizing: For Steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dipped process.

2.2 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Shop and Touch-Up Primer: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.
- C. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

- D. Supply items per Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products (ASTM A123; 2017).

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 05 52 13

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish 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. Mechanical and Electrical:
 - a. On the roof and outdoors, paint equipment that is exposed to weather or to view, including factory-finished materials.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise 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. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
 - 7. Marble, granite, slate, and other natural stones.
 - 8. Floors, unless specifically indicated.
 - 9. Ceramic and other types of tiles.
 - 10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 11. Exterior insulation and finish system (EIFS).
 - 12. Glass.
 - 13. Concrete masonry units in utility, mechanical, and electrical spaces.
 - 14. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - (VOC) Content Restrictions.
- B. Section 04 2200 - Concrete Unit Masonry: Prime and painting.
- C. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- D. Section 05 51 00 - Metal Stairs: Shop-primed items.
- E. Section 09 91 23 - Interior Painting.
- F. Section 09 93 00 - Staining and Transparent Finishing. Wood substrates.
- G. Section 32 17 23.13 - Painted Pavement Markings: Painted pavement markings.

1.3 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- E. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- F. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- G. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- H. SSPC-SP 3 - Power Tool Cleaning; 2018.
- I. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- J. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 2. MPI product number (e.g. MPI #47).
 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 4. Manufacturer's installation instructions.
 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
 6. Manufacturer's written recommendation and data sheets for primers.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, siding, factory finished metals, and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Extra Paint and Finish Materials: 1 gallon of each color, type, and surface texture; from the same product run, store where directed.
 3. Label each container with color, type, texture, and location in addition to the manufacturer's label.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience and approved by manufacturer.

1.7 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 10 feet long by 10 feet wide, illustrating paint color, texture, and finish.
- C. Provide door and frame assembly illustrating paint, stain, and varnish color, texture, and finish.
- D. Locate where directed by Architect.
- E. Mock-up may remain as part of the work, if approved.

1.8 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.
- 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.
- D. Storage: Designate a specific space at the Project Site for storing and mixing paint and related materials. Protect this space and repair all damage resulting from its use. Do not store kerosene or gasoline in this space. Remove oily rags at the end of each work day.

1.9 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 paint and finishes 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: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 PRECAUTIONS

- A. Store paints and related materials in approved containers at the designated storage area when not in actual use. Do not store paints, oils, thinners, or other flammable items inside the building. Keep fire hazards at the Project Site to a minimum.

- B. Take precautions to protect the public and construction workers during progress of the Work.
- C. Provide a temporary fire extinguisher of suitable chemicals and capacity, located near the flammable materials storage area.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 - 2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
 - 3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.
- B. Paints:
 - 1. PPG Paints: www.ppgpaints.com.
 - 2. Sherwin-Williams Company: www.sherwin-williams.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: Not permitted.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes 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.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 5. Supply each paint material in quantity required to complete entire project's work from a single production run.

6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 1. Provide paints and finishes 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.
 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.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: As indicated on drawings.
 1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.3 PAINT SYSTEMS - EXTERIOR

- A. *Products listed below represent high quality products of each manufacturer. These products are not presented as being totally equivalent, as there are too many variables to match each product. If color or sheen listed on the drawings (finish schedule) are from a different manufacturer than those listed herein, it is the contractors responsibility to provide the color, sheen and manufacturer indicated on the (finish schedule). The quality of the product being used from the finish schedule shall be equivalent to the products listed herein, and the contractor shall provide data indicating equivalency for the products in the paint submittal.*
- B. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, fiber cement siding, primed wood, and primed metal.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Exterior Latex.
 - a. Products:

- 1) PPG Paints Speedhide Exterior Latex, 6-900XI Series, Semi-Gloss. (MPI #11)
 - 2) Sherwin-Williams Solo Series, Semi-Gloss. (MPI #11)
 - 3) Substitutions: Not permitted.
 3. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Concrete Floors to be Painted.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Latex Floor Paint, Low Gloss; MPI #60.
 - a. Products:
 - 1) Behr Premium Interior/Exterior Porch and Patio Floor Paint, Low Lustre [No. 6050].
 - 2) PPG Paints Floor and Porch Enamel 100% Acrylic Latex, 3-510XI Series, Satin.
 - 3) Substitutions: Not permitted.
- D. Transparent Finish on Concrete Floors:
 1. 2 coats sealer.
 2. Sealer: Water Based Sealer for Concrete Floors; MPI #99.
 - a. Products:
 - 1) PPG Paints Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200XI, Satin. (MPI #99)
 - 2) Sherwin-Williams H&C Clarishield Water-Based Wet-Look Concrete Sealer. (MPI #99)
 - 3) Substitutions: Not permitted.
 3. Sealer Sheen:
 - a. Satin: MPI gloss level 4; use this sheen at all locations.

2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.

- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes 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 effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect 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. Exterior Plaster and Stucco: 12 percent.
 - 2. Fiber Cement Siding: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 5. Concrete Floors and Traffic Surfaces: 8 percent.
- G. Perform the following Test procedure prior to painting galvanized metals to determine if passivators exist on the metal. This procedure is not necessary on galvanized metal with G 90 Paint Grip.
 - 1. Dissolve 20 grams of copper sulfate in one liter (1000 grams) of water. Copper sulfate crystals may be purchased at most neighborhood drug stores.
 - 2. Solvent wash a small area according to SSPC-SP1.
 - 3. Sand a small washed area using emery cloth.
 - 4. Saturate a cotton swab with the copper sulfate solution and apply a swipe to both sanded and un-sanded washed areas.
 - a. If the sanded and un-sanded surfaces turn black at the same time, and that time is less than 10 seconds, there is no passivation on the surface other than light oil, and a normal degreasing / cleaning operation is sufficient preparation prior to painting.
 - b. If the un-sanded surface turns slower than the sanded surface, or not at all, a passivator of some type is present on the surface.

- c. If neither surface turns black, the surface is probably an alloy of zinc or some other metal.
- d. If the galvanized steel to be painted has been treated or passivated, remove the treatment or passivator by brush blasting. If this method is prohibited by environmental regulations, chemical etching with Amchem's GALVAPREP SG-3 is acceptable, if previously approved by the Architect. Follow the chemical etching manufacturer's procedures carefully.
- e. Notify Architect if the surface is determined to be an alloy. Perform adhesion tests of the proposed coating applied over the proposed surface preparation to determine primer recommendations.
- f. If no passivators are present, wash galvanized metal surfaces with mineral spirits to remove residual grease and oil.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to 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 or repair existing paints or finishes that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
 - 3. Clean concrete according to ASTM D4258. Allow to dry.
 - 4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.

3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- I. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- J. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- K. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- L. Galvanized Surfaces:
 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 2. Prepare surface according to SSPC-SP 3.
- M. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: 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.
 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- N. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's written instructions.
- D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

- E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- F. Apply each coat to uniform appearance.
- G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- L. Provide workmanship of the highest quality. Mix and use paint materials according to manufacturer's directions. Spread materials evenly and smoothly; brush out without sags or runs.
- M. Provide finish coats compatible with primers used. Provide barrier coats over incompatible primers where required.
- N. In the event that undercoats, stains, or other conditions show through final paint coat, apply additional coats until paint film is of uniform color and sheen.
- O. Finish the insides of wood cabinets, including backs of cabinet doors, as scheduled for the fronts and ends.
- P. Sand enamel and lacquer finishes between coats on wood and metal surfaces to produce a smooth, even finish. Use #220 grit sandpaper or finer.
- Q. Tint primer and undercoats to approximate shade of finish coat to ensure uniformity of color in the finish.
- R. Touch up suction spots and "hot spots" before applying the finish coat to produce an even result.
- S. Paint exposed ductwork, piping, and conduit in finished, occupied areas, the same color as the wall or ceiling against which it is installed, unless otherwise noted.
- T. Gypsum Board, Portland Cement Plaster, and Concrete Surfaces: Apply finish coat with rollers.
- U. Concrete Masonry Unit (CMU) Wall Surfaces Without Block Filler: Apply first coat of paint with a spray gun.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.7 COLOR SCHEDULE - SEE FINISH SCHEDULE ON DRAWINGS.

END OF SECTION 09 91 13

SECTION 10 14 63
DIGITAL EXTERIOR MARQUEE SIGN

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 specification section, apply to work of this section.

1.2 SECTION INCLUDES

- A. Cabinet, face, and message area of exterior marquee sign specifications.
- B. Lighting
- C. Structural support
- D. LED Digital sign

1.3 RELATED SECTIONS

- A. Section 03 20 00 Cast-in-place Concrete
- B. Section 05 50 00 Metal Fabrications
- C. Divisions 26 and 27

1.4 REFERENCES

- A. ASTM A 36 Standard Specification for Carbon Structural Steel
- B. ASTM A 307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- C. ASTM A 500 Standard Specification for Cold-Formed Welded and Seamless Carbon Structural Tubing in Rounds and Shapes
- D. ASTM A 615 Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement
- E. ASTM C 33 Standard Specification for Concrete Aggregates
- F. ASTM C 150 Standard Specification for Portland Cement
- G. ASTM C 270 Standard Specification for Mortar for Unit Masonry
- H. FBC - Texas Building Code and ASCE 7
- I. UL Underwriters Laboratories, Inc
- J. NEMA Standards

1.5 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's product literature including components and accessories
 - 1. Preparation instructions and recommendations
 - 2. Storage and handling requirements and recommendations
 - 3. Printed installation and maintenance instructions
 - 4. Programming Instructions and directions for access to online training
 - 5. Provide training as outlined in 3.2.

- C. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign and anchorage for Architects and District Design Coordinators review and approval.
 - 1. Anchorage shall include as a minimum an engineered foundation plans/details, structural components and connections to each other, the sign cabinet, sign face, and the foundation in compliance with FBC.
 - 2. Submit structural shop drawings to the School District Building Department in addition to the Architect.
- D. Colors: Provide color samples for Architects and District Design Coordinators selection.
- E. Submit graphics being applied to the sign for Architects and District Design Coordinators review and approval.
- F. Submit closeout information on operation and maintenance data for installed products.
- G. Submit executed warranty as specified to Owner.

1.6 QUALIFICATIONS

- A. Obtain all products in this section from single supplier.
- B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 5-years documented experience.
- C. Installation by installer specializing and with minimum 5-years experience in the installation of products specified in this section.
- D. Design Work under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Texas.

1.7 WARRANTY

- A. Non LED Electronic Display warranty
 - 1. Minimum warranty for 10-years against defects in workmanship and materials, warranty does not cover lamps or damage from vandalism.
 - 2. Sign Structure and Identification Cabinet: Under Normal use and service should the sign structure or sign malfunction due to defects in workmanship or materials, the Manufacturer will repair or replace any of the defective materials, (with exception of lamps or ballasts).
 - a. Faulty ballasts will be exchanged for new ballasts for a period of three years
 - a. The warranty also includes refinishing and reinstallation, which may be required due to repair or replacement of defective sign where defect was not apparent prior to installation
 - 3. Contractor is responsible for replacement or refinishing of sign where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.
- B. LED Electronic Display warranty
 - 1. Manufacturer shall warrant the LED Electronic Display to be free from defects in workmanship or materials for a period of 5-years from the date of Substantial Completion.
 - 2. Damage caused by abuse, misuse, misapplication or accidental damage outside the control of the Manufacturer (including Lightning), and any consequential or contingent liability is excluded from the warranty.
 - 3. Manufacturer will repair or replace malfunctioning or defective parts.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site per manufactures requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. LED Signage
 - 1. Provide product in compliance with UL or other approved agency.
 - 2. Expected LED life expectancy is 100,000 hours.
 - 3. Provide LED display on both sides of sign.
 - 4. Minimum of two LEDs per Pixel with a 20mm pitch
 - 5. Provide temperature probe
 - 6. Approximate cabinet size 4' x 10'; as per plans or by architect
 - 7. Top of sign height maximum 16', as per plans or by architect
 - 8. Mounting option as per plans or by architect
 - 9. Decorative trim as indicated on plans or by architect.
- B. Cabinet Specifications
 - 1. Double sided extruded aluminum and sized as indicated on plans
 - 2. Heliarc welded and mitered at corners
 - 3. Powder coated color finish: 3.0 to 4.0 mils thick electrostatically applied and permanently bonded guaranteed non-fading.
- C. Cabinet Face Specifications
 - 1. Provide vandal resistant clear UV solar grade high impact resistant polycarbonate cover with stainless steel hinges secured with dual compression tubular locks.
 - 2. Powder coat covers to match cabinet.
- D. Lighting Specifications
 - 1. All electrical components shall be UL listed and approved.
 - 2. Lighting: High output instant LED spaced to provide uniform night lighting over entire face of the sign.
 - 3. Install per current NEC edition.
- E. Support Structure Specifications
 - 1. Design the support structure to withstand wind loads of as required by ASCE 7 & FBC.
 - 2. Legs: Cover on both sides if indicated on plans and anchor to foundation as indicated on engineered plans.
 - 3. Side frames painted in color approved by the Architect and District Design Coordinator.
 - 4. Provide signed and sealed (by Texas licensed PE) engineered shop drawings and structural calculations for approval by District Building Department.
- F. Provide 6" high numbers for the street address on the marquee, both sides if they are viewable from the street.
- G. LED Display Cabinets:
 - 1. Heavy Gauge Formed Aluminum Cabinets:
 - a. Serviceability: LED cabinets serviceable from front
 - b. Protective Covers: Polycarbonate lens protecting LED display area.
 - c. Lifts: Gas cylinder assist lifts, one on each end of LED covers.
 - 2. Double Sided: Each side is one self contained LED Display.
 - a. Function: Each side of LED display to contain its own processor and be capable of displaying different independent messages at the same time
 - b. Weather resistant cabinets designed to meet the classification requirements of NEMA 4X construction.

- c. Closure Panels: Matching aluminum ventilated closure panels join two cabinets aesthetically together.
 - d. Cabinet Finish: Industrial, graffiti resistant coating, DGHS Polyurethane by PPG or Architect approved equal.
 - e. Climate Controlled Interior: By thermostat, controlling heaters bars, fans.
 - f. Ventilation: With side ventilation/water diverters; forced air ventilated design with an air exchange rate of 4 complete air changes per minute.
- 3. Service: Serial port provided within Electronic Message Center for troubleshooting by direct connection to PC.
- 4. Controller (CPU) Central Processing Unit:
 - a. The central processing unit provided in each display is a microprocessor based circuit board assembly.
 - b. Unit is 10 MHz device with minimum of 2-MB battery backed static RAM memory and 128K bytes Flash ROM with on board programmability.
 - c. Provide 1 Gb compact flash memory for message storage.
 - d. Input/Output: One RS-232, RS-485/422 serial port jumper selectable.
 - e. Function: CPU assembly provides automatic memory and program testing at power up, diagnostics, and full talk back.
 - f. Network: RS485 based network assembly to interface the displays with the main PC controller.
 - i) Assembly will utilize RS-485 hardwired buried cable to PC Controller interface displays to PC through a junction box that will control displays via an RS-485 connection.
- 5. System Software Requirements
 - a. Scheduling made in 12 or 24-hour formats.
 - b. Scheduler: Resides within LED display cabinet as onboard processor; does not require PC to operate messaging schedule.
 - c. Schedule Storage: System software and program sequence and schedules, can be stored on removable storage or fixed storage device.
 - d. Provide advance scheduling or pre-programming for more than 1 year in advance.
 - e. Screen Helps: Excerpts from the Owner's Manual.
 - f. Bad Word Checker: Prevents display of unacceptable words.
 - g. Library of words is password protected.
 - h. Library is fully editable for adding or deleting words.
 - i. Control: Menu guided control.
 - j. Editing and Display: Simultaneous display and edit capability.
 - k. Automatic Rebooting: Of system disk, after power outage:
 - i) System clock and calendar will continue to function during power failure.
 - ii) Message display holds memory for up to 60 days without power.
 - l. Provide all operating software to Owner along with required usage licenses and software updates.
 - m. Text Modules: Provide various with scalable fonts and traveling text.
 - n. Provide remote or on-site programming with appropriate connection.
 - o. Software Menu: User-friendly menu and icon-based software.
 - p. Provide password protection capability.
- 6. Power Supplies:
 - a. Verify the line voltage to the sign on existing school.
 - b. New power line from the building shall be in conduit sized and installed per the NEC and division 26 of the specifications.

- c. Provide the electronic switching power supplies with short circuit and surge protection.
 - i) Protect the electronic switching power supplies by an overload allowance ranging from 105 percent up to 150 percent.
 - d. Power the LED display by multiple solid-state electronic switching power supplies.
 - i) Provide a separate power supply for the CPU to isolate the processor power from the LED drive power.
- 7. Information Transmission Method:
 - a. Method: LAN connection
 - i) Utilizing CAT5 approved for underground installation.
 - b. Data Line: Run a 1 inch (25 mm) conduit with pull string per Division 26 specifications from the closest data hub to the sign location. i) Maximum distance of 1000 feet ii) Install data cable as per manufacturer's requirements.
 - iii) Cable rated for direct burial (wet location) usage
 - c. Temperature Probe: Integrated into LED cabinet
 - d. Provide alternate price for Wireless LAN or RF modem.
- 8. Heat Protection:
 - a. At or above 29 degrees C (85 degrees F), a cooling fan will automatically turn on.
 - b. If the temperature drops to 19 degrees C (67 degrees F), then the cooling fans will turn off.
 - c. At or above 80 degrees C (176 degrees F), the sign will automatically shut down to protect against damage.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install signs in strict accordance with manufacturer's instructions, District Design Standards, District Master Specifications, and FBC requirements.
- B. Install signs at location and height as shown on the permitted site plan issued by the District Building Department.

3.2 TRAINING

- A. Provide for training by one of the three options:
 - 1. Online training provided at no charge through secure access log-in at the vendor's or the manufacturer's web site.
 - 2. Provide (2) DVD training disks, one to the School and one to Facilities Services Department.
 - 3. Provide onsite training of at least two school staff members by the vendor.

3.3 CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition or replaced with new material.

END OF SECTION

**SECTION 26 02 00
BASIC MATERIALS AND METHODS**

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The requirements of the General Conditions and Supplementary Conditions apply to all Work herein.
- B. The Contract Drawings indicate the extent and general arrangement of the systems. If any departure from the Contract Drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore, shall be submitted to the Architect for approval as soon as practicable. No such departures shall be made without the prior written approval of the Architect.

1.02 SCOPE OF WORK

- A. The Work included under this Contract consists of the furnishing and installation of all equipment and material necessary and required to form the complete and functioning systems in all of its various phases, all as shown on the accompanying Drawings and/or described in these Specifications. The contractor shall review all pertinent drawings, including those of other contracts prior to commencement of Work.
- B. This Division requires the furnishing and installing of all items Specified herein, indicated on the Drawings or reasonably inferred as necessary for safe and proper operation; including every article, device or accessory (whether or not specifically called for by item) reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the work include, but are not limited to, materials, labor, supervision, transportation, storage, equipment, utilities, all required permits, licenses and inspections. All work performed under this Section shall be in accordance with the Project Manual, Drawings and Specifications and is subject to the terms and conditions of the Contract.
- C. The approximate locations of Electrical items are indicated on the Drawings. These Drawings are not intended to give complete and accurate details in regard to location of outlets, apparatus, etc. Exact locations are to be determined by actual measurements at the building, and will in all cases be subject to the Review of the Owner or Engineer, who reserves the right to make any reasonable changes in the locations indicated without additional cost to the Owner.
- D. Items specifically mentioned in the Specifications but not shown on the Drawings and/or items shown on Drawings but not specifically mentioned in the Specifications shall be installed by the Contractor under the appropriate section of work as if they were both specified and shown.
- E. All discrepancies between the Contract Documents and actual job-site conditions shall be reported to the Owner or Engineer so that they will be resolved prior to the bidding, where this cannot be done at least 7 working days prior to bid; the greater or more costly of the discrepancy shall be bid. All labor and materials required to perform the work described shall be included as part of this Contract.
- F. It is the intention of this Section of the Specifications to outline minimum requirements to furnish the Owner with a turn-key and fully operating system in cooperation with other trades.

- G. It is the intent of the above "Scope" to give the Contractor a general outline of the extent of the Work involved; however, it is not intended to include each and every item required for the Work. Anything omitted from the "Scope" but shown on the Drawings, or specified later, or necessary for a complete and functioning heating, ventilating and air conditioning system shall be considered a part of the overall "Scope".
- H. The Contractor shall rough-in fixtures and equipment furnished by others from rough-in and placement drawings furnished by others. The Contractor shall make final connection to fixtures and equipment furnished by others.
- I. Contractor shall participate in the commissioning process; including but not limited to meeting attendance, completion of checklists and participation in functional testing.

1.03 RELATED SECTIONS

- A. General Conditions
- B. Supplementary Conditions
- C. Division One

1.04 COOPERATION WITH TRADES:

- A. Cooperation with trades of adjacent, related, or affected materials or operations shall be considered a part of this work in order to affect timely and accurate placing of work and bring together in proper and correct sequence, the work of such trades.

1.05 REFERENCES

- A. National Electrical Code (NEC)
- B. American Society for Testing and Materials (ASTM)
- C. Underwriter's Laboratories, Inc. (UL)
- D. Insulated Cable Engineer's Association (ICEA).
- E. National Electrical Manufacturer's Association (NEMA).
- F. Institute of Electrical and Electronic's Engineers (IEEE).
- G. American National Standards Institute (ANSI).
- H. National Fire Protection Association (NFPA).
- I. International Energy Conservation Code (IECC).

1.06 COMPLETE FUNCTIONING OF WORK:

- A. All work fairly implied as essential to the complete functioning of the electrical systems shown on the Drawings and Specifications shall be completed as part of the work of this Division unless specifically stated otherwise. It is the intention of the Drawings and Specifications to establish the types of the systems, but not set forth each item essential to the functioning of the system. In case of doubt as to the work intended,

or in the event of amplification or clarification thereof, the Contractor shall call upon the Architect for supplementary instructions, Drawings, etc.

- B. Contractor shall review all pertinent Drawings and adjust his work to all conditions shown there on. Discrepancies between Plans, Specifications, and actual field conditions shall be brought to the prompt attention of the Architect.
 - 1. Approximate location of transformers, feeders, branch circuits, outlets, lighting and power panels, outlets for special systems, etc., are indicated on the Drawings. However, the Drawings, do not give complete and accurate detailed locations of such outlets, conduit runs, etc., and exact locations must be determined by actual field measurement. Such locations will, at all times, be subject to the approval of the Architect.
 - 2. Communicate with the Architect and secure his approval of any outlet (light fixture, receptacle, switch, etc.) location about which there may be the least question. Outlets obviously placed in a location not suitable to the finished room or without specific approval, shall be removed and relocated when so directed by the Architect. Location of light fixtures shall be coordinated with reflected ceiling plans.
- C. Additional coordination with mechanical contractor may be required to allow adequate clearances of mechanical equipment, fixtures and associated appurtenances. Contractor to notify Architect and Engineer of unresolved clearances, conflicts or equipment locations.

1.07 SCHEMATIC NATURE OF CONTRACT DOCUMENTS

- A. The contract documents are schematic in nature in that they are only to establish scope and a minimum level of quality. They are not to be used as actual working construction drawings. The actual working construction drawings shall be the approved shop drawings.

1.08 CONTRACTOR'S QUALIFICATIONS

- A. An approved contractor for the work under this division shall be:
 - 1. A specialist in this field and have the personnel, experience, training, and skill, and the organization to provide a practical working system.
 - 2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that have served their Owners satisfactorily for not less than 3 years.
 - 3. Perform work by persons qualified to produce workmanship of specified quality. Persons performing electrical work shall be required to be licensed. Onsite supervision, journeyman shall have minimum of journeyman license. Helpers, apprentices shall have minimum of apprentice license.

1.09 DATE OF FINAL ACCEPTANCE

- A. The date of final acceptance shall be the date of owner occupancy, or the date all punch list items have been completed or final payment has been received. Refer to Division One for additional requirements.
- B. The date of final acceptance shall be documented in writing and signed by the architect, owner and contractor.

1.10 DEFINITIONS AND SYMBOLS

- A. General Explanation: A substantial amount of construction and Specification language constitutes definitions for terms found in other Contract Documents, including Drawings which must be recognized as diagrammatic and schematic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article, unless defined otherwise in Division 1.
- B. Definitions and explanations of this Section are not necessarily either complete or exclusive, but are general for work to the extent not stated more explicitly in another provision of the Contract Documents.
- C. Indicated: The term "Indicated" is a cross-reference to details, notes or schedules on the Drawings, to other paragraphs or schedules in the Specifications and to similar means of recording requirements in Contract Documents. Where such terms as "Shown", "Noted", "Scheduled", "Specified" and "Detailed" are used in lieu of "Indicated", it is for the purpose of helping the reader locate cross-reference material, and no limitation of location is intended except as specifically shown.
- D. Directed: Where not otherwise explained, terms such as "Directed", "Requested", "Accepted", and "Permitted" mean by the Architect or Engineer. However, no such implied meaning will be interpreted to extend the Architect's or Engineer's responsibility into the Contractor's area of construction supervision.
- E. Reviewed: Where used in conjunction with the Engineer's response to submittals, requests for information, applications, inquiries, reports and claims by the Contractor the meaning of the term "Reviewed" will be held to limitations of Architect's and Engineer's responsibilities and duties as specified in the General and Supplemental Conditions. In no case will "Reviewed" by Engineer be interpreted as a release of the Contractor from responsibility to fulfill the terms and requirements of the Contract Documents.
- F. Furnish: Except as otherwise defined in greater detail, the term "Furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- G. Install: Except as otherwise defined in greater detail, the term "Install" is used to describe operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning and similar operations, as applicable in each instance.
- H. Provide: Except as otherwise defined in greater detail, the term "Provide" is used to mean "Furnish and Install", complete and ready for intended use, as applicable in each instance.
- I. Installer: Entity (person or firm) engaged by the Contractor or its subcontractor or Sub-contractor for performance of a particular unit of work at the project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning and similar operations, as applicable in each instance. It is a general requirement that such entities (Installers) be expert in the operations they are engaged to perform.
- J. Imperative Language: Used generally in Specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe

responsibilities that must be fulfilled indirectly by the Contractor, or when so noted by other identified installers or entities.

- K. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as minimum quality level or quantity of work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable tolerance limits. In complying with requirements, indicated or scheduled numeric values are either minimums or maximums as noted or as appropriate for the context of the requirements. Refer instances of uncertainty to Owner or Engineer via a request for information (RFI) for decision before proceeding.
- L. Abbreviations and Symbols: The language of Specifications and other Contract Documents including Drawings is of an abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self explanatory nature have been included in text of Specifications and Drawings. Specific abbreviations and symbols have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of Specification requirements with notations on Drawings and in Schedules. These are frequently defined in Section at first instance of use or on a Legend and Symbol Drawing. Trade and industry association names and titles of generally recognized industry standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of Contract Documents so indicate. Except as otherwise indicated, graphic symbols and abbreviations used on Drawings and in Specifications are those recognized in construction industry for indicated purposes. Where not otherwise noted symbols and abbreviations are defined by 1993 ASHRAE Fundamentals Handbook, chapter 34 "Abbreviations and Symbols", ASME and ASPE published standards.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- B. Deliver products to the project at such time as the project is ready to receive the equipment, pipe or duct properly protected from incidental damage and weather damage.
- C. Damaged equipment shall be promptly removed from the site and new, undamaged equipment shall be installed in its place promptly with no additional charge to the Owner.

1.12 SUBMITTALS

- A. Coordinate with Division 1 for submittal timetable requirements, unless noted otherwise within thirty (30) days after the Contract is awarded the Contractor shall submit a minimum of eight (8) complete bound sets of shop drawings and complete data covering each item of equipment or material. The first submittal of each item requiring a submittal must be received by the Architect or Engineer within the above thirty day period. The Architect or Engineer shall not be responsible for any delays or costs incurred due to excessive shop drawing review time for submittals received after the thirty (30) day time limit. The Architect and Engineer will retain one (1) copy each of all shop drawings for their files. Where full size drawings are involved, submit one (1) print and one (1) reproducible sepia or vellum in lieu of eight (8) sets. All literature pertaining to an item subject to Shop Drawing submittal shall be submitted at one time. A submittal shall not contain information from more than one Specification section, but may have a section subdivided into items or equipment as listed in each section. The Contractor may elect to

submit each item or type of equipment separately. Each submittal shall include the following items enclosed in a suitable binder:

1. A cover sheet with the names and addresses of the Project, Architect, MEP Engineer, General Contractor and the Subcontractor making the submittal. The cover sheet shall also contain the section number covering the item or items submitted and the item nomenclature or description.
 2. An index page with a listing of all data included in the Submittal.
 3. A list of variations page with a listing all variations, including unfurnished or additional required accessories, items or other features, between the submitted equipment and the specified equipment. If there are no variations, then this page shall state "NO VARIATIONS". Where variations affect the work of other Contractors, then the Contractor shall certify on this page that these variations have been fully coordinated with the affected Contractors and that all expenses associated with the variations will be paid by the submitting Contractor. This page will be signed by the submitting Contractor.
 4. Equipment information including manufacturer's name and designation, size, performance and capacity data as applicable. All applicable Listings, Labels, Approvals and Standards shall be clearly indicated.
 5. Dimensional data and scaled drawings as applicable to show that the submitted equipment will fit the space available with all required Code and maintenance clearances clearly indicated and labeled at a minimum scale of $1/4" = 1'-0"$, as required to demonstrate that the alternate or substituted product will fit in the space available.
 6. Identification of each item of material or equipment matching that indicated on the Drawings.
 7. Sufficient pictorial, descriptive and diagrammatic data on each item to show its conformance with the Drawings and Specifications. Any options or special requirements or accessories shall be so indicated. All applicable information shall be clearly indicated with arrows or another approved method.
 8. Additional information as required in other Sections of this Division.
 9. Certification by the General Contractor and Subcontractor that the material submitted is in accordance with the Drawings and Specifications, signed and dated in long hand. Submittals that do not comply with the above requirements shall be returned to the Contractor and shall be marked **"REVISE AND RESUBMIT"**.
- B. Refer to Division 1 for additional information on shop drawings and submittals.
- C. Equipment and materials submittals and shop drawings will be reviewed for compliance with design concept only. It will be assumed that the submitting Contractor has verified that all items submitted can be installed in the space allotted. Review of shop drawings and submittals shall not be considered as a verification or guarantee of measurements or building conditions.
- D. Where shop drawings and submittals are marked **"REVIEWED"**, the review of the submittal does not indicate that submittals have been checked in detail nor does it in any way relieve the Contractor from his responsibility to furnish material and perform work as required by the Contract Documents.
- E. Shop drawings shall be reviewed and returned to the Contractor with one of the following categories indicated:
1. **REVIEWED:** Contractor need take no further submittal action, shall include this submittal in the O&M manual and may order the equipment submitted on.

2. **REVIEWED AS NOTED:** Contractor shall submit a letter verifying that required exceptions to the submittal have been received and complied with including additional accessories or coordination action as noted, and shall include this submittal and compliance letter in the O&M manual. The contractor may order the equipment submitted on at the time of the returned submittal providing the Contractor complies with the exceptions noted.
 3. **NOT APPROVED:** Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is not approved, the Contractor will automatically be required to furnish the product, material or method named in the Specifications and/or drawings. Contractor shall not order equipment that is not approved. Repetitive requests for substitutions will not be considered.
 4. **REVISE AND RESUBMIT:** Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is marked revise and resubmit, the Contractor will automatically be required to furnish the product, material or method named in the Specifications and/or provide as noted on previous shop drawings. Contractor shall not order equipment marked revise and resubmit. Repetitive requests for substitutions will not be considered.
 5. **CONTRACTOR'S CERTIFICATION REQUIRED:** Contractor shall resubmit submittal on material, equipment or method of installation. The Contractor's stamp is required stating the submittal meets all conditions of the contract documents. The stamp shall be signed by the General Contractor. The submittal will not be reviewed if the stamp is not placed and signed on all shop drawings.
 6. **MANUFACTURER NOT AS SPECIFIED:** Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is marked manufacturer not as specified, the Contractor will automatically be required to furnish the product, material or method named in the specifications. Contractor shall not order equipment where submittal is marked manufacturer not as specified. Repetitive requests for substitutions will not be considered.
- F. Materials and equipment which are purchased or installed without shop drawing review shall be at the risk of the Contractor and the cost for removal and replacement of such materials and equipment and related work which is judged unsatisfactory by the Owner or Engineer for any reason shall be at the expense of the Contractor. The responsible Contractor shall remove the material and equipment noted above and replace with specified equipment or material at his own expense when directed in writing by the Architect or Engineer.
- G. Shop Drawing Submittals shall be complete and checked prior to submission to the Engineer for review.
- H. Furnish detailed shop drawings, descriptive literature, physical data and a specification critique for each section indicating "compliance" and/or "variations" for the following items:
- Distribution Panelboards
 - Lighting and Appliance Panelboards
 - Wiring Gutters
 - Heavy Duty Disconnect Switches
 - Lighting Fixtures
 - Lighting Contactors
 - Time Clocks
 - Lighting Control System

Photocells
Wiring Devices and Plates
Conduit and Fittings
Wire
Switchboards

Harmonic Mitigating Type Transformers
Emergency Generator
Automatic Transfer Switches
Sound Reinforcing System
Fire Alarm System
Surge Protection Device (SPD)

- I. Refer to each specification section for additional requirements.

1.13 OPERATION AND MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 1 and in addition to the requirements specified in Division 1, include the following information for equipment items:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 4. Servicing instructions and lubrication charts and schedules.

1.14 COORDINATION DRAWINGS

- A. Prepare coordination drawings to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
1. Indicate the proposed locations of pipe, duct, equipment, and other materials. Include the following:
 - a. Wall and type locations.
 - b. Clearances for installing and maintaining insulation.
 - c. Locations of light fixtures and sprinkler heads.
 - d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - e. Equipment connections and support details.
 - f. Exterior wall and foundation penetrations.
 - g. Routing of storm and sanitary sewer piping.
 - h. Fire-rated wall and floor penetrations.
 - i. Sizes and location of required concrete pads and bases.

- j. Valve stem movement.
 - k. Structural floor, wall and roof opening sizes and details.
-
- 2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 - 3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
 - 4. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components, and other ceiling-mounted items.
-
- B. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include, but not be limited to: voltage, ampacity, capacity, electrical and piping connections, space requirements, sequence of construction, building requirements and special conditions.
 - C. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

1.15 RECORD DRAWINGS

- 1. Maintain a continuous record during the course of construction of all changes and deviations in the work from the contract drawings. Upon completion of the work, purchase a set of "Auto Positive Tracings" on vellum and make corrections as required to reflect the electrical systems as installed. Location and size of all conduit shall be accurately shown to dimension. Submit three prints of the tracings for approval. Make corrections to tracings as directed and deliver "Auto Positive Tracings" to the Architect. Record drawings shall be furnished in addition to shop drawings. Symbols on the Record drawings shall correspond to the identification symbols on the contract drawings and equipment identification plates and tags.
- 2. The Contractor shall maintain a set of clearly marked black line record "AS-BUILT" prints on the job site on which he shall mark all work details, alterations to meet site conditions and changes made by "Change Order" notices. These shall be kept available for inspection by the Owner, Architect or Engineer at all times.
- 3. Refer to Division 1 for additional requirements concerning record drawings. If the Contractor does not keep an accurate set of as-built drawings, the pay request may be altered or delayed at the request of the Architect. Mark the drawings with a colored pencil. Delivery of as-built prints and reproducibles is a condition of final acceptance.
- 4. The record prints shall be updated on a daily basis and shall indicate accurate dimensions for all buried or concealed work, precise locations of all concealed pipe or duct, locations of all concealed valves, controls and devices and any deviations from the work shown on the Construction Documents which are required for coordination. All dimensions shall include at least two dimensions to permanent structure points.
- 5. Submit three prints of the tracings for approval. Make corrections to tracings as directed and delivered "Auto Positive Tracings" to the architect. "As-Built" drawings shall be furnished in addition to shop drawings.

6. When the option described in paragraph F., above is not exercised then upon completion of the work, the Contractor shall transfer all marks from the submit a set of clear concise set of reproducible record "AS-BUILT" drawings and shall submit the reproducible drawings with corrections made by a competent draftsman and three (3) sets of black line prints to the Architect or Engineer for review prior to scheduling the final inspection at the completion of the work. The reproducible record "AS-BUILT" drawings shall have the Engineers Name and Seal removed or blanked out and shall be clearly marked and signed on each sheet as follows:

CERTIFIED RECORD DRAWINGS

DATE:

(NAME OF GENERAL CONTRACTOR)

BY: _____
(SIGNATURE)

(NAME OF SUBCONTRACTOR)

BY: _____
(SIGNATURE)

1.16 CERTIFICATIONS AND TEST REPORTS

- A. Submit a detailed schedule for completion and testing of each system indicating scheduled dates for completion of system installation and outlining tests to be performed and schedule date for each test. This detailed completion and test schedule shall be submittal at least 90 days before the projected Project completion date.
- B. Test result reporting forms shall be submitted for review no later than the date of the detailed schedule submitted.
- C. Submit 4 copies of all certifications and test reports to the Architect or Engineer for review adequately in advance of completion of the Work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.
- D. Certifications and test reports to be submitted shall include, but not be limited to those items outlined in Section of Division 26.

1.17 MAINTENANCE MANUALS

- A. Coordinate with Division 1 for maintenance manual requirements, unless noted otherwise bind together in "D ring type" binders by National model no. 79-883 or equal, binders shall be large enough to allow 1/4" of spare capacity. Three (3) sets of all approved shop drawing submittals, fabrication drawings, bulletins, maintenance instructions, operating instructions and parts exploded views and lists for each and every piece of equipment furnished under this Specification. All sections shall be typed and indexed into sections and labeled for easy reference and shall utilize the individual specification section numbers shown in the Electrical Specifications as an organization guideline. Bulletins containing information about equipment that is not installed on the project shall be properly marked up or stripped and reassembled. All pertinent information required by the Owner for proper operation and maintenance of equipment supplied by Division 26 shall be clearly and legibly set forth in memoranda that shall, likewise, be bound with bulletins.

- B. Prepare maintenance manuals in accordance with Special Project Conditions, in addition to the requirements specified in Division 26, include the following information for equipment items:
1. Identifying names, name tags designations and locations for all equipment.
 2. Fault Current calculations and Coordination Study.
 3. Reviewed shop drawing submittals with exceptions noted compliance letter.
 4. Fabrication drawings.
 5. Equipment and device bulletins and data sheets clearly highlighted to show equipment installed on the project and including performance curves and data as applicable, i.e., description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and model numbers of replacement parts.
 6. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 7. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions, servicing instructions and lubrication charts and schedules.
 8. Equipment name plate data.
 9. Wiring diagrams.
 10. Exploded parts views and parts lists for all equipment and devices.
 11. Color coding charts for all painted equipment and conduit.
 12. Location and listing of all spare parts and special keys and tools furnished to the Owner.
 13. Furnish recommended lubrication schedule for all required lubrication points with listing of type and approximate amount of lubricant required.
- C. Refer to Division 1 for additional information on Operating and Maintenance Manuals.
- D. Operating and Maintenance Manuals shall be turned over to the Owner or Engineer a minimum of 14 working days prior to the beginning of the operator training period.

1.18 OPERATOR TRAINING

- A. The Contractor shall furnish the services of factory trained specialists to instruct the Owner's operating personnel. The Owner's operator training shall include 12 hours of on site training in three 4 hour shifts.
- B. Before proceeding with the instruction of Owner Personnel, prepare a typed outline in triplicate, listing the subjects that will be covered in this instruction, and submit the outline for review by the Owner. At the conclusion of the instruction period obtain the signature of each person being instructed on each copy of the reviewed outline to signify that he has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines.
- C. Refer to other Division 26 Sections for additional Operator Training requirements.

1.19 SITE VISITATION

- A. Visit the site of the proposed construction in order to fully understand the facilities, difficulties and restriction attending the execution of the work.

- B. Before submitting a bid, it will be necessary for each Contractor whose work is involved to visit the site and ascertain for himself the conditions to be met therein in installing his work and make due provision for same in his bid. It will be assumed that this Contractor in submitting his bid has visited the premises and that his bid covers all work necessary to properly install the equipment shown. Failure on the part of the Contractor to comply with this requirement shall not be considered justification for the omission or faulty installation of any work covered by these Specifications and Drawings.
- C. Understand the existing utilities from which services will be supplied; verify locations of utility services, and determine requirements for connections.
- D. Determine in advance that equipment and materials proposed for installation fit into the confines indicated.

1.20 WARRANTY

- A. The undertaking of the work described in this Division shall be considered equivalent to the issuance, as part of this work, of a specific guarantee extending one year beyond the date of completion of work and acceptance by Owner, against defects in materials and workmanship. Materials, appliances and labor necessary to effect repairs and replacement so as to maintain said work in good functioning order shall be provided as required. Replacements necessitated by normal wear in use or by Owner's abuse are not included under this guarantee.
- B. All normal and extended warranties shall include parts, labor, miscellaneous materials, travel time, incidental expenses, freight/shipping, refrigerant, oils, lubricants, belts, filters and any expenses related to service call required to diagnose warranty problems.

1.21 TRANSFER OF ELECTRONIC FILES

- A. Project documents are not intended or represented to be suitable for reuse by Architect/Owner or others on extensions of this project or on any other project. Any such reuse or modification without written verification or adaptation by Engineer, as appropriate for the specific purpose intended, will be at Architect/Owner's risk and without liability or legal exposure to Engineer or its consultants from all claims, damages, losses and expense, including attorney's fees arising out of or resulting thereof.
- B. Because data stored in electric media format can deteriorate or be modified inadvertently, or otherwise without authorization of the data's creator, the party receiving the electronic files agrees that it will perform acceptance tests or procedures within sixty (60) days of receipt, after which time the receiving party shall be deemed to have accepted the data thus transferred to be acceptable. Any errors detected within the sixty (60) day acceptance period will be corrected by the party delivering the electronic files. Engineer is not responsible for maintaining documents stored in electronic media format after acceptance by the Architect/Owner.
- C. When transferring documents in electronic media format, Engineer makes no representations as to the long term compatibility, usability or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by Engineer at the beginning of the Project.
- D. Any reuse or modifications will be Contractor's sole risk and without liability or legal exposure to Architect, Engineer or any consultant.

- E. The Texas Board of Architectural Examiners (TBAE) has stated that it is in violation of Texas law for persons other than the Architect of record to revise the Architectural drawings without the Architect's written consent.

It is agreed that "MEP" hard copy or computer-generated documents will not be issued to any other party except directly to the Architect/Owner. The contract documents are contractually copyrighted and cannot be used for any other project or purpose except as specifically indicated in AIA B-141 Standard Form of Agreement Between Architect and Owner.

If the client, Architect/Owner, or developer of the project requires electronic media for "record purposes", then an AutoCAD based compact disc ("CD") will be prepared. The "CD" will be submitted with all title block references intact and will be formatted in a "plot" format to permit the end user to only view and plot the drawings. Revisions will not be permitted in this configuration.

- F. At the Architect/Owner's request, Engineer will prepare one "CD" of electronic media to assist the contractor in the preparation of submittals. The Engineer will prepare and submit the "CD" to the Architect/Owner for distribution to the contractor. All copies of the "CD" will be reproduced for a cost of reproduction fee of Five Hundred Dollars (\$500.00) per "CD".

The "CD" will be prepared and all title blocks, names and dates will be removed. The "CD" will be prepared in a ".dwg" format to permit the end user to revise the drawings.

- G. This Five Hundred Dollars (\$500.00) per "CD" cost of reproduction will be paid directly from the Contractor to the Engineer. The "CD" will be prepared only after receipt of the Five Hundred Dollars (\$500.00). The Five Hundred Dollars (\$500.00) per "CD" cost of reproduction is to only recover the cost of the manhours necessary to reproduce the documents. It is not a contractual agreement between the Contractor and Engineer to provide any engineering services, nor any other service.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. The names and manufacturers and model numbers have been used in the Contract documents to establish types of equipment and standards of quality. Where more than one manufacturer is named for a specific item of equipment, only one of the specified manufacturers will be considered for approval. Where only one manufacturer is mentioned with the phrase "or approved equal", Contractor may submit an alternate manufacturer for consideration, provided the following conditions are met:

1. Submit alternate equipment with complete descriptive data in shop drawing form. Provide sample of equipment upon request for review by Architect. Samples will be returned if requested in writing.
2. Alternate equipment must be equal from the standpoint of materials, construction and performance.
3. Alternate submittal must be presented to the Engineer/Architect ten (10) days prior to bid date for approval.

- B. The Architect and Engineer shall be the sole judge of quality and equivalence of equipment, materials and methods.

2.02 All materials and products used on this project shall be listed by Underwriters' Laboratories.

2.03 ACCESS DOORS

- A. Wherever access is required in walls or ceilings to concealed junction boxes, pull boxes, equipment, etc., installed under this Division, furnish a hinged access door and frame with flush latch handle to another Division for installation. Doors shall be as follows:
 - 1. Plaster Surfaces: Milcor Style K.
 - 2. Ceramic Tile Surfaces: Milcor Style M.
 - 3. Drywall Surfaces: Milcor Style DW.
 - 4. Install panels only in locations approved by the Architect.

2.04 EQUIPMENT PADS

- A. Unless noted otherwise 4" high concrete pads for floor mounted equipment shall be installed under Division 3. Pads shall conform to the shape of the equipment with a minimum of 3" margin at equipment supports. Top and sides of pads shall be troweled to a smooth finish, equal to floor. External corners shall be bullnosed to a 3/4" radius, unless shown otherwise.

2.05 ESCUTCHEONS

- A. Provide heavy chrome or nickel plated plates, of approved pattern, on conduit passing through walls, floors and ceilings in finished areas. Where conduit passes through a sleeve, no point of the conduit shall touch the building construction. Caulk around such conduit with sufficient layers of two hour rated firesafing by Thermafiber 4.0 P.C.F. density, U.S.G. fire test 4/11/78 and seal off openings between conduit and sleeves with non-hardening mastic prior to application of escutcheon plate. Escutcheons shall be Gravler Sure-Lock, or approved equal.

2.06 SPACE LIMITATIONS

- A. Equipment shall be chosen which shall properly fit into the physical space provided and shown on the drawings, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearances in accordance with Code requirements. Physical dimensions and arrangement of equipment shall be subject to the approval of the Architect.

2.07 PAINTING

- A. All factory assembled equipment for electrical work, except light fixtures, that normally is delivered with a factory applied finish shall be delivered with a hard surface factory applied finish such as baked-on machinery enamel which will not require additional field painting. The finish shall consist of not less than 2 coats of medium gray color paint USA No. 61 Munsell Notation 8-3G, 6. 10/0.54 enamel. This Contractor shall protect this finish from damage due to construction operations until acceptance of the building. He shall be responsible for satisfactorily restoring any such finishes or replacing equipment that becomes stained or damaged.

2.08 ELECTRICAL SYSTEM IDENTIFICATION

- A. Conduit Systems: Provide adequate marking of major conduit which is exposed or concealed in accessible spaces to distinguish each run as either a power or signal/communication conduit. Except as otherwise indicated, use orange banding with black lettering. Provide self-adhesive or snap-on type plastic markers. Indicate voltage

for that raceway. Locate markers at ends of conduit runs, on pull boxes, on junction boxes, near switches and other control devices, near items of equipment served by the conductors, at points where conduit passes through walls or floors, or enters non-accessible construction and at spacings of not more than 50 feet along each run of conduit. Switch-leg conduit and short branches for power connections do not have to be marked, except where conduit is larger than $\frac{3}{4}$ inch. Branch circuit conduits, junction boxes and pull boxes shall be marked with a permanent marker indicating panel name and branch circuit numbers.

- B. Underground Cable Identification: Bury a continuous, preprinted, bright colored plastic ribbon cable marker with each underground cable (or group of cables), regardless of whether conductors are in conduit, duct bank, or direct buried. Locate each directly over cables, 6 to 8 inches below finished grade.
- C. Identification of Equipment:
 - 1. All major equipment shall have a manufacturer's label identifying the manufacturer's address, equipment model and serial numbers, equipment size, and other pertinent data. Care shall be taken not to obliterate this nameplate in any way.
 - 2. A black-white-black laminated plastic engraved identifying nameplate shall be secured by stainless steel screws to each automatic transfer switch, switchboard, distribution panel, motor control center, motor starter panels and panelboards.
 - a. Identifying nameplates shall have $\frac{1}{4}$ inch high engraved letters and shall contain the following information:
 - 1) Name
 - 2) Voltage
 - 3) Phase
 - 4) "3" or "4" wire, and
 - 5) Where it is fed from.
 - b. An example of a panelboard nameplate is:
Center Panel – 1HB
480/277 volt, 3 phase, 4 wire
Center Fed from DP2
 - c. An example of an automatic transfer switch nameplate is:
Center ATS #2
480/277 volt, 3 phase, 4 wire, 4 pole
Center Fed from MSB and DPE
 - 3. Each feeder device in a switchboard, distribution panel, and motor control center device shall have a nameplate showing the load served in $\frac{1}{2}$ inch high engraved letters.
 - 4. A black-white-black laminated plastic engraved identifying nameplate shall be secured by screws to each safety switch, disconnect switch, individual motor starter, enclosed circuit breaker, wireway, and terminal cabinet.
 - a. Identifying nameplates shall have $\frac{1}{4}$ inch high engraved letters and shall indicate the equipment served.
 - b. An example if a disconnect switch is: AHU-1.
 - 5. Cardholders and directory cards shall be furnished for circuit identification in panelboards. Cardholder shall be located on inside of panel door and shall be in a metal frame with clear plastic front. Circuit lists shall be typewritten. Circuit descriptions shall include location and name of each item of equipment served. Spares and spaces shall be written in erasable pencil for future use. Circuit directory shall show the room served by each circuit. The final graphs/signage room numbers shall be used. Do not use Architectural numbering on plans.

6. Prohibited Markings: Markings which are intended to identify the manufacturer, vendor, or other source from which the material has been obtained are prohibited for installation within public, tenant, or common areas within the project. Also, prohibited are materials or devices which bear evidence that markings or insignias have been removed. Certification, testing (example, Underwriters' Laboratories, Inc.), and approval labels are exceptions to this requirement.
7. Warning Signs: Provide warning signs where there is hazardous exposure associated with access to or operation of electrical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.
8. Operational Tags: Where needed for proper and adequate information on operation and maintenance of electrical system, provide tags of plasticized card stock, either preprinted or hand printed. Tags shall convey the message, example: "DO NOT OPEN THIS SWITCH WHEN BURNER IS OPERATING."

PART 3 - EXECUTION

3.01 EXCAVATING AND BACKFILLING

- A. Trenching and backfilling and other earthwork operations required to install the facilities specified herein shall conform to the applicable requirements of Division 2 (95% of maximum standard density). Where trenching or excavation is required in improved areas, the backfill shall be compacted to a condition equal to that of adjacent undisturbed earth and the surface of the area restored to the condition existing prior to trenching or excavating operations. Provide a minimum of 3" of sand underneath all conduits. The plans indicate information pertaining to surface and sub-surface obstructions; however, this information is not guaranteed. Should obstructions be encountered whether or not shown, the Contractor shall alter routing of new work, reroute existing lines, remove obstructions where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of new work and leave existing surfaces and structures in a satisfactory and serviceable condition. **All work shall comply with OSHA Standards.**

3.02 WORKMANSHIP AND CONCEALMENT

- A. The work of this Section shall be performed by workman skilled in their trade. Installation shall be consistent in completeness whether concealed or exposed. Each item of electrical work shall be concealed in walls, chases, under floors and above ceilings except:
 1. Where shown to be exposed.
 2. Where exposure is necessary to the proper function.

3.03 SLEEVES, CUTTING AND PATCHING

- A. This section shall be responsible for placing sleeves for all conduit passing through walls, partitions, sound walls, beams, floors, roof, etc. Sleeves through below-grade walls shall use water-tight fitting manufactured by O.Z. Gedy.
- B. All cutting and patching will be done under another Division, but this Section will be responsible for timely performance of this work and layout of holes and setting sleeves.
- C. All un-used sleeves shall be sealed with 2 hour UL approved fire sealant manufactured by "3M" or approved equal.

- D. Refer to 26 05 33 for additional requirements.

3.04 ELECTRICAL GEAR

- A. Install all electrical equipment in accordance with the National Electrical Code and as shown on the drawings.
- B. Lighting contractors, time clocks, disconnect switches, etc. mounted in mechanical/electrical rooms shall be mounted at a working height not requiring a ladder, when wall space is available. Installation of these devices at greater elevations shall be approved by the Engineer. Contractor shall provide a coordination sketch of each mechanical/electrical room noting locations and mounting heights of all electrical devices (note bottom and top elevations) shown to be installed. Sketches shall be provided to the Engineer for review and the general contractor for coordination with other trades working in these rooms.

3.05 CLEANING

- A. Clean lighting fixtures and equipment.
- B. Touch-up and refinish scratches and marred surfaces on panels, switches, starters, and transformers.

3.06 TESTS AND INSPECTIONS

- A. Tests and inspection requirements shall be coordinated with Division I.
- B. Date for final acceptance test shall be sufficiently in advance of completion date of contract to permit alterations or adjustments necessary to achieve proper functioning of equipment prior to contract completion date.
- C. Conduct re-tests as directed by Architect on portions of work or equipment altered or adjusted as determined to be necessary by final acceptance test. No resultant delay or consumption of time as a result of such necessary re-test beyond contract completion date shall relieve Contractor of his responsibility under contract.
- D. Put circuits and equipment into service under normal conditions, collectively and separately, as may be required to determine satisfactory operation. Demonstrate equipment to operate in accordance with requirements of these specifications. Perform tests in the presence of Architect. Furnish instruments and personnel required for tests.
- E. Final Inspection:
 - 1. At the time designated by the Architect, the entire system shall be inspected by the Architect and Engineer. The contractor or his representative shall be present at this inspection.
 - 2. Panelboards, switches, fixtures, etc., shall be cleaned and in operating condition.
 - 3. Certificates and documents required hereinbefore shall be in order and presented to the Architect prior to inspection.
 - 4. Panel covers, junction box covers, etc., shall be removed for visual inspection of the wire, bus bars, etc.
 - 5. After the inspection, any items which are noted as needing to be changed or corrected in order to comply with these specifications and the drawings shall be accomplished without delay.

- F. The contractor shall provide a thermographic test using an independent testing laboratory using an infrared scanning device. This test shall include but not limited to all switchboards, distribution panelboards, panelboards, automatic transfer switches and other electrical distribution devices. This test shall be conducted to locate high temperature levels. This test shall be conducted between 3 to 8 months after occupancy, but not beyond the one year warranty period. Submit test to the architect and engineer using test reporting forms. All unacceptable conditions shall be corrected prior to the end of the warranty period.

END OF SECTION 26 02 00

**SECTION 26 03 00
DEMOLITION WORK**

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The drawings do not show all demolition work required. The contractor shall make himself familiar with the required scope of work to accomplish the work required by these documents. All demolition work implied or required shall be included in the scope of this contract.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 DEMOLITION WORK

- A. The contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen and shall be responsible for repairing such loss or damage. The contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection, and in-service maintenance of all electrical services for the new and existing facilities. The contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.
- B. The contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being accomplished under this project.
- C. Where existing construction is removed to provide working and extension access to existing utilities, contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, air conditioning ductwork and equipment, etc., to provide this access and shall reinstall same upon completion of work in the areas affected.
- D. Where partitions, walls, floors, or ceilings of existing construction are being removed, all contractors shall remove and reinstall in locations approved by the Architect all devices required for the operation of the various systems installed in the existing construction.
- E. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The contractor shall allow the Owner 2 weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.
- F. The contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner, and shall be delivered to such

destination as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The contractor may, at his discretion and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

- G. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.
- H. When items scheduled for relocation are found to be in damaged condition before work has been started on dismantling, the contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the contractor's responsibility and shall be repaired or replaced by the contractor as approved by the Owner, at no additional cost to the Owner.
- I. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.
- J. During the construction and remodeling, portions of the project shall remain in service. Construction equipment, materials, tools, extension cords, etc., shall be arranged so as to present minimum hazard or interruption to the occupants of the building.
- K. Certain work during the demolition phase of construction may require overtime or nighttime shifts or temporary evacuation of the occupants. Coordinate and schedule all proposed down time with the Owner's Representative at least 72 hours in advance.
- L. Make every effort to minimize damage to the existing building and the Owner's property. Repair, patch, or replace as required any damage which might occur as a result of work at the site. Care shall be taken to minimize interference with the Owner's activities during construction. Cooperate with the Owner and other trades in scheduling and performance of the work.
- M. Include in the contract price all rerouting of existing conduits, wiring, outlet boxes, fixtures, etc., and the reconnecting of existing fixtures as necessitated by field conditions to allow the installation of the new systems. Furnish all temporary conduit, wiring, boxes, etc., as required to maintain lighting and power service for the existing areas with a minimum of interruption. Remove wire and conduit back to nearest accessible active junction box and extend to existing homeruns as required.

- N. All existing lighting fixtures, switches, outlets, speakers, materials, equipment and appurtenances not included in the remodel or alteration areas are to remain in place and shall remain in service.
- O. Electrical equipment, outlets, speakers, circuits to mechanical and building systems equipment, etc., which are to remain but which are served by conduit and/or circuiting that is disturbed by the remodeling work, shall be reconnected in such as manner as to leave it in proper operating condition.
- P. Existing branch circuit wiring which is to be removed, shall be pulled from the raceways and the empty conduit shall be removed to a point of permanent concealment.

END OF SECTION

SECTION 26 05 19
WIRE, CABLE AND RELATED MATERIALS

PART 1 - GENERAL

1.01 SCOPE

- A. Provide 600 volt building wire, cable and connectors and 300 volt wire, cable and connectors.
- B. WORK INCLUDED: Include the following Work in addition to items normally part of this Section.
 - 1. Wiring for lighting and power.
 - 2. Automatic Control Wiring.
 - 3. Connection of equipment shown.
- C. WORK SPECIFIED ELSEWHERE:
 - 1. Heating, ventilating, and air conditioning equipment.
 - 2. Structured cabling system.
 - 3. Coaxial cables

1.02 STANDARDS

- A. UL83
- B. ASTM B-3
- C. All wire cable and connectors shall be UL approved.

1.03 ACCEPTABLE MANUFACTURERS

- A. 600 VOLT WIRE AND CABLE
 - 1. Southwire
 - 2. Encore
 - 3. Cerro
 - 4. Tyco Thermal Controls
- B. 300 VOLT WIRE AND CABLE
 - 1. Westpenn
 - 2. Beldon
 - 3. Alpha
 - 4. Tappan - Southwire
- C. FLEXIBLE CABLE SYSTEMS
 - 1. AFC Modular Cable Systems
- D. CONNECTORS
 - 1. AMP - TYCO

2. Burndy
3. Ideal
4. 3M
5. O.Z. Gedney
6. Thomas & Betts

1.04 SUBMITTALS

- A. Shop drawings shall include, but not limited to:
1. Cutsheets of wire, cable and connectors to indicate the performance, fabrication procedures, product variations, and accessories.

1.05 REQUIREMENTS OF REGULATORY AGENCIES WORK IN ACCORDANCE WITH:

- A. National Electrical Code.
- B. Local, municipal, or state codes that have jurisdiction.

PART 2 - PRODUCTS

2.01 WIRING

- A. All wire shall be new and continuous without weld, splice, or joints throughout its length. It must be uniform in cross-section, free from flaws, scales and other imperfections.
- B. WIRE MATERIAL: Soft drawn, annealed, 98% pure copper, with tin coating. Aluminum wiring is not acceptable.
- C. TYPES:
1. Provide type **["THHN/THWN"]** insulation for all buried feeders and service entrance conductors.
 2. Provide type "THHN/THWN" insulation for all branch circuits and above grade feeders.
 3. All wire No. 8 and larger shall be stranded. All wire No. 10 and smaller shall be stranded or solid.
 4. Provide type "XHHW" or other 90 degrees insulation wiring for branch circuit wiring installed through continuous rows of fluorescent fixture bodies.
 5. All 300-volt cable including but not limited to telephone, fire alarm, data, CATV and security shall be UL listed for use in return air plenums.
- D. CONDUCTOR SIZES
1. Feeder conductors shall be sized for a maximum of 2% drop in rated voltage at scheduled load.
 2. Branch circuit conductors shall be sized for a maximum 3% drop in the rated voltage to the longest outlet on the circuit.
 3. Minimum wire shall be No. 12, unless otherwise shown on Drawings or required by Code.
- E. COLOR CODING: No. 6 or larger shall use tape for color coding. No. 8 and smaller wire shall be color coded in accordance with the governing authority requirements or as follows:

120/208 VOLT

NEUTRAL: White

PHASE A: Black

PHASE B: Red

PHASE C: Blue

GROUND: Green

277/480 VOLT

Neutral: Gray

Phase A: Brown

Phase B: Purple

Phase C: Yellow

Ground: Green

120/240 VOLT

Neutral: White

Phase A: Black

Phase B: Orange

Phase C: Blue

Ground: Green

2.02 GROUNDING

Permanently connect all conduit work, motors, starters, and other electrical equipment to grounding system in accordance with the National Electrical Code.

2.03 METAL CLAD CABLE - TYPE MC

At the contractor's option, metal clad cable (MC) may be used if approved by the authority having jurisdiction. The cable shall contain an insulated green grounding conductor (3 wire) and shall be the same size as the phase conductor. Conductors shall be solid copper and the armor shall be flexible galvanized steel.

2.03 ARMORED CABLE - TYPE AC

At the contractor's option, armored cable (BX) may be used if approved by the authority having jurisdiction. The cable shall contain an insulated green grounding conductor (3 wire) and shall be the same size as the phase conductor. Conductors shall be solid copper.

PART 3 - EXECUTION

3.01 WIRE

- A. Do not pull wire into conduit until Work of an injurious nature is completed. Where two or more circuits run to a single outlet box, each circuit shall be properly tagged. Wyreze or approved equal may be used as a lubricant where necessary.
- B. Splices shall be fully made up in outlet boxes with compression crimp-on type splice connectors.
- C. Joints and splices will not be permitted in service entrance or in feeders. Joints in branch circuits will be permitted where branch circuits divide, and then shall consist of one through-circuit to which the branch shall be spliced. Joints shall not be left for the fixture hanger to make. Connect joints and splices with Buchanan Series "2000" solderless connectors complete with insulating caps or properly sized wire nuts.
- D. All stranded conductors shall be furnished with lugs or connectors.
- E. Connectors furnished with circuit breakers or switches shall be suitable for copper wire termination.
- F. "Sta-Cons" shall be used to terminate stranded conductors on all switches and receptacles.

[SELECT FOR SPECIFIC JOBS ONLY - CONSULT YOUR PROJECT MANAGER]

- G. Metal Clad Cable - Type MC

1. Metal clad cable shall not be used for homeruns. Metal clad cable shall only be used for branch circuit drops from ceiling mounted junction boxes to outlets and for horizontal runs in a common wall from outlet to outlet. Do not route to outlets to adjacent walls. Metal clad cable may be looped from outlet to outlet in areas where non-accessible ceilings are used. Metal clad cable shall only be used in air-conditioned areas and shall not be run exposed.
2. Metal clad cable shall be UL approved connectors and shall be used and installed per Article 334 of the National Electrical Code. The cable shall be supported at intervals not exceeding 6 feet and within 12 inches of every box.
3. Provide anti-short bushing at cable ends.
4. Refer to electrical details for additional information and restrictions.
5. Metal clad cable shall not be installed in concrete.

G. Armored Cable - Type AC

1. Armored cable shall not be used for homeruns. Armored cable shall only be used for branch circuit drops from ceiling mounted junction boxes to outlets and for horizontal runs in a common wall from outlet to outlet. Do not route to outlets to adjacent walls. AC cable may be looped from outlet to outlet in areas where non-accessible ceilings are used.
 2. Armored cable shall be UL approved connectors and shall be used and installed per Article 333 of the National Electrical Code. The cable shall be supported at intervals not exceeding 4-1/2 feet and within 12 inches of every box.
- H. All stranded #10 and small conductors shall be terminated with an approved solderless terminal if the device or light fixture does not have provisions for clamp type securing of the conductor.
- I. The jacket for all travelers used on 3-way and 4-way switches shall be pink.

3.02 BALANCING SYSTEM

The load on each distribution and lighting panel shall be balanced to within 10% by proper arrangement of branch circuits on the different phase legs. Provide written documentation showing results. Submit with O & M manuals.

3.03 LOW VOLTAGE WIRING

- A. Low voltage wiring shall be plenum rated. All wiring in mechanical rooms, electrical rooms, drywall ceiling, inaccessible areas, underground, plaster ceiling, inside concealed walls areas exposed to occupant view, and other areas subject to physical damage shall be run in conduit.
- B. Low voltage wiring shall be routed in separate raceways from power wiring systems.
- C. Sleeves shall be placed in the forms of concrete, masonry and fire rated walls, floor slabs and beams, for the passage of wiring. Sleeves should be set in place a sufficient time ahead of the concrete work so as not to delay the work. Sleeves shall be rigid galvanized steel.

3.04 CABLE SUPPORTS

- A. Provide cable supports in all vertical raceways in accordance with Article 300-19 of the NEC.

3.05 DEFECTS

- A. Defects shall include, but are not to limited to, the following:
1. Tripping circuit breakers under normal operation.
 2. Improperly connected equipment.
 3. Damaged, torn, or skinned insulation.

END OF SECTION

SECTION 26 05 26
GROUNDING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The requirements of the General Conditions and Supplementary Conditions apply to all work herein.

1.02 SCOPE

- A. **WORK COMBINED WITH OTHER SECTIONS:** Combine the work specified herein with the following Sections to form a single responsibility for the Work:
 - 1. Electrical.
 - 2. Basic materials and methods.
- B. Provide electrical service, equipment and wiring device grounding as shown, scheduled and as specified.
- C. The types of grounding include, but not limited to, the grounding bonding of all equipment devices, building steel piping, and as required by the National Electrical Code, Local Inspection Department and Power Company.

1.03 STANDARDS

- A. NATIONAL ELECTRICAL CODE (NFPA-70)
- B. Local municipal and State codes that have jurisdiction.
- C. NECA

1.04 ACCEPTABLE MANUFACTURES

- A. Provide grounding products manufactured by Copperweld and Cadweld.

1.05 SUBMITTALS

- A. Shop drawings shall include, but not limited to the following:
 - 1. Cut sheets of ground rods, clamps and connectors.
 - 2. Grounding system diagram.

PART 2 - PRODUCTS

- A. **GENERAL:** Provide all materials required to construct a complete grounded electrical system.
- B. **GROUND RODS:** Ground rods shall be 3/4" inch diameter by 10 feet long construction with copper jacket and a steel core.
- C. **CLAMPS:** Ground clamps shall be copper except for steel or iron pipes in which the clamps shall be galvanized iron.

- D. CONDUCTORS: Conductors shall be connected by means of an approved pressure connector or clamp.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. GENERAL: Install grounding system as shown and specified to ensure a properly grounded system.
- B. SERVICE ENTRANCE GROUNDING SYSTEM: Provide a main bonding jumper between the neutral and ground bus of each switchboard. Route a separate grounding electrode conductor in conduit from each **[main gutter]** to the ground rod grid, incoming cold water piping system, **[and to the "lightning protection system" (250 - 106 of NEC) under ground bonding loop]**. Provide a bonding jumper around water meter. The grounding electrode conductor shall be stranded copper, 98% conductivity and shall be run continuous without splices or joints and installed at least 12" below grade.
- C. BUILDING STEEL AND PIPING SYSTEM: Install a bonding jumper between building steel and metallic piping systems to bond them to the electrical grounding system.
- D. NEUTRAL: The neutral shall be grounded only at the service entrance and other separately derived systems. The neutral shall be kept separate from the grounding system and shall not be used as a ground.
- E. GROUNDING SEPARATELY DERIVED ALTERNATING CURRENT SYSTEM
1. TRANSFORMERS: The center point (neutral) of each wye connected transformer shall be bonded to the case and a grounding electrode conductor shall be connected to a ground rod or building steel.
 2. STANDBY EMERGENCY GENERATOR: The generator neutral shall be bonded to the generator when a 4 pole switched neutral automatic transfer switch is specified.
- F. GROUNDING CONDUCTOR: A grounding conductor and metallic conduit system shall bond all equipment served by the electrical system. Provide a flexible bonding jumper for isolated metallic piping and ductwork and around expansion fittings and joints.
- G. CONDUIT GROUNDING BUSHING:
- Conduit terminating in equipment that has a ground bus such as switchboards, panelboards, etc., shall have grounding bushings installed. Ground each conduit by means of a grounding bushing and to the ground bus in the equipment.
- H. MOTORS: The frame of all motors shall be grounded.
- I. SPECIAL GROUNDING: Provide a #6 AWG copper grounding conductor for each telephone board, television system, etc. Terminate the grounding conductor on ground bus and to the building electrical grounding system. Refer to 800-40(d) and 820-40(d) of the NEC.
- J. REMOTE PANELBOARDS: Provide a grounding electrode conductor all remote panels as required by the NEC and shown on drawings.

- K. LIGHTING FIXTURES: Flexible fixture whips containing a green grounding conductor shall be used to connect light fixtures. Flexible fixture whips shall not exceed ten feet.
 - L. RECEPTACLES: All receptacles shall be grounded using the branch circuit grounding conductor. Receptacles shall use an approved grounding yoke.
- 3.02 TESTING: Perform a ground resistance test using a biddle analog or digital portable earth/ground resistance tester. The system resistance shall not exceed 5 OHMS. Provide additional electrodes as required (refer to 250-84 of the NEC or the most current edition 250-56). Test shall not be conducted following wet weather. Provide personal instruments to conduct these tests and submit certified test for review. Test shall be verified by Engineer.

END OF SECTION

SECTION 26 05 33

RACEWAYS

PART 1 - GENERAL

1.01 E

- A. provide electrical raceways and fittings as shown, scheduled and specified.
- B. the types of raceways and fittings required are as follows:
 - 1. rigid hot-dipped galvanized steel conduit (RGS)
 - 2. immediate hot-dipped galvanized steel conduit (IMC)
 - 3. electrical metallic tubing (EMT)
 - 4.
 - 5. flexible metal conduit
 - 6. liquid-tight flexible metal conduit (non-metallic is not acceptable)
 - 7. E-coated rigid galvanized steel conduit
 - 8. aluminum Rigid Conduit (ARC)

1.02 STANDARDS

- A. SI, C80.1 & C80.3
- B. MA FB-1
- C. MA TC3
- D. , 6, 797 & 1242

1.03 TABLE MANUFACTURERS

- A. raceways
 - 1. Allied
 - 2. Triangle
 - 3. Republic
 - 3. Carlon
 - 4. Wheatland Tube
 - 5. Cantex
 - 6. Western Tube
 - 7. Robroy Industries
- B. fittings
 - 1. pleton
 - 2. ouse Hinds
 - 3. eel City
 - 4. Z. Gedney
 - 5. rlon
 - 6. co, Inc.

1.04 DETAILS

- A. op drawing shall include but not be limited to:
 - 1. sheets for raceways and fitting.

1.05 REQUIREMENTS OF REGULATORY AGENCIES WORK IN ACCORDANCE WITH:

- A. National Electrical Code.
- B. Local, municipal, or state codes that have jurisdiction.

PART 2 - PRODUCTS

2.01 PROVIDE CONDUIT AS FOLLOWS:

- A. Except as noted or otherwise specified, all wiring shall be installed in galvanized rigid steel, rigid aluminum conduit or electrical steel tube (EMT) of the proper size to contain the number of conductors required in accordance with the latest edition of the N.E.C. Where conduit sizes are shown on the drawings, these shall take preference. Contractor shall epoxy coat galvanized rigid steel conduit for use in natatoriums.
- B. EMT in sizes up to 4 inches when concealed or not exposed to damage and located indoors only.
- C. PVC coated rigid galvanized steel shall be used for all penetrations of slab on grade.
- D. Rigid galvanized steel where embedded in concrete or masonry construction, mechanical yard or in exterior/interior applications where subject to damage.
- E. Rigid aluminum shall be used in exterior applications. (i.e. roof, top of canopies)
- F. Carlon Schedule 40 PVC may be utilized underground, in or below slab where shown on the construction documents.
- G. MINIMUM SIZE: [1/2], [3/4] inch. **[All homeruns shall be 3/4" minimum]. 1/2" conduit may be used for drops down walls to a single receptacle or switch.**
- H. PVC coated rigid galvanized steel conduit shall be coated inside and outside.
- I. PVC coated rigid galvanized steel conduit shall be used at cooling towers, corrosive areas and pool pump rooms.
- J. Fixture whips: Refer to 26 51 00 for additional information.
- K. Flexible metal shall be used for connecting rotating equipment installed in conditioned spaces.
- L. Sealtite shall be used for connecting rotating equipment installed in non-conditioned spaces and outside.
- M. Bear the stamped approval of the UL and be approved by the Architect and Engineer.

- 2.02 Branch circuits run underground shall be run in Carlon Schedule 40 PVC conduit. Install ground wire in accordance with NEC table 250-122.

2.03 FITTINGS

- A. Couplings for rigid steel or intermediate conduit shall be hot dipped galvanized steel. Set screw type is not acceptable.
- B. Steel or malleable iron fittings shall be used on all other raceway types except for PVC.
- C. **Couplings for aluminum raceways shall be threaded aluminum.**
- D. **EMT systems shall utilize steel insulated throat, set screw connectors and steel set screw couplings in all indoor conditioned spaces. EMT system shall utilize steel insulated throat, threadless, watertight compression type connectors and steel threadless watertight compression type coupling in all non-conditioned spaces.**
- D. Coupling and connectors accessories and fittings for PVC coated rigid galvanized steel shall be PVC coated.
- E. Metal sealtite fittings shall be steel. Plastic is not acceptable.
- F. Provide nylon bushing on end of all low voltage cabling system conduits (sleeves, rough-ins, etc.).

PART 3 - EXECUTION

3.01 CONDUIT

A. GENERAL

The Drawings are diagrammatic, and are intended to show the general location of outlets, devices, fixtures, and arrangement and control of circuits. The Contractor shall determine exact locations by actual measurement of the building or by reference to the Architectural Drawings.

- B. Of such size, and so installed that conductors may be drawn in without injury or excessive strain.
- C. Where entering panels, pull boxes, junction boxes, or outlet boxes, shall be secured in place with lock nuts inside and outside, and insulated bushings inside.
- D. Have Red seal type VCC or approved equal cable supports in risers, as required by N.E.C.
- E. Have ends reamed after cutting and application of die.
- F. Keep conduit corked and dry during construction and swab out before conductors are pulled.
- G. Have bends and offsets made with approved tools. Bends or offsets in which the pipe is crushed or deformed shall not be installed.
- H. Where not embedded in concrete or masonry, be firmly secured by approved clamps, half-straps or hangers.

- I. Have O.Z. Gedney or approved equal expansion fittings where crossing building expansion joints.
- J. EXPANSION JOINTS: Make provision for expansion and shifting of metal or PVC conduits where risers occur from underground.
- K. Except in the mechanical equipment rooms, run conduit concealed, and by the shortest practicable route between outlets. Install risers, drops, and offsets necessary to avoid conflict with ductwork, piping, structural members, and similar items.
- L. Install exposed conduit in mechanical rooms, and elsewhere as indicated, parallel to horizontal and vertical lines of walls, ceilings, and floors.
- M. In general, fluorescent fixtures in finished areas having suspended acoustical ceilings shall be connected to outlet boxes of lighting grid by flexible metal conduit; length not to exceed ten feet.
- N. Outlet boxes in partitions shall never be set back to back. They shall be offset to prevent undue noise transmission from room to room.
- O. Concealed conduit shall run in as direct manner as possible using long bends. Exposed conduit shall be run parallel with or at right angles to the lines of the building; and all bends shall be made with standard conduit elbows or conduit benders. Not more than equivalent of four quarter bends shall be used in any run between terminals and cabinet, of between outlet or junction boxes. Approved condulets shall be used in lieu of conduit elbows where ease of installation and appearance warrants their use and approved by the engineer. Conduit joints shall be made with approved couplings and unions.
- P. Conduits shall be continuous from outlet to outlet and from outlets to cabinets, junction or pull boxes and shall be electrically continuous throughout. Terminals of all conduits shall be provided with double lock nuts and bushing or terminated on conduit hubs. Use of running threads is prohibited.
- Q. Each entire conduit system shall be installed complete before any conductors are drawn in. Every run of conduit shall be finished before covering up to guard against obstructions and omissions.
- R. Sleeves shall be placed in the forms of concrete, masonry and fire rated walls, floor slabs and beams, for the passage of conduits. Sleeves should be set in place a sufficient time ahead of the concrete work so as not to delay the work. Sleeves shall be rigid galvanized steel and set to extend 4" above slab.
- S. All pipe penetrations through walls and concrete floors shall be fire rated by applying USG Thermafiber in the space between the concrete and the pipe. The fire rating shall be additionally sealed by using 3M brand model CP 25 or 303 fire barrier caulk and putty. All fire rating material shall be installed in accordance with manufacturer's printed instructions.
- T. All conduit shall be cleaned and swabbed to remove all foreign matter and moisture prior to pulling wire and cable. All boxes in which conduits terminate shall be cleaned of all concrete mortar and other foreign matter.
- U. Provide #30 nylon pulling line in all conduits in which permanent wiring is not installed.

- V. All conduit shall be securely fastened and supported using hot galvanized malleable iron one-hole pipe straps, clamps, hanger or other means approved by the engineer. Supports shall be as required by NEC Table 344-3 (B)(2). Tie wire shall not be used as support or securing means. Support conduit independently of ceiling hanger wire. Use all thread rods to support outlet boxes, junction boxes and conduit.
- W. When PVC conduit is routed underground, all stub-up's and 90° elbows shall be PVC coated rigid galvanized steel. Use PVC coated rigid galvanized steel when penetrating concrete on grade.
- X. Route all conduit above grade unless otherwise noted on the construction documents.
- Y. Contact the Architect and Engineer for an installation review before covering any below grade or above grade conduit.
- Z. All new outlets shall be flush mounted. In remodeled areas where wall construction prohibits flush mounting, provide wiremold 2400 series. Verify exact location and routing with architect before installation.
- AA. Contractor shall not penetrate water proof barriers without using proper fitting to maintain barriers. This shall include exterior walls and slabs. Coordinate with Architect for proper methods.

3.02 FITTINGS

- A. Install approved expansion fitting in all conduit runs in excess of 150 feet or when crossing building expansion joints.

3.03 CONDUIT CORROSION PROTECTION

- A. Branch circuit conduits installed in concrete slabs on fill or grade shall be positioned in a manner to ensure complete concrete cover. In no case shall such conduits be exposed below or above the slab surfaces, or penetrate the waterproof membrane.
- B. At locations where metallic conduits pass through slabs on grade or transitions below grade, PVC coated rigid galvanized conduit shall be used.

3.04 OUTLET AND JUNCTION BOXES

- A. Provide an approved galvanized outlet box with adequate volume for number of conductors installed.
- B. Provide standard galvanized switch boxes of the required number of gangs. Switch boxes where conduit is exposed shall be handy boxes or approved equal.
- C. Outlet boxes for receptacles shall be similar to Universal 52151 with suitable raised cover. Receptacle boxes where conduit is exposed shall be handy boxes or approved equal.
- D. Weatherproof boxes shall be FS or FD. Provide these boxes in all non-conditioned areas, exterior areas and natatoriums.
- E. Outdoor boxes shall be NEMA 3R, with conduit connections made by Myers Hubs.

- F. See notes and details on Drawings for special box requirements.
- G. Provide junction boxes required to facilitate installation of the various conduit systems. Provide support boxes required for risers, each complete with approved cable supports as described elsewhere in this Division.
- H. Outlet boxes for drywall shall be standard galvanized 4" square boxes with the appropriate device cover.
- I. Provide floor outlet fittings for telephone to match fittings for duplex floor receptacles.
- J. Provide 3-1/2" deep gangable masonry boxes in all masonry wall (CMU). Steel City GW-135-G or approved equal.
- K. Provide shallow 4"x4" boxes in all demountable partitions.
- L. Metallic boxes located in fire rated walls or partitions shall be separated by a minimum horizontal distance of 24 in. This minimum separation distance between metallic boxes may be reduced when "Wall Opening Protective Materials" (CLIV) are installed according to the requirements of their Classification. Metallic boxes shall not be installed on opposite side of walls or partitions of staggered stud construction unless "Wall Opening Protective Materials" are installed with the metallic boxes in accordance with Classification requirements for the protective materials.
- M. Junction, pull boxes, condulets, gutters, disconnects, contactors, etc., above 2-foot x 2-foot grid ceilings shall be mounted within 18-inches of ceiling grid. Above 2-foot x 4 – foot grid ceiling they shall be mounted within 30-inches of ceiling grid. All junction box, pull box, gutter openings shall be side or bottom accessible.

3.05 THRU-WALL SEALS

- A. Provide O.Z. Gedney "Thru-wall" seals for all conduits passing through concrete structure below grade, above grade, and floor penetrations below grade. These prevent moisture from entering the building.
- B. Straight sleeves are not acceptable.

3.06 PULL BOXES

- A. Pull boxes shall be provided for conduit systems as required and shall be constructed of galvanized steel of not less than gauge and size specified by National Electrical Code.
- B. Where two or more feeders pass through a common pull box, they shall be tagged to indicate clearly their electrical characteristics, circuit number, and panel designation.

3.07 WIREWAYS

- A. Wireways shall be installed as indicated or required and locations shall be coordinated with architect.
- B. Wireways shall be made of not less than 16-gauge sheet steel for 4 inch and 6 inch square sizes and 14 gauge steel for 8 inch and 12 inch square sizes. Couplings end plates, and knockouts shall be furnished as required. Each section of wireways shall be

rigidly supported.

- C. Wiring in wireways shall be neatly bundled, tied and suitably tagged.
- D. The finish shall be ANSI-49 gray epoxy paint applied by a cathodic electrode position paint process over a corrosion resistant phosphate preparation for NEMA 1 wireways. Provide galvanized steel for NEMA 3R wireways. NEMA 3R wireways and auxiliary gutters are for horizontal mounting only.

3.08 UNDERGROUND DUCTBANK SYSTEM

A. DUCT SYSTEM

1. The duct system shall consist of Schedule 40 PVC or type 1-EB PVC conduits encased in concrete as detailed on the drawings. Use rigid conduit for stub-ups and the last ten feet at the end of each ductbank. Duct lines shall be laid to a minimum grade of 4 inches per 100 feet and shall be free from either horizontal or vertical waves. Duct lines shall be straight unless otherwise noted on the drawings. Duct lines shall be installed so that the top of concrete in encased duct lines is not less than 24 inches below finished grade or finished paving at any point. Changes in direction or runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet. The long sweep bends may be made up of one or more curved or straight sections and/or combinations thereof using five degree angle couplings. Conduit shall be thoroughly cleaned before using or laying. During construction and after the duct line is completed, the ends of the conduit shall be plugged to prevent water washing mud into the conduits. Particular care shall be taken to keep the conduits clean of concrete, dirt, and any other substance during the course of construction.
2. Each single conduit of the duct bank shall be completely encased in steel reinforced concrete as indicated. The thickness of concrete encasement indicated is the minimum thickness, and may be increased to fit the actual shape of trench.
3. Concrete for duct bank envelopes shall be standard 2000 psi concrete mix as described in Division 03.
 - a. Envelopes may be poured directly against sides of trenches if the "cut" is clean, even and free of loose material. All loose dirt and extraneous material shall be removed from the trenches before and during the pouring of concrete to ensure sound envelopes. Concrete shall be carefully spaded during pouring to eliminate all voids under and between the conduit and honeycombing of the exterior surfaces. Power driven tampers or agitators shall not be used, unless specifically designed for the application, in order to ensure that the water-tightness of the conduits is not destroyed.
 - b. Generally, each run of envelopes shall be poured in one continuous operation. Where more than one pour is necessary, each pour shall terminate in a vertical plane. Partial pours shall not terminate in horizontal or angular planes.

- B. For normal underground installation see Section 26 02 00 -3.01 for Excavating and Backfilling.

END OF SECTION

EXTERIOR LED LIGHTING
26 56 19

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. Exterior LED lighting that is designed for and exclusively use LED lamp technology.
- 2. Luminaire supports.
- 3. Luminaire-mounted photoelectric relays.

B. Scope of work

- 1. Furnish and install 6 parking lot LED lights.
- 2. Furnish and install 5 canopy lights.

C. Related Requirements:

- 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
- 2. Section 260926 "Lighting Control Panelboards" for panelboard-based lighting control.
- 3. Section 260933 "Central Dimming Controls" or Section 260936 "Modular Dimming Controls" for architectural dimming systems specified in Section 265100.
- 4. Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
- 5. Section 265613 "Lighting Poles and Standards" for poles and standards used to support exterior lighting equipment.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaire.
4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.
5. Photometric data and adjustment factors based on laboratory tests, complying with **[IES Lighting Measurements Testing and Calculation Guides, of each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project] [IES LM-79] [IES LM-80].**
 - a. Manufacturer's Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.
 - b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
6. Wiring diagrams for power, control, and signal wiring.
7. Photoelectric relays.
8. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Sustainable Design Submittals:

1. <Double click to insert sustainable design text for BUG Rating.>
2. <Double click to insert sustainable design text for luminaire calculation requirements.>
3. <Double click to insert sustainable design text for lighting submittals.>

D. Samples: For each luminaire and for each color and texture indicated with factory-applied finish.

E. Product Schedule: For luminaires and lamps. **[Use same designations indicated on Drawings.]**

F. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports **[and seismic restraints]**.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: 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. Luminaires.
2. Structural members to which **[equipment]** **[and]** luminaires will be attached.
3. Underground utilities and structures.
4. Existing underground utilities and structures.
5. Above-grade utilities and structures.
6. Existing above-grade utilities and structures.
7. Building features.
8. Vertical and horizontal information.
9. Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.

B. Qualification Data: For testing laboratory providing photometric data for luminaires.

C. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
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.

D. Product Certificates: For each type of the following:

1. Luminaire.
2. Photoelectric relay.

E. Product Test Reports: For each luminaire, for tests performed by **[manufacturer and witnessed by a qualified testing agency]** **[a qualified testing agency]**.

F. Source quality-control reports.

G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires **[and photoelectric relays]** to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

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. Lamps: **[Ten for every 100]** of each type and rating installed. Furnish at least one of each type.
2. Glass, Acrylic, and Plastic Lenses, Covers, and Other Optical Parts: **[One for every 100]** of each type and rating installed. Furnish at least one of each type.

3. Diffusers and Lenses: [**One for every 100**] of each type and rating installed. Furnish at least one of each type.
4. Globes and Guards: [**One for every 20**] of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products and complying with applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- E. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- F. Mockups: For exterior luminaires, complete with power and control connections.
 1. Obtain Engineer's approval of luminaires in mockups before starting installations.
 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.10 FIELD CONDITIONS

- A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.
- B. Mark locations of exterior luminaires for approval by Engineer prior to the start of luminaire installation.

1.11 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including luminaire support components.
 - b. Faulty operation of luminaires and accessories.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: **[5]** year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to **[ASCE/SEI 7]**
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified **[and the luminaire will be fully operational during and after the seismic event].**"

2.2 LUMINAIRE REQUIREMENTS

- 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. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. UL Compliance: Comply with UL 1598 **[and listed for wet location]**.
- E. Lamp base complying with **[ANSI C81.61]** **[or]** **[IEC 60061-1]**.
- F. Bulb shape complying with ANSI C79.1.
- G. CRI of **[minimum]** **[80]**. CCT of **[4100 K]**.
- H. L70 lamp life of **[50,000]** hours.
- I. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- J. Internal driver.

- K. Nominal Operating Voltage: **[12-24V]**.
- L. In-line Fusing: **[On the primary for each luminaire]**.
- M. Lamp Rating: Lamp marked for **[outdoor use]**.
- N. Source Limitations: Obtain luminaires from single source from a single manufacturer.
- O. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.3 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

- A. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- B. Comply with UL 773 or UL 773A.
- C. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc (16 to 32 lx) and off at 4.5 to 10 fc (48 to 108 lx) with 15-second minimum time delay. **[Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.]**
 - 1. Relay with locking-type receptacle shall comply with ANSI C136.10.
 - 2. Adjustable window slide for adjusting on-off set points.

2.4 LUMINAIRE TYPES

- 1. Acceptable Manufactures:
 - a. ERT Lighting & Sales, Inc., Contact: Mike Canales (956) 432 – 4885
 - a) Substitutions shall be provided to the engineer 10 days prior to bid.
- 2. Luminaire-Mounting Height: **[25']**.
- 3. Mounting Type: **[Slip-Fitter Mount]**.
- 4. Distribution: **[Type III & Type V]**.
- 5. Diffusers and Globes: **[Clear polycarbonate]**.
- 6. Housings:
 - a. **[Extruded-aluminum]** housing and heat sink.
 - b. **[powder-coat]** finish.

2.5 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: **[Corrosion-resistant aluminum]** or **[Epoxy-coated steel]** **[Fiberglass]**. Form and support to prevent warping and sagging.
- C. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 2. Glass: Annealed crystal glass unless otherwise indicated.
 3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- E. 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.
- F. Housings:
1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
 2. Provide filter/breather for enclosed luminaires.
- G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage and coating.
 - c. CCT and CRI for all luminaires.

2.6 FINISHES

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. 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.
- C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
 3. Class I, Clear-Anodic Finish: AA-M32C22A41 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

4. Class I, Color-Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker), complying with AAMA 611.
 - a. Color: **[Light gray]**.
- D. 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, 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 or SSPC-SP 8.
 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.
 - b. Color: Match Engineer's sample of **[manufacturer's standard]** color.
 - c. Color: As selected by Engineer from manufacturer's full range.

2.7 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

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 the Work.
- B. Examine area for suitable conditions where luminaires will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Engineer, use selected permanent luminaires for temporary lighting. When construction is substantially complete, clean luminaires used for temporary lighting and install new lamps.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

- C. Install lamps in each luminaire.
- D. Fasten luminaire to structural support.
- E. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Support luminaires without causing deflection of finished surface.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. **[Install luminaires level, plumb, and square with finished grade unless otherwise indicated.] [Install luminaires at height and aiming angle as indicated on Drawings.]**
- G. Coordinate layout and installation of luminaires with other construction.
- H. Adjust luminaires that require field adjustment or aiming. **[Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.]**
- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.4 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES

- A. Aim as indicated on Drawings.
- B. Install on concrete base with top **[4 inches (100 mm)** for Trail Lighting] 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 Section 033000 "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 Section 260533 "Raceways and Boxes for Electrical Systems." 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 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections [**with the assistance of a factory-authorized service representative**]:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Verify operation of photoelectric controls.
- C. Illumination Tests:
 - 1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
 - a. IES LM-5.
 - b. IES LM-50.
 - c. IES LM-52.
 - d. IES LM-64.
 - e. IES LM-72.
 - 2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- D. Luminaire will be considered defective if it does not pass tests and inspections.
- E. 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**] [**Train**] Owner's maintenance personnel to adjust, operate, and maintain luminaires[**and photocell relays**].

3.9 ADJUSTING

- A. Occupancy Adjustments: When requested within [**12**] months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to [**two**] visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Engineer.

END OF SECTION 265619

1. THE FOLLOWING NOTES ARE GENERAL AND APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS AS IF THEY WERE WRITTEN IN THEIR ENTIRETY ON EACH SHEET.
2. ALL WORK DESCRIBED IN THESE GENERAL NOTES SHALL BE CONSIDERED INCIDENTAL TO OTHER WORK AND SHALL NOT BE PAID SEPARATELY, UNLESS IDENTIFIED IN THE BID FORM.
3. CONTRACTOR SHALL CONTACT THE OWNER 48 HOURS PRIOR TO START OF ANY CONSTRUCTION WITHIN PROJECT SITE.
4. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE HIDALGO COUNTY DRAINAGE DISTRICT NO. 1, HIDALGO COUNTY IRRIGATION DISTRICT NO. 1.
5. IN THE EVENT THE OWNER AND/OR ENGINEER FINDS THE MATERIALS OR THE FINISHED WORK IN WHICH THE MATERIALS ARE USED OR THE WORK PERFORMED ARE NOT IN REASONABLY CLOSE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS, AND HAVE RESULTED IN AN INFERIOR OR UNSATISFACTORY PRODUCT, THE WORK OR MATERIALS SHALL BE REMOVED AND REPLACED OR OTHERWISE CORRECTED AT THE CONTRACTOR'S EXPENSE. FIELD WORK AND CORRECTIONS SHALL ONLY BE APPROVED OR REJECTED BY THE OWNER AND/OR ENGINEER.
6. THE CONTRACTOR SHALL HAVE AVAILABLE AT ALL TIMES AND ON THE WORK SITE WHEN WORK IS IN PROGRESS, AS HIS AGENT, A COMPETENT SUPERINTENDENT CAPABLE OF READING AND UNDERSTANDING THE PLANS AND SPECIFICATIONS AND EXPERIENCED IN THE TYPE OF WORK BEING PERFORMED. THE SUPERINTENDENT SHALL BE FURNISHED IRRESPECTIVE OF THE AMOUNT OF WORK SUBLET.
7. PROVIDE OWNER AND/OR ENGINEER THE NAME AND EMERGENCY TELEPHONE NUMBER(S) OF AN AUTHORIZED REPRESENTATIVE(S) OF THE CONTRACTOR. SAID REPRESENTATIVE(S) SHALL BE AVAILABLE 24 HOURS, SEVEN DAYS A WEEK IN THE EVENT AN AFTER HOUR EMERGENCY ARISES ON THE PROJECT SITE. ONLY THE OWNER HAS THE AUTHORITY TO DIRECT THE CONTRACTOR IN AN EMERGENCY SITUATION. UPON RECEIVING DIRECTION FROM THE OWNER, THE CONTRACTOR'S REPRESENTATIVE(S) SHALL COORDINATE AND MOBILIZE CORRECTIVE PROCEDURES.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. CONTRACTOR SHALL NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONDITIONS BEFORE PROCEEDING WITH WORK.
9. SHOULD ANY ERRORS BECOME APPARENT ON THE PLANS, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND/OR ENGINEER PRIOR TO CONSTRUCTION SO THAT CLARIFICATION OR REDESIGN MAY OCCUR.
10. THE LAYOUT OF THE PROJECT FEATURES AS SHOWN SHALL BE FIELD STAKED BY THE CONTRACTOR AND APPROVED BY THE OWNER PRIOR TO CONSTRUCTION.
11. CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES WITHIN THE CONSTRUCTION AREA 48 HOURS PRIOR TO EXCAVATION NEAR THEIR UTILITIES.
12. UNLESS DETAILED, SPECIFIED OR OTHERWISE INDICATED ON THE DRAWINGS CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS SHALL APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.
13. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK, DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.
14. PRIOR TO EXCAVATION FOR NEW STRUCTURES, ELECTRICAL CONDUIT, FABRICATION OF NEW PIPING AND/OR OTHER PROPOSED UTILITIES, CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING PIPING AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL TEMPORARILY RELOCATE CONFLICTING EXISTING UTILITIES AT TIE-IN CONNECTION LOCATIONS AND REINSTALL THEM AS REQUIRED TO ELIMINATE THE CONFLICT AT NO ADDITIONAL COST TO THE OWNER.
15. EXISTING FACILITY AND UTILITY INFORMATION SHOWN ON THE DRAWING WAS OBTAINED FROM AVAILABLE RECORDS OR ELECTRONIC FILES. THE CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS, SIZES, MATERIAL TYPES, AND ELEVATIONS SHOWN AROUND OR NEAR AREAS OF CONSTRUCTION PRIOR TO START OF CONSTRUCTION.
16. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT FROM DAMAGE, ALL EXISTING FACILITIES AND UTILITIES SHOWN OR NOT SHOWN WHICH ARE TO REMAIN IN PLACE. ALL FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATION SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
17. CONTRACTOR SHALL VERIFY LOCATION OF ALL MECHANICAL AND ELECTRICAL ITEMS BEFORE PLACING ANY STRUCTURAL STEEL OR CONCRETE. ALSO, STRUCTURAL DIMENSIONS AND OPENINGS CONTROLLED BY MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
18. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.
19. CONTRACTOR TO OBTAIN ALL CONSTRUCTION PERMITS NOT SUPPLIED BY OWNER AT HIS EXPENSE PRIOR TO COMMENCEMENT OF WORK.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE DRAINAGE OF PROPOSED FACILITIES AT ALL TIMES DURING CONSTRUCTION.
23. THE CONTRACTOR SHALL PROVIDE/MAINTAIN ADEQUATE POSITIVE DRAINAGE AT ALL TIMES DURING THE INSTALLATION OF THE STRUCTURES, DRAINAGE, UTILITY, IRRIGATION AND ROAD IMPROVEMENTS. DEWATERING OF THE TRENCH MAY BE REQUIRED DURING THE INSTALLATION OF THE DRAINAGE, UTILITY AND IRRIGATION FACILITIES/STRUCTURES. SAID DEWATERING SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL UNLESS OTHERWISE NOTED.
24. THE CONTRACTOR SHALL PROVIDE ACCESS TO EXISTING RESIDENCES AT ALL TIMES.
25. CONTRACTOR IS RESPONSIBLE FOR CLEANING MUD AND/OR DIRT TRACKED ONTO TO EXISTING STREETS BY HIS WORKMANS, SUPPLIER'S, OR SUBCONTRACTOR'S VEHICLES. STREETS MUST BE CLEANED WITHIN 2 HOURS OF WHEN THE TRACKING OCCURS. NO SEPARATE PAY.
26. PROVIDE ALL SHEETING/SHORING REQUIRED TO PROTECT EXISTING STRUCTURES, PIPE, AND FACILITIES. CONTRACTOR IS HEREBY INFORMED THAT ALL TRENCHING AND SHORING WILL BE DONE IN STRICT ACCORDANCE WITH THE LATEST OSHA STANDARDS.
27. ANY ADDITIONAL SOIL BORINGS THE CONTRACTOR REQUIRES ARE TO BE DONE BY THE CONTRACTOR AT HIS EXPENSE.
28. ALL WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE LOCAL REQUIREMENTS.
29. PAVED SURFACES SHALL BE PROTECTED FROM DAMAGE FROM ANY EQUIPMENT.
30. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY IRON RODS DISTURBED DURING CONSTRUCTION AND SHALL BE REPLACED BY REGISTERED PUBLIC LAND SURVEYOR TO ORIGINAL PROPERTY CORNER AT NO SEPARATE PAY.
31. WORK PERFORMED UNDER THIS CONTRACT IS GOVERNED BY REQUIREMENTS OF SEVERAL PUBLIC, GOVERNMENTAL, AND PRIVATE ENTITIES. CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF SAID ENTITIES.
32. CONTRACTOR SHALL SECURE THE CONSTRUCTION SITE AT ALL TIMES INCLUDING EVENTS OF INCLEMENT WEATHER.
33. THE CONTRACTOR TO MAINTAIN ALL EQUIPMENT AND TRANSPORTATION OF SAID EQUIPMENT WITHIN THE EXISTING RIGHTS-OF-WAY OF THE CITY, COUNTY, OR STATE.
34. 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.
35. ANY DAMAGES TO FENCES, WALKS, OR PRIVATE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

- ALL CONSTRUCTION SHALL CONFORM WITH OWNER STANDARDS
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALL DIG TESS 48 HOURS PRIOR TO COMMENCEMENT OF WORK FOR UTILITY SPOTTING (1-800-DIG-TESS).
3. THE CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES FOR VERIFICATION OF LOCATION OF EXISTING FACILITIES PRIOR TO BEGINNING ANY EXCAVATION.
4. UTILITIES SHOWN ON PLANS ARE APPROXIMATE IN LOCATION, ARE FOR INFORMATIONAL PURPOSES ONLY, AND MAY NOT BE ALL INCLUSIVE. THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE BASED UPON ABOVE GROUND EVIDENCE (INCLUDING, BUT NOT LIMITED TO MANHOLES, INLETS, VALVES, AND MARKS MADE UPON THE GROUND BY OTHERS) AND ARE SPECULATIVE IN NATURE. THERE MAY ALSO BE OTHER EXISTING UNDERGROUND UTILITIES FOR WHICH THERE IS NO ABOVE GROUND EVIDENCE OR FOR WHICH NO ABOVE GROUND EVIDENCE WAS OBSERVED. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS AND ELEVATIONS AND SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT UTILITY LINES WHETHER SHOWN OR NOT SHOWN. ANY DEVIATIONS SHALL BE CALLED TO THE ENGINEER'S ATTENTION IMMEDIATELY.
5. THE CONTRACTOR SHALL HAVE THE RESPONSIBILITY BEFORE ANY CONSTRUCTION WORK HAS BEGUN, OF DETERMINING THE EXACT HORIZONTAL AND VERTICAL LOCATIONS OF ANY UNDERGROUND FACILITIES IN THE AREA OF CONSTRUCTION PRIOR TO COMMENCING WORK, WHETHER INDICATED ON THE PLANS OR NOT. ANY FACILITIES DISTURBED BY THE CONTRACTOR SHALL BE RESTORED BY CONTRACTOR AT OWN EXPENSE. THE CONTRACTOR SHALL COORDINATE WITH THE PROPER UTILITY THE RELOCATION OF ANY FACILITY DESIGNATED ON THE PLANS OR DEEMED NECESSARY TO BE RELOCATED BY THE ENGINEER IN ORDER TO COMPLETE CONSTRUCTION OF THE PROJECT.
6. IN THE EVENT OF DAMAGE TO UNDERGROUND FACILITIES WHETHER OR NOT SHOWN IN THE DRAWINGS, THE CONTRACTOR SHALL MAKE THE NECESSARY REPAIRS TO PLACE THE FACILITIES BACK IN SERVICE AT NO INCREASE IN THE CONTRACT PRICE. SUCH REPAIRS SHALL CONFORM TO THE REQUIREMENTS OF THE COMPANY OR AGENCY SERVICING THE FACILITY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL RESIDENTS/BUSINESSES OF INTERRUPTION TO THEIR UTILITIES THAT WILL BE CAUSED BY THE CONSTRUCTION 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
8. SHOULD A POTENTIAL CONFLICT EXIST BETWEEN THE EXISTING UTILITY, LATERAL, AND/OR SERVICE, AND THE PROPOSED IMPROVEMENTS, IMMEDIATELY NOTIFY OWNER AND/OR ENGINEER FOR FURTHER DIRECTION.
9. MAINTAIN SERVICE TO ALL EXISTING UTILITIES THROUGHOUT THE DURATION OF THE PROJECT.
10. SUPPORT, BRACE, AND/OR SHORE EXISTING UTILITIES WHEN EXCAVATING ADJACENT TO, ABOVE, OR BELOW EXISTING UTILITIES.
11. CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE APPROPRIATE UTILITY COMPANY FOR SECURING POLES, IF NECESSARY, WHILE CONSTRUCTION PASSES BY POLES. COSTS OF SECURING POLES WILL BE PAID FOR BY THE CONTRACTOR, NO SEPARATE PAY.
12. TRENCHING FOR UTILITY INSTALLATION SHALL BE NO MORE THAN 200' AHEAD OF PIPE INSTALLATION AND BACKFILL. NO TRENCH SHALL BE LEFT OPEN AFTER NORMAL WORKING HOURS. TRENCH PLATES SHALL BE USED TO COVER OPEN TRENCHES AT ROAD CROSSINGS.
13. UNLESS SHOWN OTHERWISE ON PLANS OR SPECIFICATIONS, DEWATERING FOR UTILITY INSTALLATION, INCLUDING ALL MANHOLES & CULVERTS, WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
14. ALL PIPELINES 12" AND LARGER SHALL HAVE A MINIMUM COVER OF 48" UNLESS THE COVER AND DEPTH IS SPECIFICALLY INDICATED IN THE DRAWINGS. PIPE SMALLER THAN 12" SHALL HAVE A MINIMUM COVER OF 36" UNLESS NOTED OTHERWISE. PIPES SHALL BE ROUTED AS SHOWN UNLESS MINOR REVISIONS ARE NECESSARY TO MISS EXISTING PIPES, STRUCTURES, ETC. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL FITTINGS AND ADAPTERS REQUIRED TO MAKE THE ROUTING CHANGES AT NO ADDITIONAL COST TO THE OWNER.
15. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING PIPE, EQUIPMENT, ETC. AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS. PROVIDE ALL SUPPORTS REQUIRED FOR A RIGIDLY SUPPORTED, COMPLETE AND WORKING SYSTEM.
16. CONTRACTOR SHALL NOTIFY OWNER A MINIMUM OF 48 HRS. PRIOR TO ANY TIE-INS WHICH REQUIRE INTERRUPTION OF SERVICE TO EXISTING CUSTOMERS.
17. OVERHEAD LINES MAY EXIST ON THE PROPERTY AND CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS IN THE VICINITY OF ANY OVERHEAD ELECTRIC LINES. LINES HAVE NOT BEEN MARKED SINCE THEY ARE CLEARLY VISIBLE, BUT CONTRACTOR SHOULD LOCATE THEM PRIOR TO CONSTRUCTION. CONTRACTOR SHALL ABIDE BY NATIONAL ELECTRIC CODE AND ANY REQUIREMENT BY OWNER OF ELECTRIC LINES. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS AND OWNERS ARE LEGALLY RESPONSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS IN THE VICINITY OF ANY OVERHEAD ELECTRIC LINES.
18. CONTRACTOR SHALL VERIFY LOCATION OF ALL MECHANICAL AND ELECTRICAL ITEMS BEFORE PLACING ANY STRUCTURAL STEEL OR CONCRETE. ALSO, STRUCTURAL DIMENSIONS AND OPENINGS CONTROLLED BY MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
19. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.
20. CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH OSHA STANDARDS FOR CONFINED SPACE. CONTRACTOR SHALL PROVIDE ALL REQUIRED EQUIPMENT INCLUDING A MONITOR FOR AIR AND EQUIPMENT FOR BREATHING AIR AND RETRIEVING SYSTEMS.
21. 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.
22. 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.
23. 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. THE CONTRACTOR SHALL RESTORE RELOCATED OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION. SAID RESTORATION SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
24. THE CONTRACTOR SHALL ADJUST EXISTING N.A.W.S.C. WATER LINES AS REQUIRED TO INSTALL DRAINAGE IMPROVEMENTS SAID ADJUSTMENTS SHALL BE COORDINATED WITH N.A.W.S.C. PRIOR TO COMMENCEMENT OF WORK. SAID WATER LINE ADJUSTMENT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
25. THE CONTRACTOR SHALL ADJUST AND CONNECT TO NEW SYSTEM EXISTING FIELD DRAIN LINES AT PROPOSED LOCATIONS. SAID WORK SHALL BE COORDINATED WITH H.C.I.D. NO. 1 PRIOR TO COMMENCEMENT OF WORK. SAID LINE ADJUSTMENTS AND CONNECTIONS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
26. 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).
20. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER AND SEWER CONNECTIONS TO ALL HOMES AND BUSINESSES 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. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO SAID SERVICES.
21. 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. THE CONTRACTOR SHALL RESTORE RELOCATED OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION. SAID RESTORATION SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

ASPHALT LAYING MACHINE SHALL BE CAPABLE OF LAYING A 14' WIDTH.

2. DURING SUBGRADE PREPARATION, THE DEVELOPMENT OF ANY SOFT AREAS SHALL BE REMOVED AND REPLACED WITH COMPACTABLE MATERIAL AND COMPACTED AS PER PROJECT SPECIFICATIONS. A SOFT AREA SHALL BE DEFINED AS AN AREA THAT EXHIBITS A DEPRESSION GREATER THAN 1" MEASURED VERTICALLY WHEN ROLLED AT 2" INTERVALS OR LESS BY A 14 YARD DUMP TRUCK FULLY LOADED. THIS WORK SHALL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

3. WHERE EXISTING ASPHALT IS TO BE CUT, THESE CUTS SHALL BE VERTICAL CUTS MADE WITH A SAW.

4. CARE SHALL BE TAKEN TO PROTECT CURB AND GUTTER AND OTHER CONCRETE SURFACES FROM ASPHALT SPLATTER DURING PRIMING, SEALING, AND TACKING OPERATIONS.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING AREA BETWEEN THE BACK OF CURB/EDGE OF PAVEMENT, ROAD SIDE DITCH AND RIGHT-OF-WAY TO HAVE POSITIVE FLOW TO THE PROPOSED DRAINAGE SYSTEM.

6. PRIMING AND HOT MIX OPERATIONS SHALL NOT BE CONDUCTED ON DAYS WHEN OZONE ADVISORY HAS BEEN ISSUED; EXCLUDING DIRECTED REPAIRS.

7. ALL ROAD CROSSINGS SHALL BE REPLACED WITH A MINIMUM OF 8" COMPACTED CALICHE AND 2" HMAC OR LIKE SECTION, WHICHEVER IS GREATER.

8. THE DRAINAGE DISTRICT WILL PROVIDE 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 CURB & GUTTER, IRRIGATION LINE, ROADWAY, STORM DRAIN PIPE, ROADSIDE DITCHES, DRIVEWAY CULVERTS AND DITCH WORK AT NO SEPARATE PAY UNLESS NOTED OTHERWISE.

9. THE CONTRACTOR SHALL CONNECT PROPOSED IRRIGATION LINE WITH EXISTING IRRIGATION PIPE IN ACCORDANCE WITH H.C.I.D. NO 2 SPECIFICATIONS. SUPPORT COLLARS MAY BE USED. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY DAMAGE TO THE EXIST. LINE CAUSED BY THIS WORK. ELBOWS AND MISC. FITTINGS SHALL ALSO BE USE TO IRRIGATION 1.0 FT SEPARATION BETWEEN TOP OF PROP. DRAIN LINE AND BOTTOM OF THE IRRIGATION LINE.

10. ELBOW FOR RCP OR HPP BEING PROPOSED AT THE END OF LINES SHALL BE PRE-FABRICATED AND SECURED TO THE PIPE WITH A CONCRETE COLLAR (TYPICAL ON ALL PIPE ELBOW INSTALLATIONS.) ELBOW SHALL BE REQUIRED AT ALL LOCATIONS SHOWN ON THE PLAN. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL. PRE-FABRICATED ELBOWS SHALL BE FIELD CONFIRMED BY THE CONTRACTOR.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPROVING ALL EXISTING DRIVEWAYS. CALICHE, DIRT OR DRIVEWAYS SHALL BE REPLACED WITH 4" COMPACTED CALICHE AND 1" APC. CONCRETE DRIVEWAYS SHALL BE REPLACED WITH 4" CONCRETE WITH REINFORCEMENT AS PER DETAILS. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED ON THE PROPOSAL UNLESS A SPECIFIC BID ITEM IS INCLUDED IN THE BID FOR DRIVEWAYS.

12. FOR ALL PITTS OR QUARRIES, COMPLY WITH THE "TEXAS AGGREGATE QUARRY AND PIT SAFETY ACT."

13. THE CONTRACTOR SHALL RELOCATE OR RECONSTRUCT ALL MAIL BOXES TO BE 1' BEHIND CURB OF DRIVEWAY. IF BEHIND EDGE OF PAVEMENT, MAIL BOXES SHALL BE REPLACED TO THE SAME EXISTING CONDITIONS OR BETTER. SAID RELOCATION AND/OR RECONSTRUCTION OF MAIL BOXES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL EXISTING WATER VALVES AND MANHOLES TO MATCH PROPOSED FINISH GRADE OF ROADWAY. CONCRETE COLLARS SHALL BE INSTALLED TO MATCH TOPS WITH PAVEMENT GRADE. THIS WORK SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED OTHERWISE.

15. THE CONTRACTOR SHALL INSURE A 6" MINIMUM COVER FOR DRIVEWAY CULVERTS. THE RELAYING OR REMOVAL OF DRIVEWAY PIPE CULVERTS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED ON THE PROPOSAL.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT/RELOCATION OF ALL REGULATORY SIGNS REMOVED DUE TO CONSTRUCTION OPERATIONS WITH THE SAME SIGN ON FIXED SUPPORT(S) IMMEDIATELY UPON ITS REMOVAL. APPROVAL BY THE ENGINEER IS NECESSARY BEFORE REMOVING ANY REGULATORY ROADWAY SIGN(S). FLAGGERS ARE REQUIRED TO BE AVAILABLE TO DIRECT TRAFFIC DURING SIGN INTERMEDIATE DOWN TIME. RELOCATION OF ANY DIRECTIONAL SIGN REQUIRES REMOVAL DURING CONSTRUCTION OPERATIONS IMMEDIATELY UPON THEIR REMOVAL IS REQUIRED. THESE SIGNS SHALL BE RELOCATED TO A LOCATION IN ACCORDANCE WITH THE LATEST VERSION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES." IN NO CASE WILL A SIGN BE REMOVED WITHOUT RELOCATION. REMOVAL AND RELOCATION OF SIGN(S) BEHIND CURB, SIGNABLE AND LOCATION ESTABLISHED. REMOVAL AND RELOCATION OF THESE SIGNS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED ON THE PROPOSAL.

17. ALL CONSTRUCTION OPERATIONS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AS PROVIDED FOR IN THE SPECIFICATIONS. TxDOT STANDARDS, TEXAS M.U.T.C.D. AND/OR AS DIRECTED. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CURRENT EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

18. DIRT EXCAVATION AND HAULING MEASUREMENT SHALL BE BASED UPON CROSS-SECTIONS AS REQUIRED, IN ACCORDANCE WITH SECTION 02315, WHICH ARE BASED ON DIRT IN THE GROUND. NO ADDITIONAL PAYMENT WILL BE GIVEN FOR OVER EXCAVATION. FURTHER, PAYMENT SHALL NOT BE BASED ON THE NUMBER OF TRUCK LOADS.

19. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION AND SUBMITTAL OF THE TRENCH EXCAVATION PROTECTION PLAN. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A PROFESSIONAL ENGINEER LICENSED TO EXERCISE IN THE STATE OF TEXAS. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM A TRENCH PROTECTION SYSTEM (BOX). THE ENGINEER RESERVES THE RIGHT TO REJECT DESIGNS NOT MEETING THE REQUIREMENTS OF SECTION ITEM 02490 AND 02331.

20. ALL DEBRIS, VEGETATION AND SURPLUS MATERIAL, RESULTING FROM DEMOLITION AND/OR CLEARING OF THE RIGHT-OF-WAY IN PREPARATION FOR PROPOSED CONSTRUCTION SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE TO HIDALGO COUNTY DRAINAGE DISTRICT NO 1. THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGEWAYS WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE HIDALGO COUNTY DRAINAGE DISTRICT NO. 1. 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.

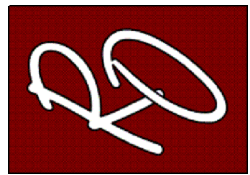
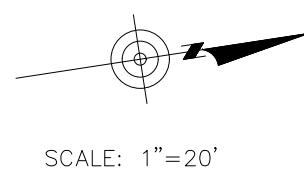
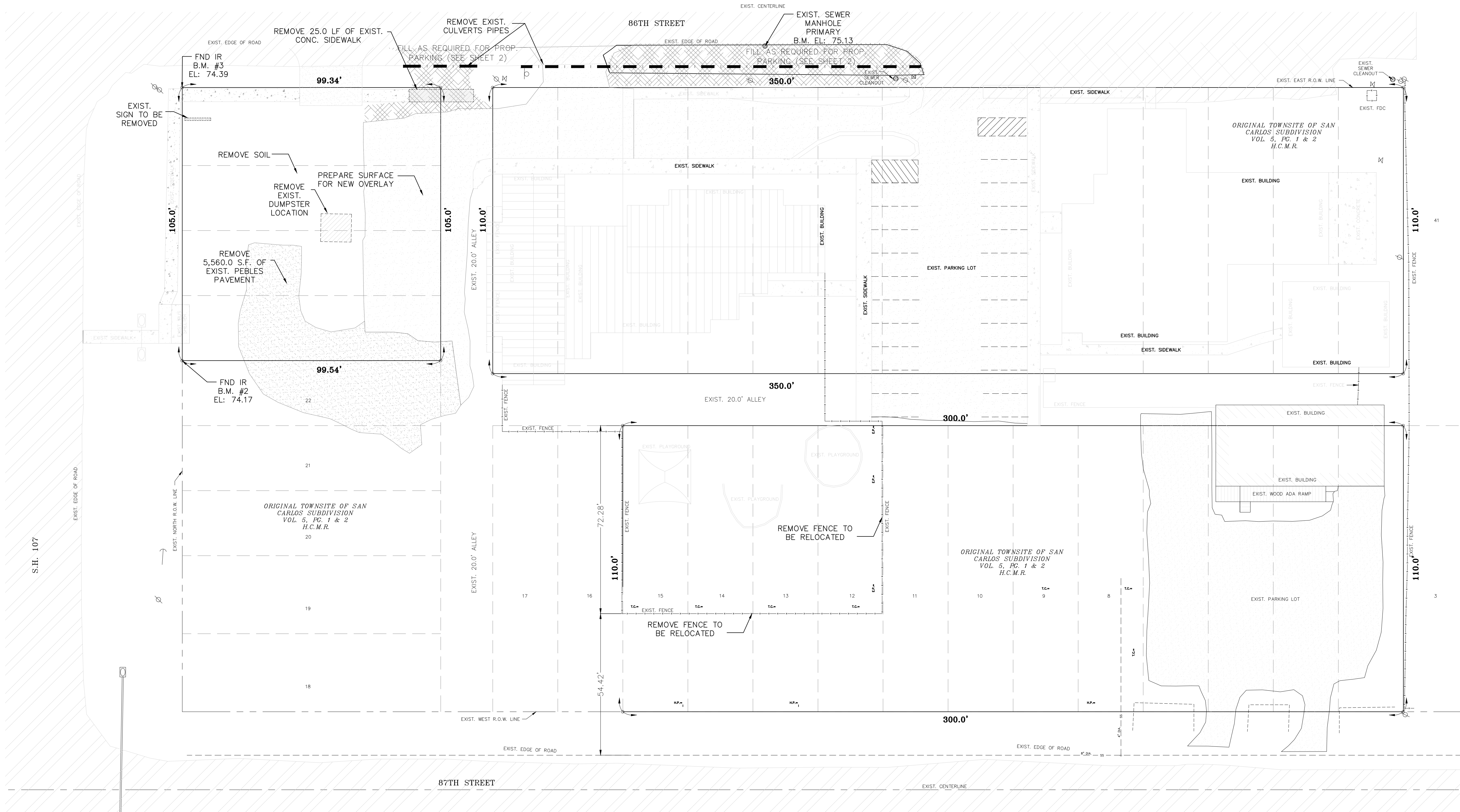
21. NO OPEN EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED. AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AND UNPAVED AREAS SUBJECT TO VEHICULAR LOADING. ¾" PLYWOOD, WOOD PLANKING WITH O.S.H.A. ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS NOT SUBJECT TO VEHICULAR LOADING, OR AS APPROVED BY THE ENGINEER.

22. DURING EXCAVATION OPERATIONS FOR DRAINAGE AND/OR UTILITIES, THE CONTRACTOR SHALL NOT PILE EXCAVATED MATERIAL OR EXCAVATE WITHIN THE DRIP LINE OF TREES THAT ARE TO BE PRESERVED.

23. THE CONTRACTOR SHALL BE RESPONSIBLE TO FOLLOW ALL T.C.E.Q. STORM WATER POLLUTION PREVENTION PLAN (SWPP3) REQUIREMENTS AS PER SWPP3 SHEETS AND AS STATED IN THE SPECIFICATIONS. THE CONTRACTOR SHALL OBTAIN A CONSTRUCTION GENERAL PERMIT (TPDES TXR150000, EFFECTIVE DATE MARCH 5, 2008), INCLUDING N.O.I. AND N.O.T. SUBMITTAL AND MSA NOTIFICATION.

ITEM	DESCRIPTION	PROJECT NAME
	1. REMOVAL OF PIPING AND STRUCTURES DESIGNATED IN PLANS. EXCAVATIONS SHALL BE BACKFILLED USING NATIVE MATERIAL AND COMPACTED TO 95% STANDARD PROCTER DENSITY. 2. EXISTING PIPE LEFT IN PLACE AFTER DEMOLITION/REMOVAL ACTIVITIES SHALL BE PLUGGED OR CAPPED USING RESTRAINED FITTING. IF RESTRAINED FITTINGS CAN NOT BE USED THEN THRUST BLOCKING SHALL BE INSTALLED. 3. THE CONTRACTOR WILL BE REQUIRED TO CONTACT THE ENGINEER AND OWNER TO COORDINATE ANY DEMOLITION ACTIVITIES AT LEAST 48 HOURS PRIOR TO INITIATING ANY SUCH ACTIVITY. 4. THE CONTRACTOR IS REQUIRED TO DISPOSE OF ALL MATERIALS AND PAY FOR ALL FEES RELATING TO DISPOSAL OF ALL MATERIAL IN COMPLIANCE WITH TCEQ AND EPA RULES AND REGULATIONS AT PERMITTED DISPOSAL SITES AND PROVIDE ALL HAULING MANIFESTS. THIS PROJECT WILL NOT BE ACCEPTED UNTIL CONTRACTOR PRODUCES THIS DOCUMENTATION. 5. REMOVAL OF THE EXISTING IMPROVEMENTS SHALL BE AS REQUIRED FOR THE PROJECT. THOSE MATERIALS SHALL BE REMOVED AND DISPOSED OF IN A PROPER AND LEGAL MANNER PER FEDERAL, STATE, AND OR LOCAL LAWS AND ORDINANCES. 6. IF AN HAZARDOUS MATERIAL ARE ENCOUNTERED THE OWNER SHALL BE NOTIFIED. THOSE MATERIALS SHALL BE REMOVED AND DISPOSED OF IN A MANNER AS APPROVED BY ALL GOVERNING AGENCIES AND IN A LANDFILL OR DISPOSAL FACILITY LICENSED TO ACCEPT HAZARDOUS MATERIAL. 7. PRE DEMOLITION PHOTOGRAPHS SHALL BE TAKEN THAT SHOW EXISTING CONDITIONS OF THE SITE AND ADJOINING STRUCTURES TO REMAIN. PHOTOS SHALL INCLUDE DAMAGE TO FINISH SURFACES THAT MIGHT BE MISCONSTRUED AS DAMAGE CAUSED BY DEMOLITION OPERATIONS. 8. EXISTING BUILDINGS, PAVEMENTS, SIDEWALKS, CURBS, DRIVEWAYS, ELECTRIC TRANSFORMERS, DITCHES, DRAINAGE PIPE AND STRUCTURES, FENCES, LAWN, TREES, BUSHES, MAILBOXES, SIGNS, POWER POLES, ETC., TO REMAIN SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. ANY DAMAGE DURING CONSTRUCTION SHALL BE RESTORED, RECONSTRUCTED OR REPLACED BY THE CONTRACTOR AT HIS EXPENSE. ALL DAMAGES SHALL BE RESTORED OR REPLACED TO AT LEAST THEIR ORIGINAL CONDITION OR AS REQUIRED OR DICTATED BY FEDERAL, STATE, COUNTY, CITY OR LOCAL GOVERNING AGENCIES. 9. SAW CUT THE EDGES OF PAVED AREAS CLEAN, NEAT AND TRUE TO LINE SO NO UNWANTED CHIPPING OR BREAKING OF EXISTING PAVEMENT TO REMAIN WILL OCCUR. 10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSPECT EACH DAY AND REMOVE ALL MUD, DIRT, GRAVEL OR LOOSE MATERIALS TRACKED DURING, SPILL OR WIND BLOWN AT EACH CONSTRUCTION SITE ONTO OTHER SITES, RIGHT OF WAY, PUBLIC OR PRIVATE STREETS OR ROADS, DRIVEWAYS, YARDS OR SIDEWALKS. THE CONTRACTOR MUST CLEAN OR PICK UP DAILY IF NECESSARY. THE CONTRACTOR SHALL REDUCE THE AIRBORNE DUST DURING THE ENTIRE DEMOLITION SCHEDULE. WATER MAY BE USED AS A REDUCER. 11. IT IS THE RESPONSIBILITY OF THE CONTRACTOR OR CONTRACTORS TO OBTAIN ALL FEDERAL, STATE, COUNTY, CITY, AND LOCAL PERMITS FOR ANY AND ALL WORK REQUIRED UNLESS OTHERWISE NOTED. THIS SHALL INCLUDE ALL SUBMITTALS AS REQUIRED INCLUDING STORMWATER POLLUTION PREVENTION PLAN. THE CONTRACTOR OR CONTRACTORS ARE RESPONSIBLE TO PAY FOR ALL THE REQUIRED PERMITS BY ANY OR ALL AGENCIES MENTIONED ABOVE UNLESS OTHERWISE NOTED BY THE CONTRACT OR SPECIFICATIONS. 12. REMOVAL OF EXISTING CONCRETE OR OTHER PAVED AREAS SHALL INCLUDE ALL AGGREGATE BASE MATERIALS. AREAS TO BE REMOVED SHALL BE SAW CUT CLEAN, NEAT AND TRUE TO LINE. REMOVE ALL NON ORGANIC MATTER THAT WOULD INTERFERE WITH THE GROWTH OF VEGETATION. 13. THE CONTRACTOR SHALL ABANDON AND CAP ANY PORTION OF PIPE LINE (STORM, IRRIGATION, ETC.) FOUND WITHIN THE PROPOSED PIPE TRENCH, AT THE ENGINEERS REQUEST, ONCE APPROVED BY THE ENGINEER, THE PIPE TO BE ABANDONED SHALL BE CAPPED AND SEALED WITH CEMENT AT BOTH ENDS OF THE TRENCH. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS UNLESS OTHERWISE STATED. 14. THE CONTRACTOR SHALL REMOVE ALL FENCES LOCATED WITHIN THE EASEMENTS, INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCING SHALL BE REPLACED WITH A NEW FENCE OR UNDAAGED ORIGINAL FENCING. REMOVAL AND RE-RECEMENT 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 UNLESS NOTED OTHERWISE. 15. ABANDONED FITTINGS, VALVES, EQUIPMENT, ETC. SHALL BE RECOVERED AND STOCKPILED AT A SECURE LOCATION BY THE CONTRACTOR FOR SALVAGE BY THE OWNER. HOWEVER, ALL RELATED ITEMS THAT ARE UNWANTED BY THE OWNER SHALL BECOME PROPERTY OF THE CONTRACTOR AND DISPOSED OF IN AN APPROPRIATE MANNER. 16. ALL EXISTING PIPES THAT ARE TO BE ABANDONED IN PLACE OR REMOVED MAY NOT BE SHOWN. WHERE PIPING IS TO BE ABANDONED AND MUST REMAIN IN SERVICE UNTIL COMPLETION OF OTHER PHASES OF WORK, AND IT CONFLICTS WITH NEW PIPING, TEMPORARILY RELOCATE PIPING BY PIPING IN AND PROVIDE ALL NECESSARY SUBMITTALS AS REQUIRED TO MAINTAIN SERVICE AT NO ADDITIONAL COST TO THE OWNER UNLESS OTHERWISE SHOWN IN THE BID FORM.	

C.0



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
TBPB REGISTRATION NO. 12179
02/21/23

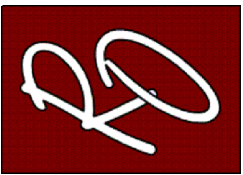
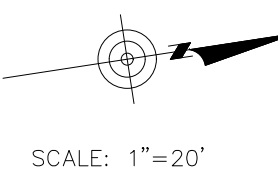
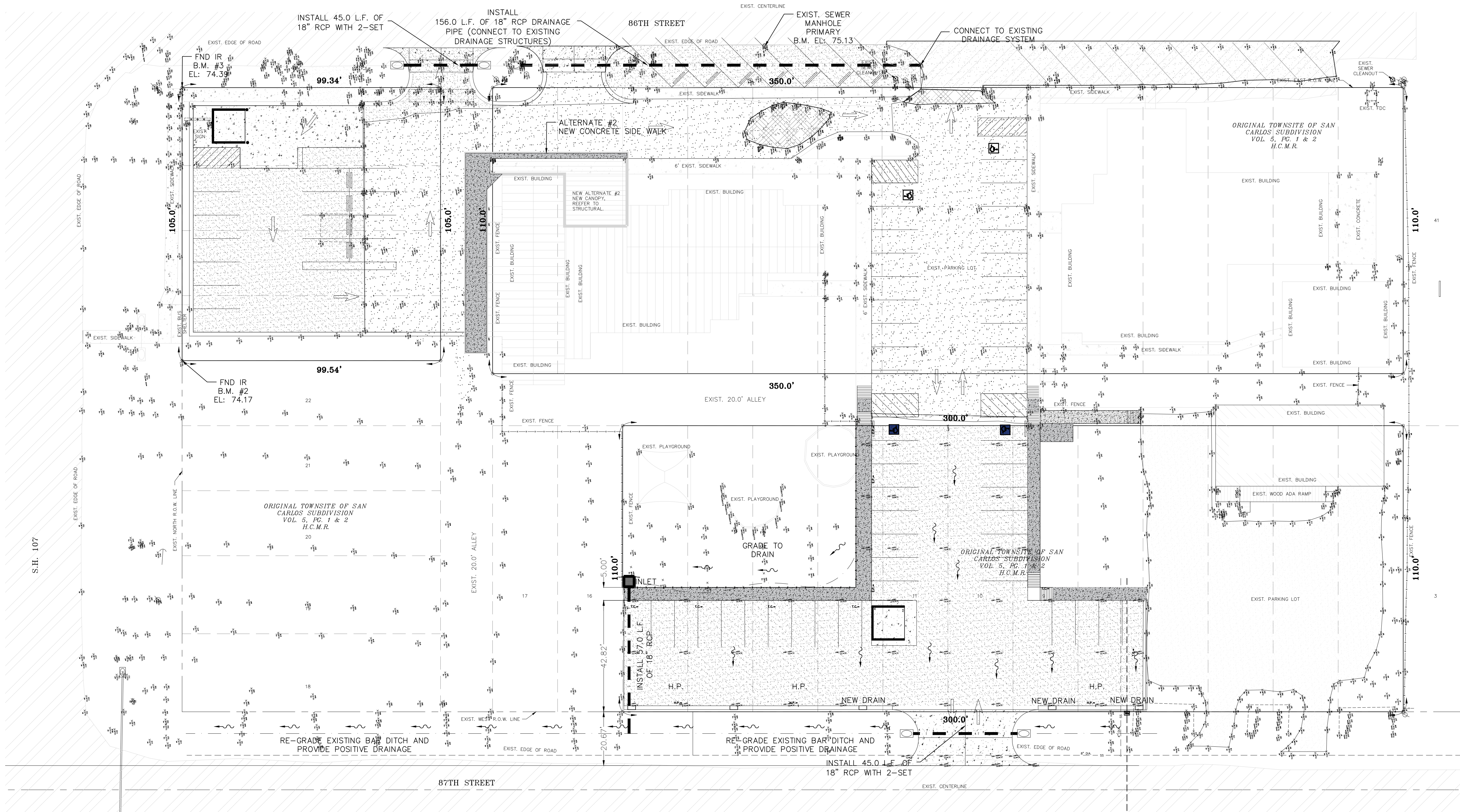
PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
**HEAD START
PARKING LOT IMPROVEMENTS**

NO.	DATE	DESCRIPTION

PROJECT NO.: 22011B
DRAWN BY: RDL
CHECKED BY: R.O.

SHEET TITLE:
DEMO PLAN



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
TBPB REGISTRATION NO. 12179



PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
**HEAD START
PARKING LOT IMPROVEMENTS**

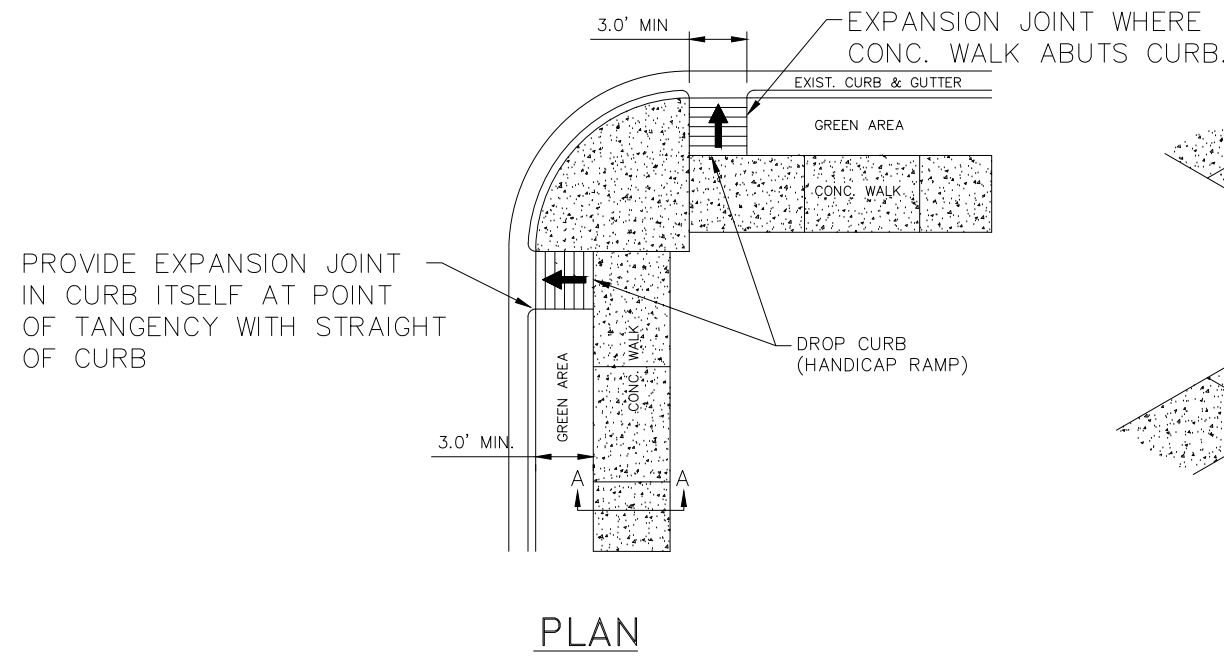
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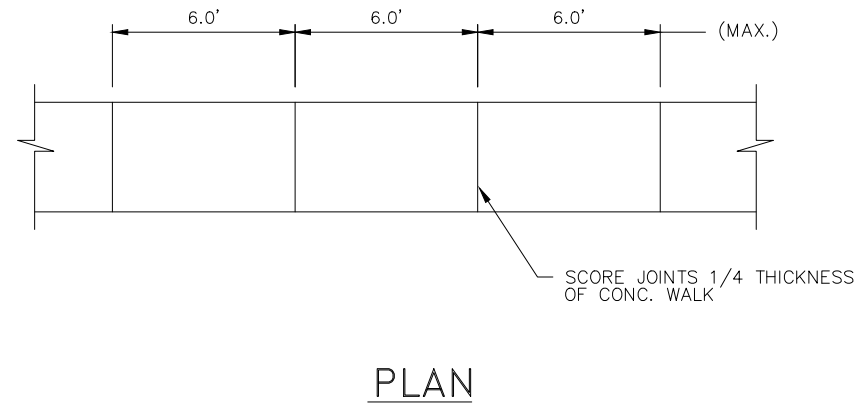
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S H E E T

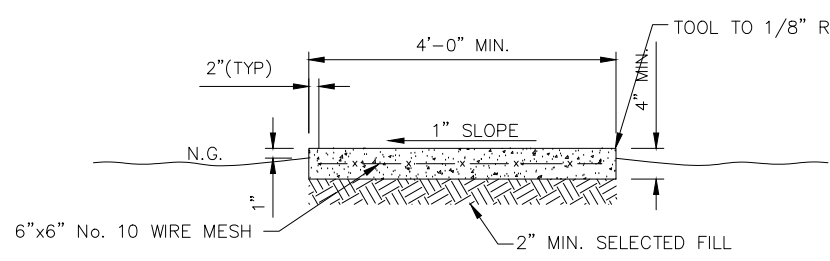
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PLAN

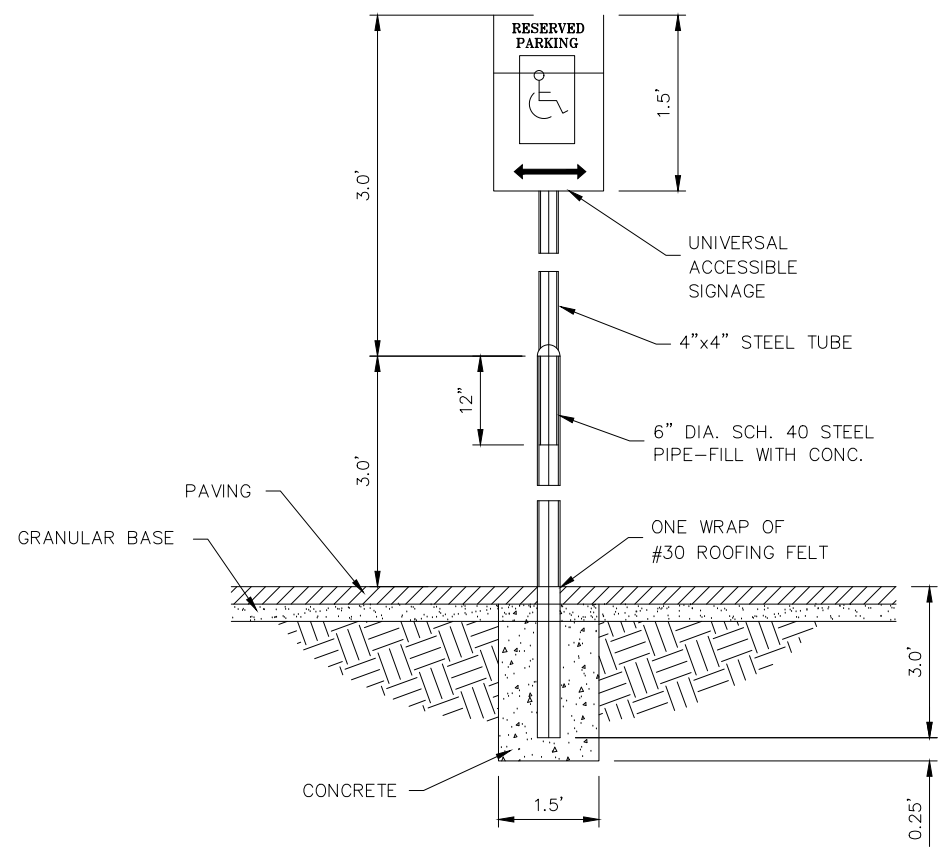


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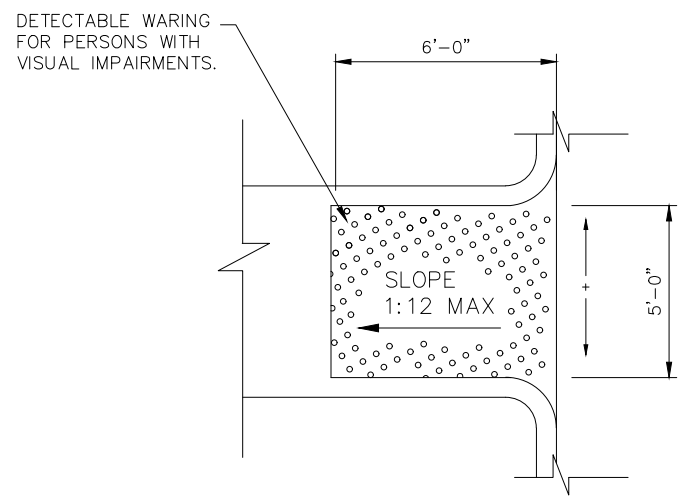


SECTION A-A

TYPICAL CONC. WALK DETAIL

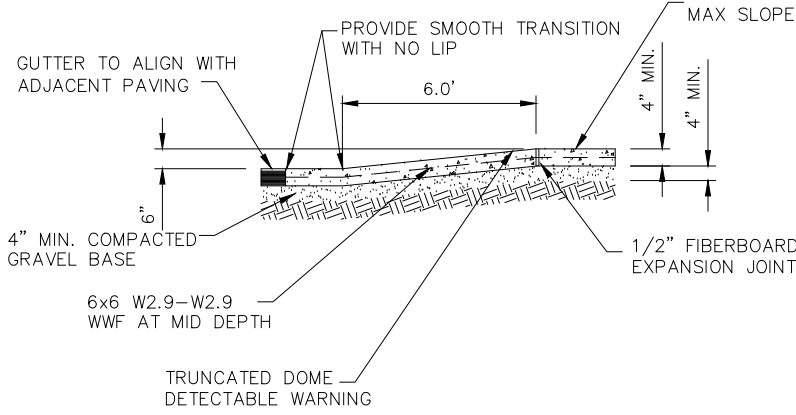


ACCESSIBLE PARKING SIGN

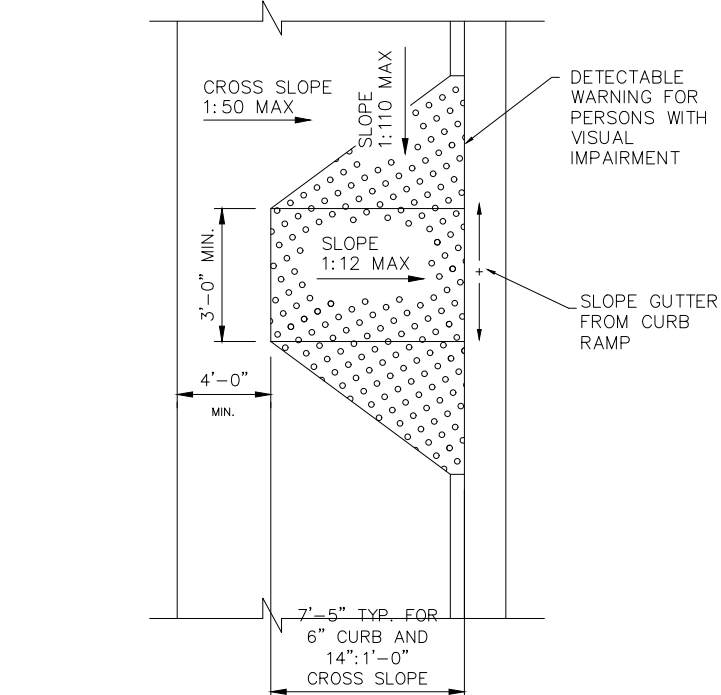


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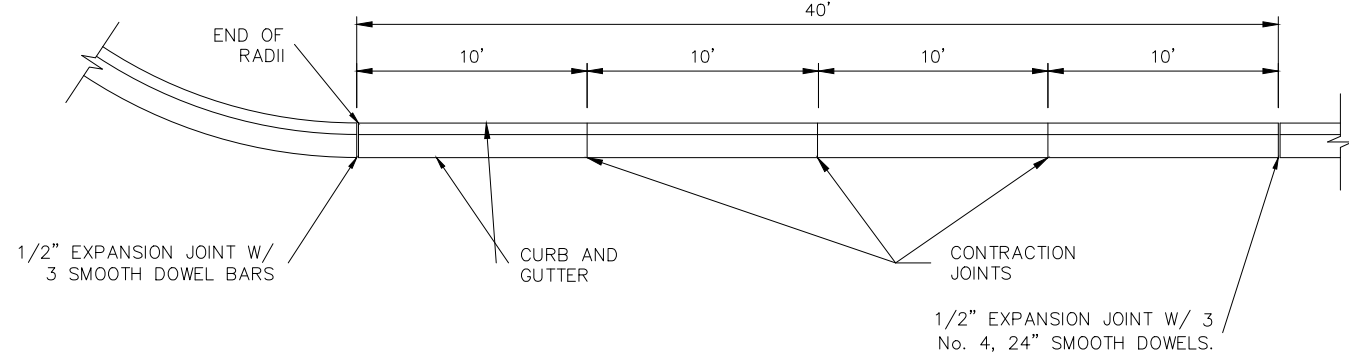
GENERAL NOTES:
1) ALL SIDEWALKS AND HANDICAPPED RAMPS ARE FOR SCHEMATIC PURPOSES ONLY.
2) THE HANDICAPPED RAMPS MUST BE IN ACCORDANCE WITH THE FEDERAL ADA-AG SUBSECTIONS 4.16, 4.8 AND 429.2 AND THE STATE TAS SUBSECTION 4.3 STANDARDS.



CURB RAMP SECTION

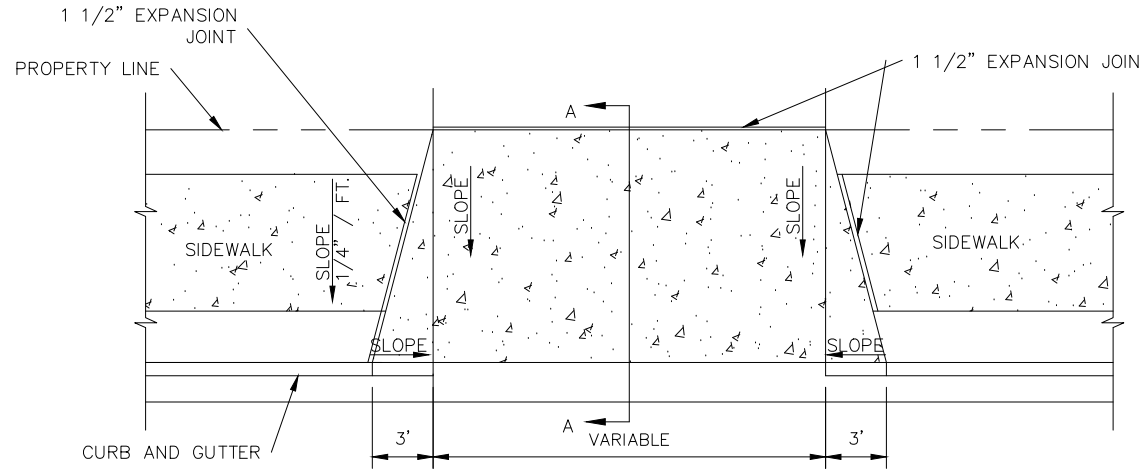


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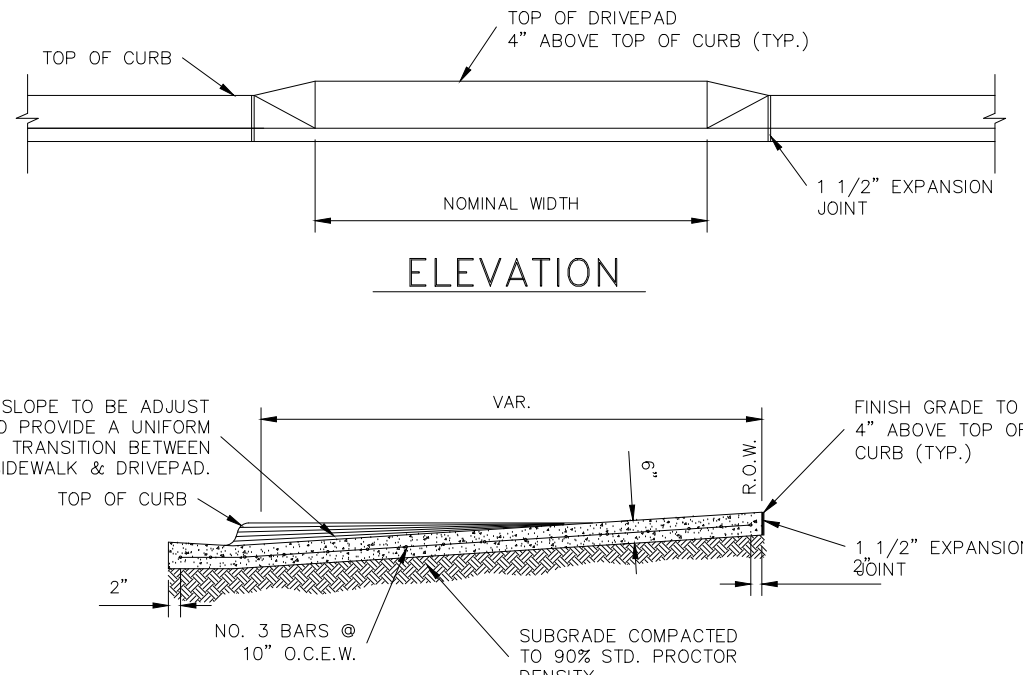


TYPICAL JOINTS

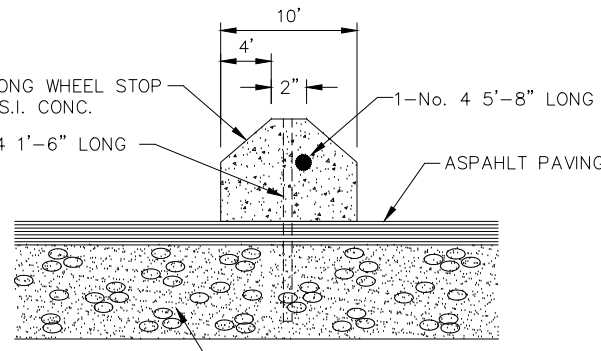
NOT TO SCALE



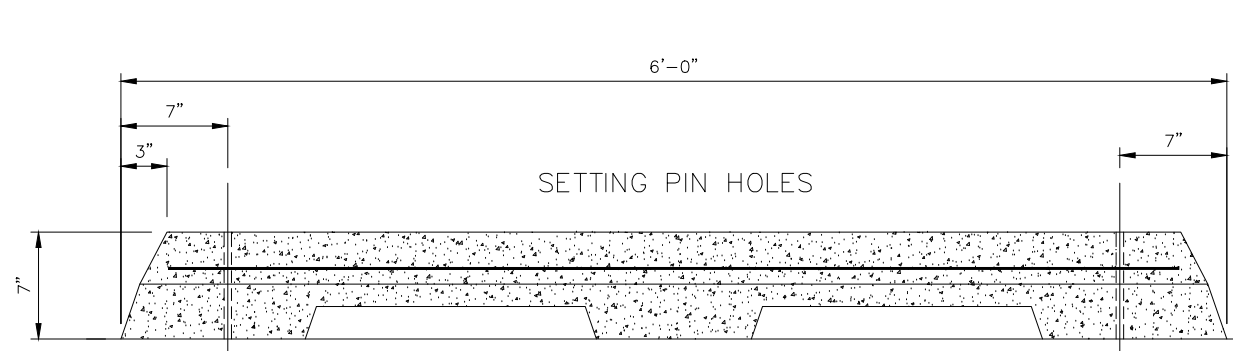
PLAN VIEW



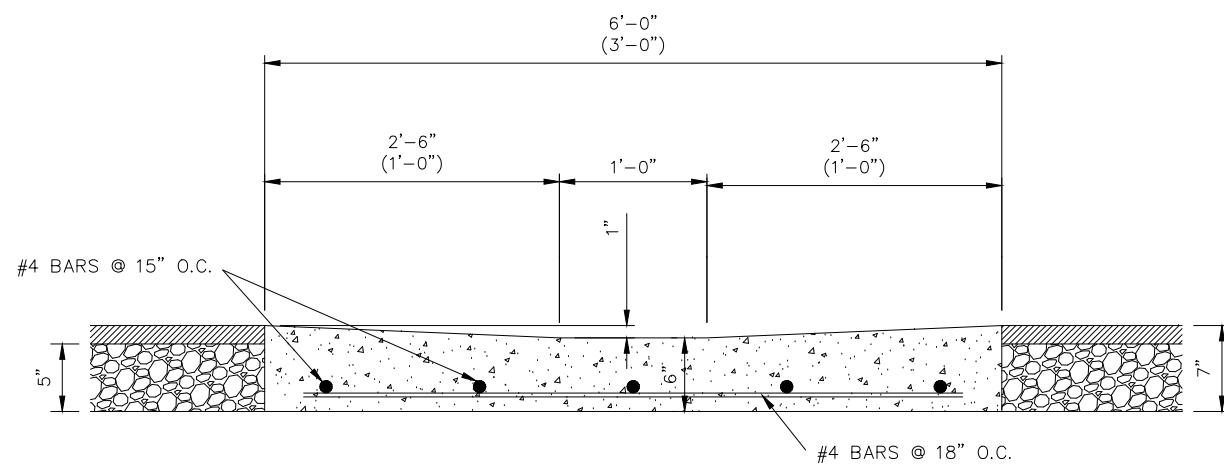
SECTION A-A



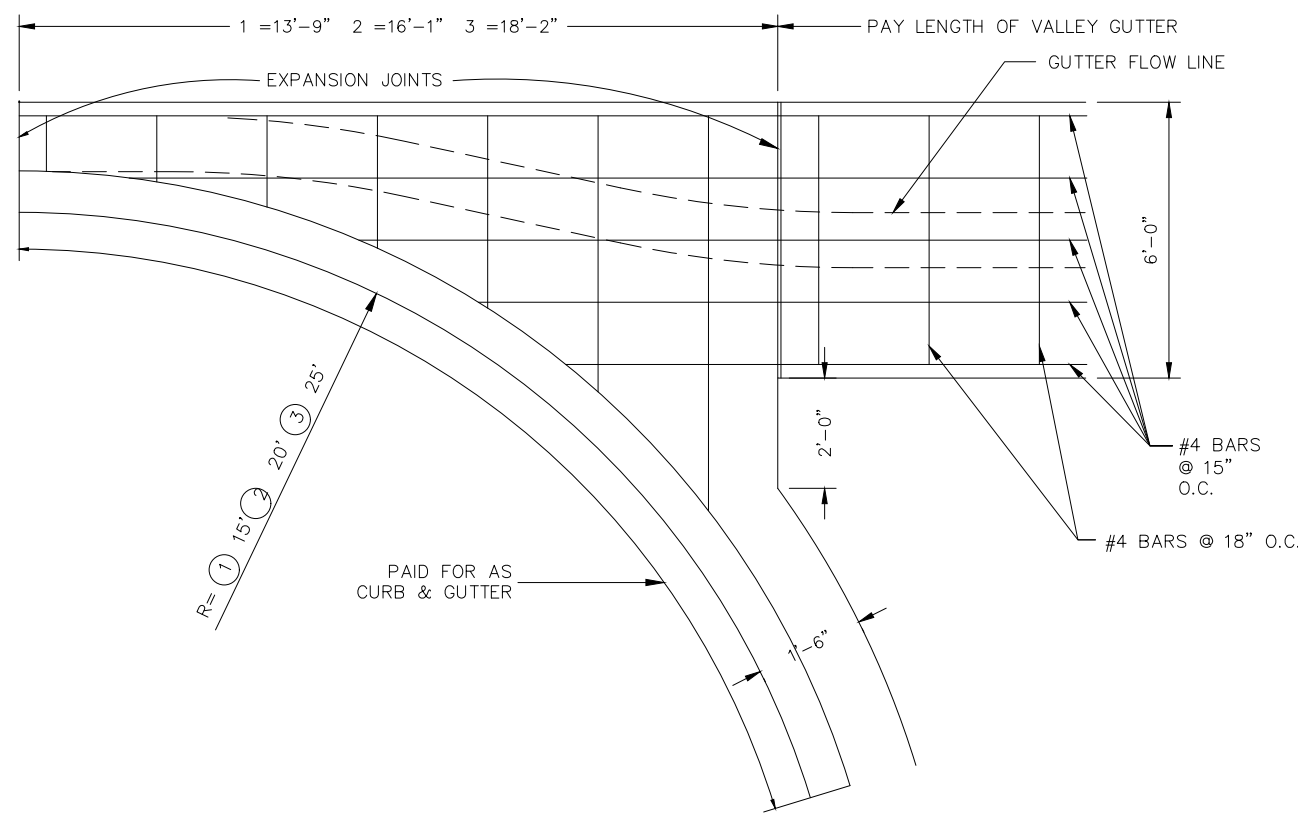
CONCRETE WHEEL STOP



CONCRETE WHEEL STOP

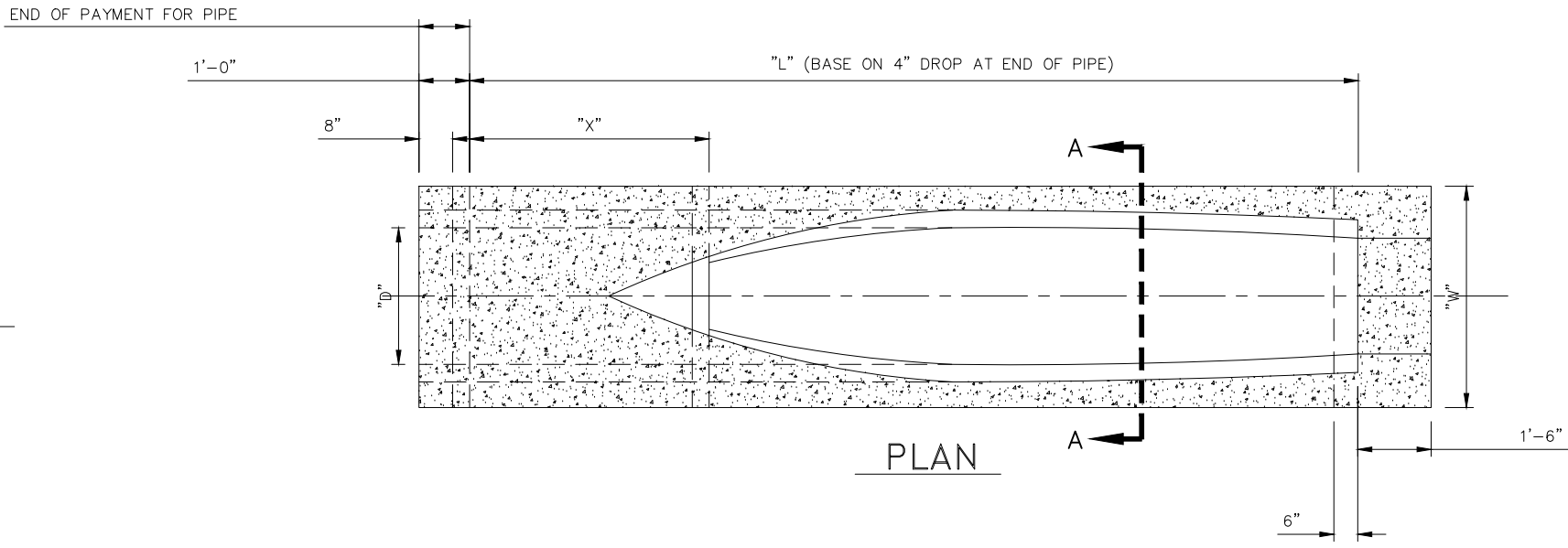


TYPICAL VALLEY GUTTER SECTION

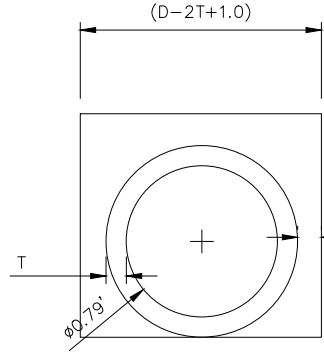


VALLEY GUTTER DETAIL

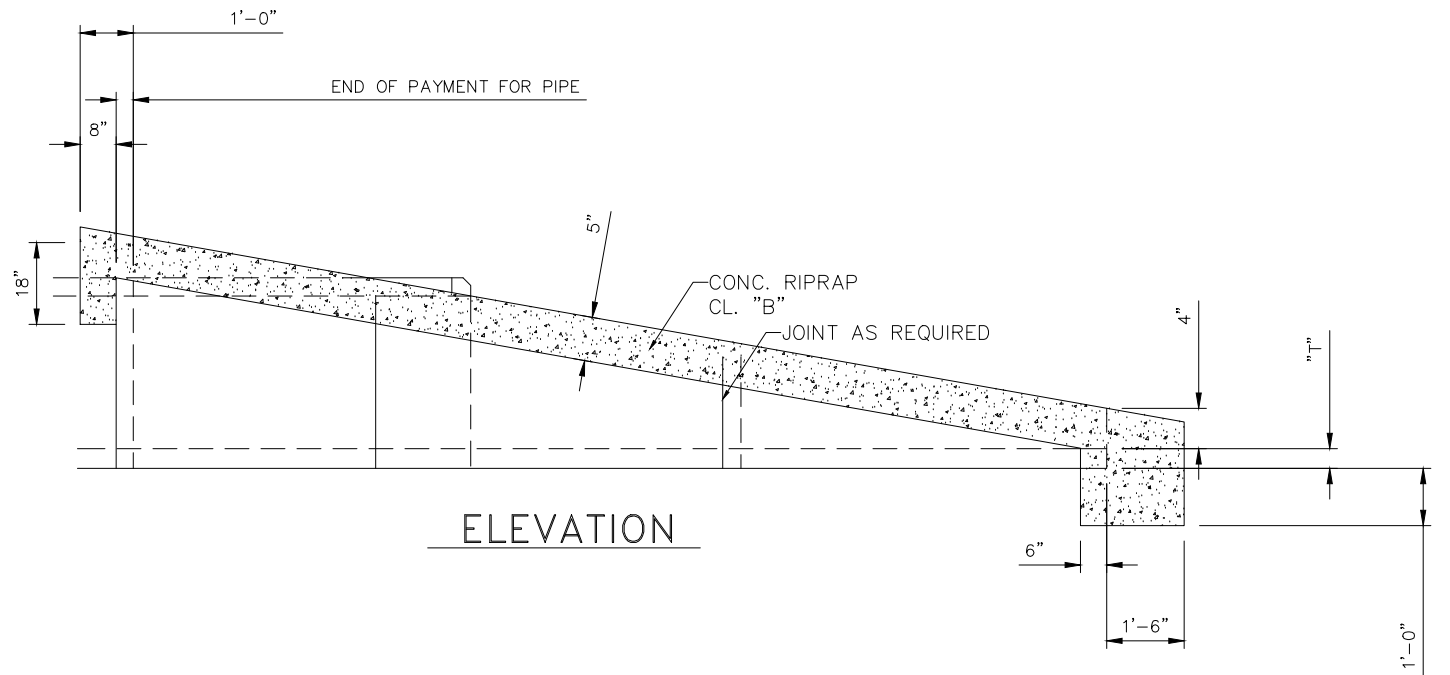
GENERAL NOTES:
1. CONCRETE SHALL BE 3000 P.S.I. COMPRESSIVE STRENGTH AT 28 DAY.
2. ALL CONCRETE WORK SHALL BE TREATED WITH MEMBRANE CURING COMPOUND TYPE 2 WHITE PIGMENTED IN ACCORDANCE W/ TEXAS DEPARTMENT OF TRANSPORTATION DEPARTMENTAL MATERIALS SPECIFICATION ITEM 4650, CONSIDERED INCIDENTAL TO CONCRETE WORK.
3. 1/2\"/>



PLAN

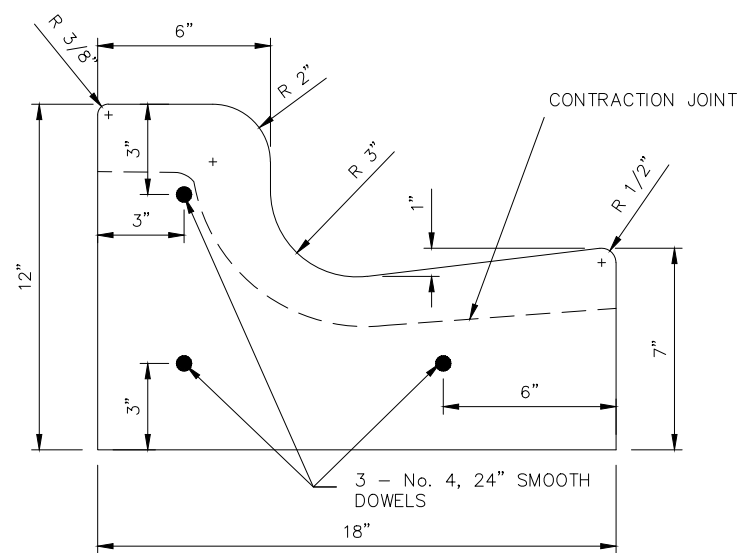


A-A



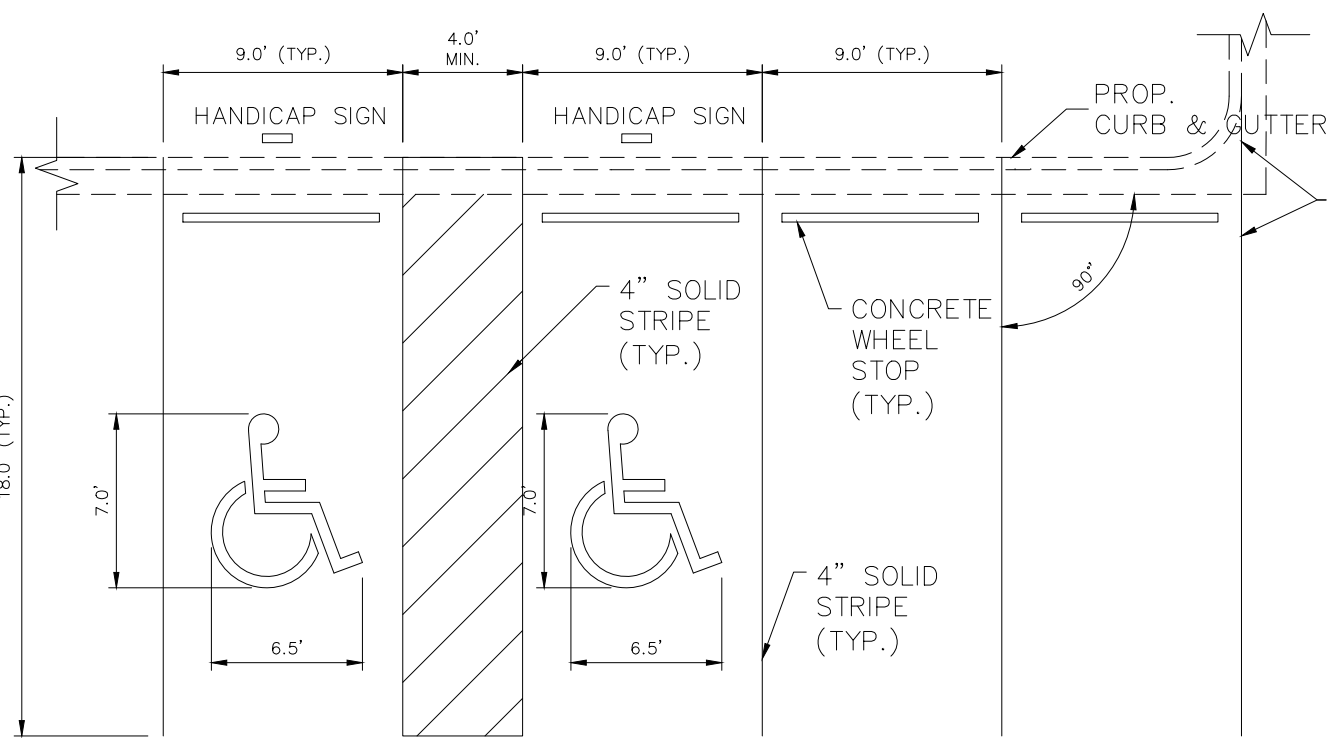
ELEVATION

SLOPED REINFORCED CONCRETE PIPE

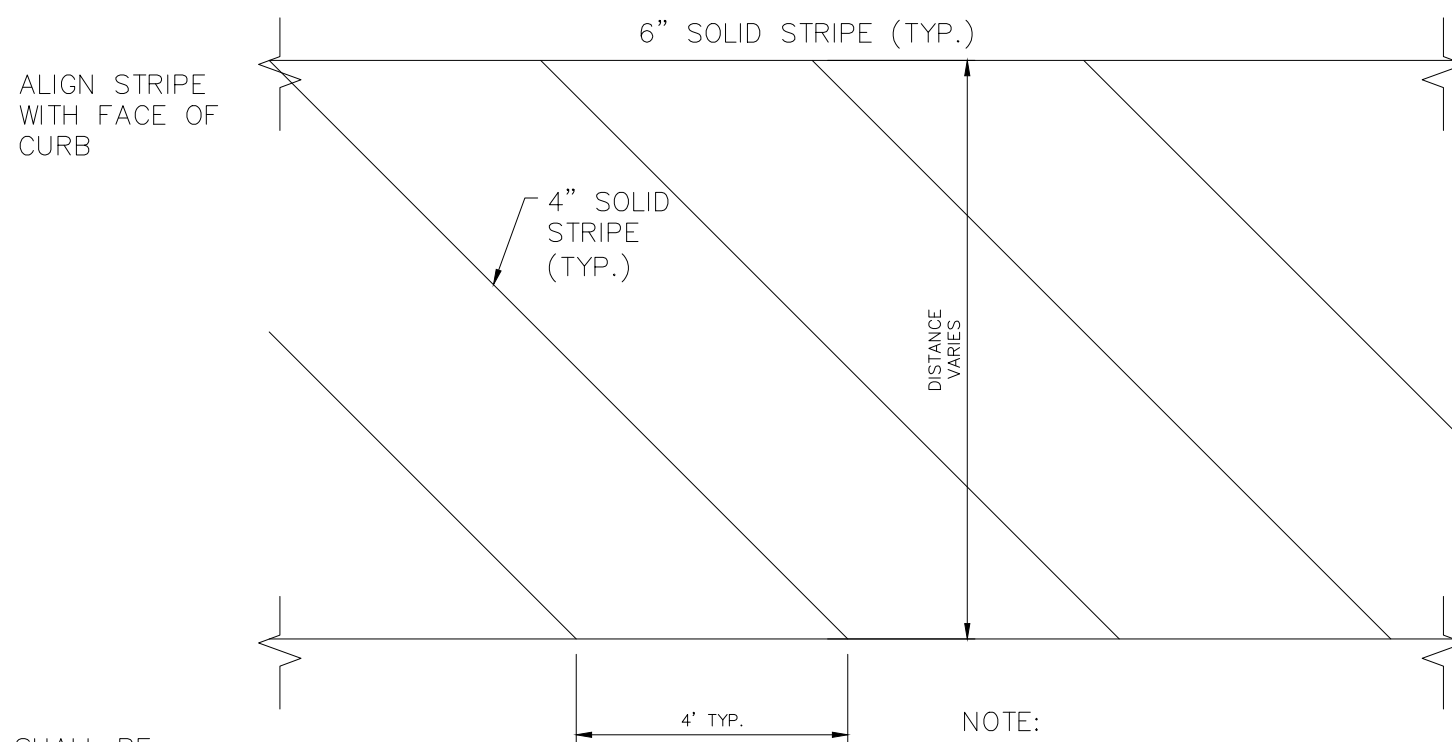


CURB AND GUTTER DETAIL

NOT TO SCALE

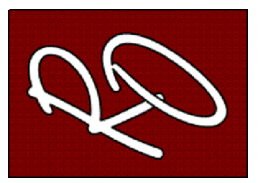


90° PARKING DETAIL & TYPICAL STRIPING DETAIL FOR ACCESSIBLE AREAS



CROSSWALK DETAIL

RO ENGINEERING, PLLC
ENGINEERING & CONSTRUCTION MANAGEMENT
2705 E. Davis Rd., Suite A
Edinburg, Texas 78540
TBE Firm Registration No. 12179



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
TBE REGISTRATION NO. 122179



TITLE:

PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
**HEAD START
PARKING LOT IMPROVEMENTS**

DESCRIPTION	DATE	NO.

PROJECT NO.: 22011B

DRAWN BY: RDL

CHECKED BY: R.O.

SHEET TITLE:

PARKING DETAILS

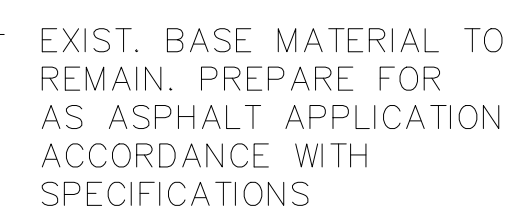
S H E E T

C.6



Diagram illustrating the existing pavement structure and the seal coat application. The diagram shows a cross-section of the road surface and subgrade. The existing pavement is shown as a solid line, and the seal coat is shown as a thin layer on top. The subgrade is shown as a hatched area below the pavement. Labels indicate the seal coat layer to match existing grades, the existing pavement to be prepared in accordance with specifications, the existing pavement, and the existing base and asphalt to remain in existing conditions.

SEAL COAT DETAIL

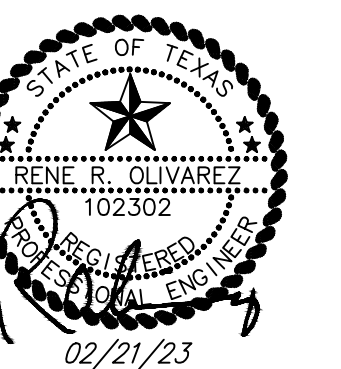


PROP. ASPHALT
REMOVE/REPLACE



CONCRETE PAVEMENT REINFORCEMENT DETAIL

PRO ENGINEERING, PLLC
ENGINEERING & CONSTRUCTION MANAGEMENT
2705 E. Davis Rd., Suite A



PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

HEAD START PARKING LOT IMPROVEMENTS

[illegible]

PROJECT NO.: 22011B

DRAWN BY: RDL

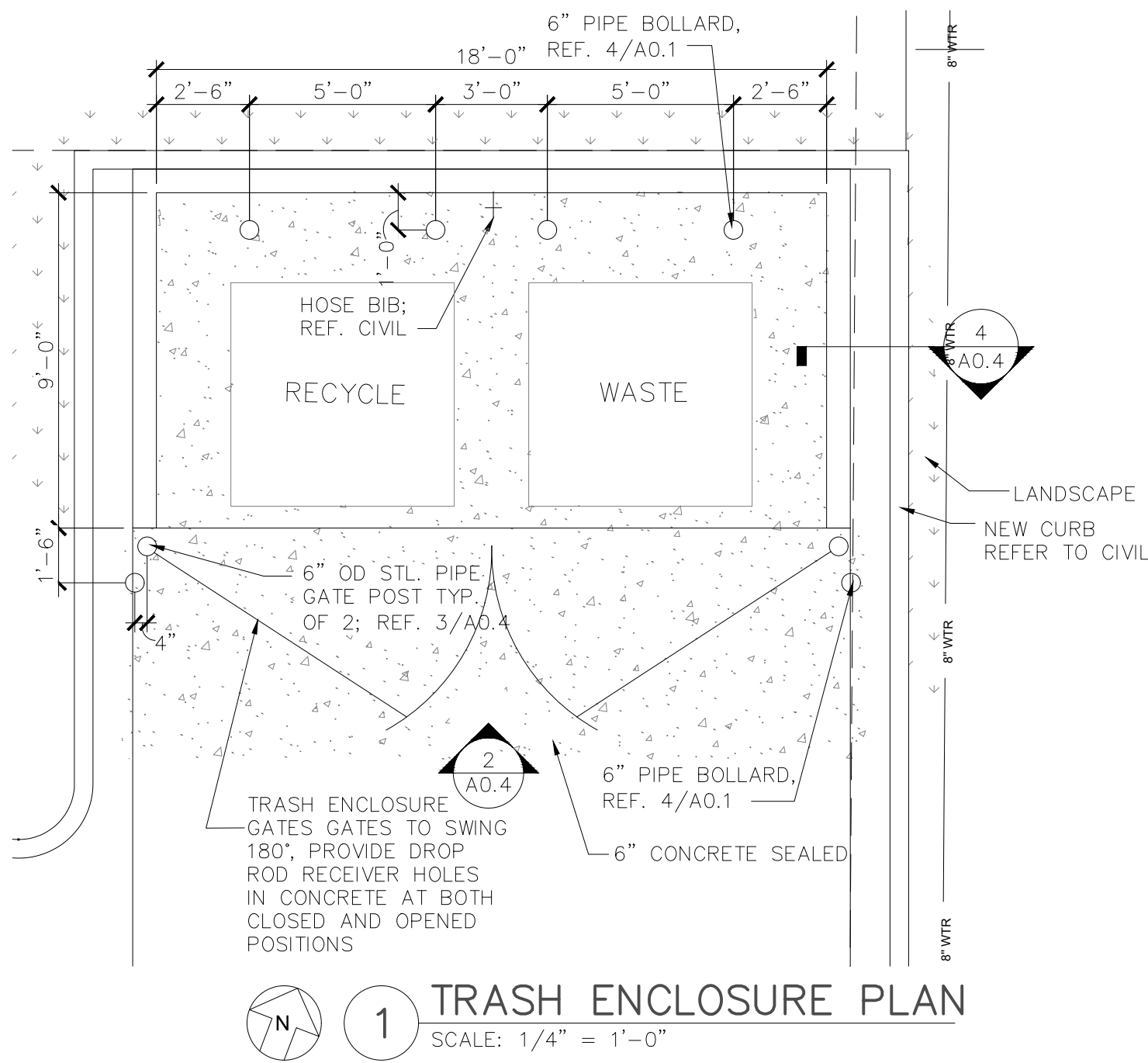
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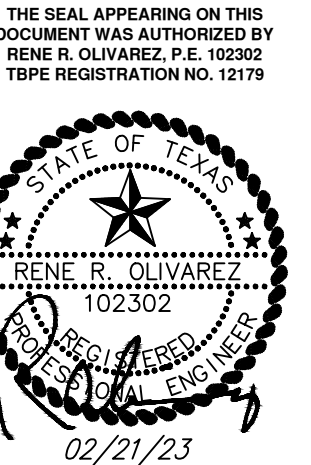
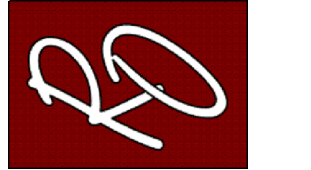
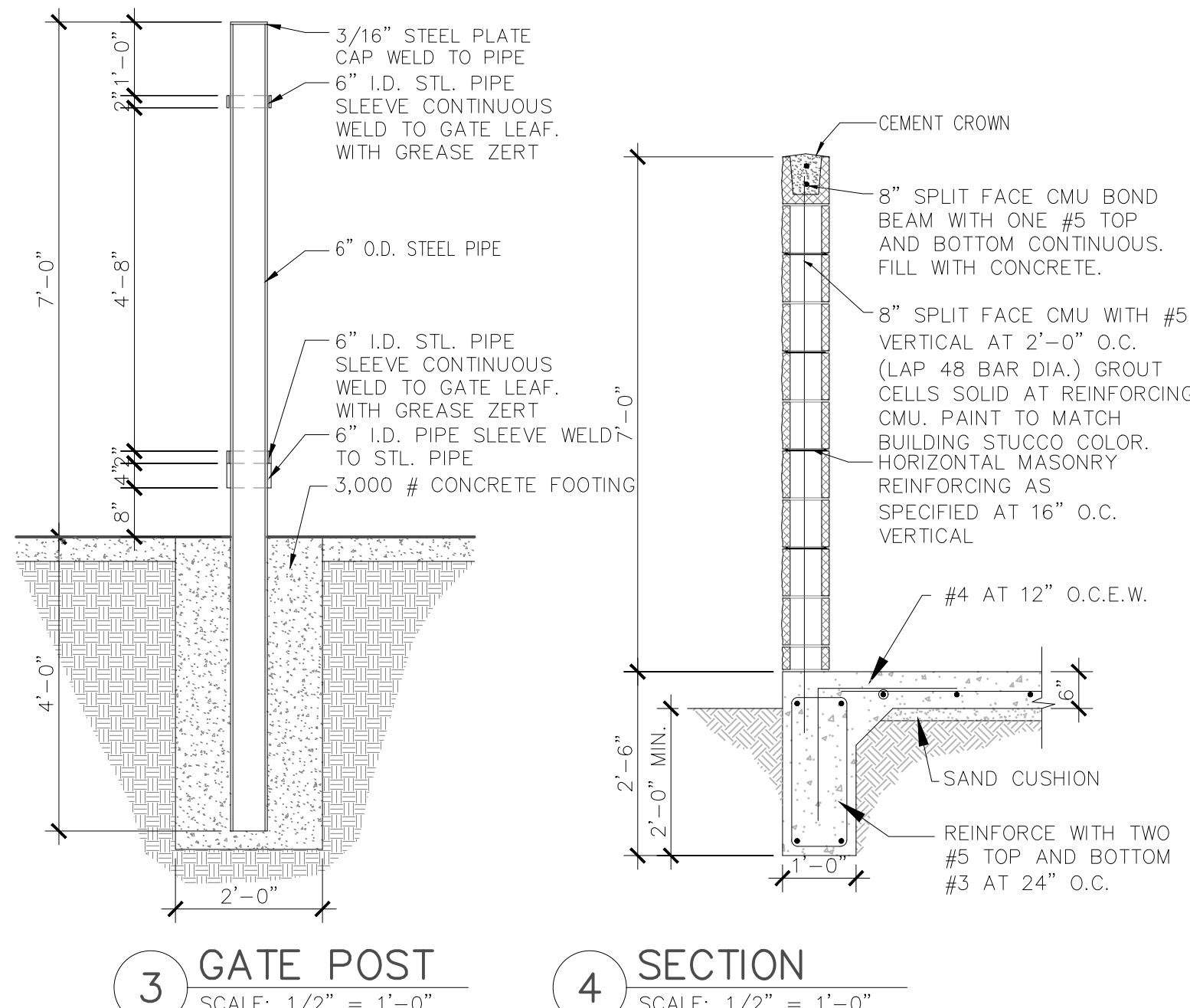
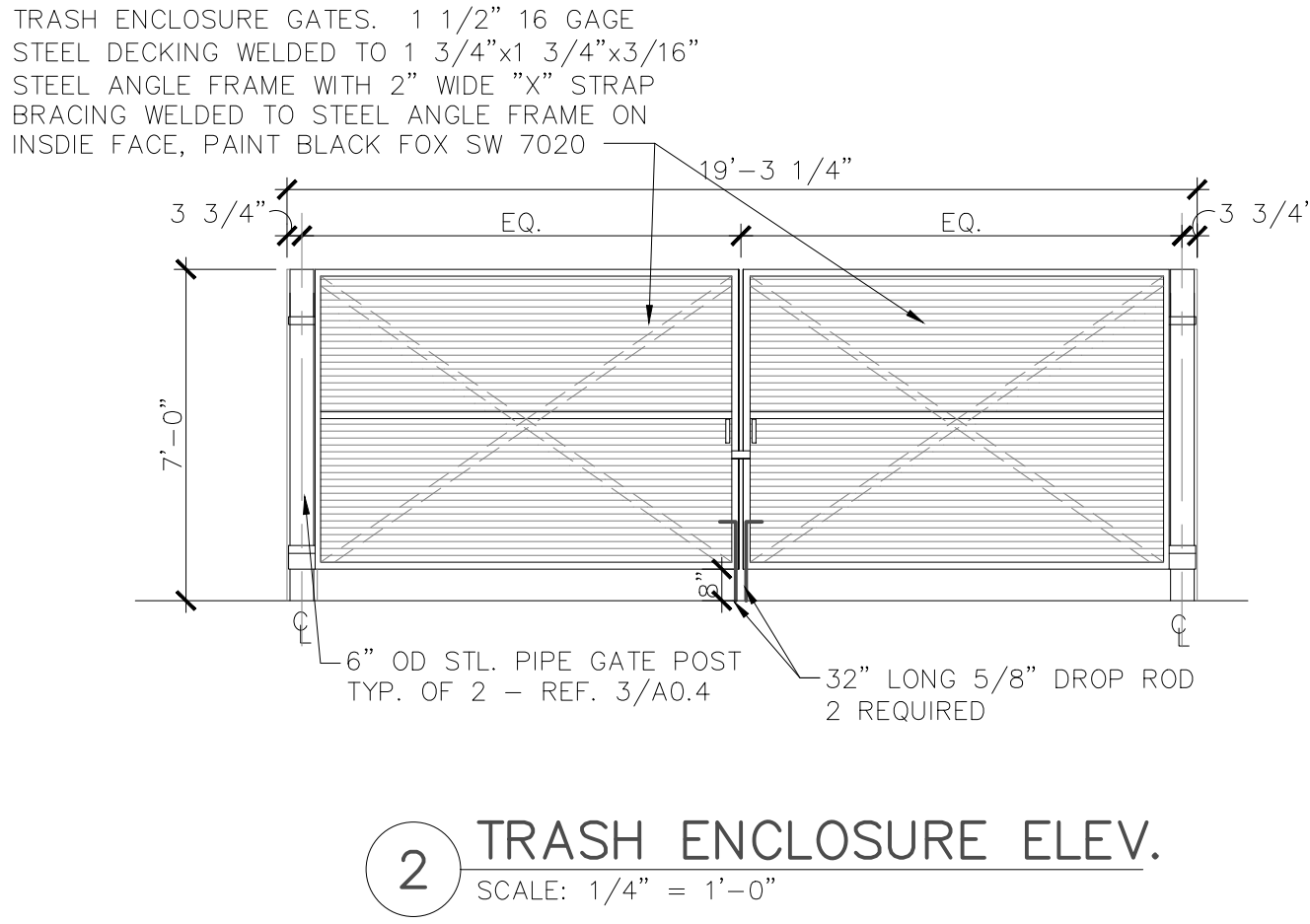
PARKING DETAILS

S H E E T

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TRASH ENCLOSURE DOOR		
QTY.	DESCRIPTION	NUMBER - FINISH
4	RICHARD WILCOX: HINGE	1035.00271 24" - BLK
2	RICHARD WILCOX: CANE BOLT	0524.00021 - BLK
2	LAWRENCE BROS PULL	CD1210S - BLK
1	LAWRENCE BROS HASP	CD1915S-6"
1	PADLOCK	C955-2 FIC - 606 (hardware number to be determined)
1	CYLINDER CORE	



PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
**HEAD START
PARKING LOT IMPROVEMENTS**

NO.	DATE	DESCRIPTION

PROJECT NO.: 22011B

DRAWN BY: RDL

CHECKED BY: R.O.

SHEET TITLE:

**CONCRETE TRASH PAD
DETAILS**

EXISTING CONDITIONS & COORDINATION/RENOVATION:

1. COORDINATE FACILITY SCHEDULES AND PROJECT COMPLETION DATES WITH OWNER. PERFORM WORK IN CLOSE COORDINATION WITH OWNER. MAJORITY OF WORK SHALL BE PERFORMED WHEN SCHOOL IS UNOCCUPIED, SUCH AS WEEKENDS, AFTER HOURS, SPRING AND SUMMER BREAK OR AT OWNER APPROVED TIME.
2. COORDINATE WORK AMONG ALL DISCIPLINES. IT IS NOT THE INTENT OF THESE DOCUMENTS TO DICTATE WHO MUST DO THE WORK. ALL WORK SHOWN IS THE RESPONSIBILITY OF THE (PRIME) CONTRACTOR.
3. WORK TO BE DONE UNDER ALLOWANCES BECOMES AN INTEGRAL PART OF THE WORK AND THE RESPONSIBILITY OF THE CONTRACTOR ONCE THE ALLOWANCE IS APPROVED.
4. COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, ESPECIALLY THOSE THAT MIGHT AFFECT OTHER BUILDINGS ON CAMPUS.
5. CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INVOLVING A CHANGE IN PROJECT SCOPE OR COST WITHOUT FIRST HAVING OBTAINED ENGINEER'S APPROVAL IN WRITING. UNLESS ENGINEER HAS AGREED TO SUCH CHANGE PRIOR TO IT BEING DONE, AND HAS AGREED THAT AN INCREASE IN COST ASSOCIATED WITH SUCH CHANGE IS WARRANTED; CONTRACTOR WILL NOT BE REIMBURSED FOR SUCH CHANGE.
6. OWNER'S EQUIPMENT, MATERIALS, FURNISHINGS, CARPETS, AND INTERIOR SURFACES ARE TO BE PROTECTED FROM DUST ACCUMULATION AND DAMAGE, AND MUST BE THOROUGHLY CLEANED PRIOR TO SUBSTANTIAL COMPLETION. REFER TO SPECIFICATIONS SECTION 26 03 00 EXECUTION REQUIREMENTS FOR FURTHER DETAIL.
7. MAINTAIN PROJECT SITE FREE OF WASTE MATERIALS AND DEBRIS, AND CLEAN SITE AT END OF EACH WORK DAY TO GREATEST EXTENT POSSIBLE.
8. SUBMISSION OF PROPOSAL IS CONSIDERED AN ACKNOWLEDGEMENT THAT CONTRACTOR VISITED SITE, VERIFIED ALL EXISTING CONDITIONS, AND INCLUDED ANY MODIFICATIONS TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERATIONAL SYSTEM.
9. TIME OR MONEY ALLOWANCES WILL NOT BE MADE TO ACCOMMODATE CONDITIONS THAT COULD HAVE BEEN VERIFIED PRIOR TO SUBMITTING PROPOSAL.
10. DRAWINGS SHOWING ALL EQUIPMENT LOCATIONS, DUCT AND PIPE SIZES, ELEVATIONS, AND ELECTRICAL INFORMATION HAVE BEEN RECREATED USING DRAWINGS AND SITE SURVEYS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE CONDITIONS IN ORDER TO MAKE ANY NECESSARY ADJUSTMENTS, PRIOR TO ORDERING MATERIALS OR COMMENCING INSTALLATION. CHANGE ORDERS WILL NOT BE APPROVED FOR DIMENSIONAL VERIFICATIONS REQUIRING MINOR ADJUSTMENTS NEEDED TO COMPLETE INSTALLATION.
11. PROVIDE OWNER WITH MINIMUM 10 DAYS ADVANCE NOTICE OF INTENT TO PERFORM ANY WORK WHICH WILL REQUIRE ELECTRICAL SERVICE TO BE SHUT DOWN.
19. PRIOR TO DEMOLITION WORK, SUBMIT A DETAILED DEMOLITION AND CONSTRUCTION SCHEDULE TO OWNER AND ENGINEER. DO NOT PROCEED WITH WORK UNTIL PROPOSED SCHEDULE IS APPROVED BY ALL PARTIES. PROVIDE OWNER WITH MINIMUM 10 DAYS ADVANCE NOTICE OF INTENT TO PERFORM ANY WORK WHICH WILL REQUIRE ELECTRICAL SERVICE TO BE SHUT DOWN.
20. PROVIDE SHOP DRAWINGS TO COORDINATE EXISTING AND NEW WORK.
21. NOTIFY OWNER AND ENGINEER IF ANY MATERIALS SUSPECTED OF CONTAINING ASBESTOS ARE FOUND AND STOP WORK IMMEDIATELY.
22. IT IS CONTRACTOR'S RESPONSIBILITY TO REMOVE AND DISPOSE OF ALL ITEMS INDICATED TO BE REMOVED. ONLY EXPRESSLY DESIGNATED ITEMS SHALL BE TURNED OVER TO OWNER.
23. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL OF ALL MATERIAL REMOVED. CONTRACTOR SHALL DISPOSE OF ALL MATERIALS WHICH THE OWNER DOES NOT WANT.
24. REMOVE ALL EQUIPMENT, MATERIALS, CONTROL DEVICES, BOXES, POWER AND CONTROL WIRING, SAFETY SWITCHES, TUBING, ELECTRICAL CONDUIT, PIPING, SENSORS, ELECTRICAL DISCONNECTS, SUPPORTING DEVICES AND STRUCTURES, AND ALL RELATED AUXILIARY ITEMS ASSOCIATED WITH EQUIPMENT AND MATERIALS WHICH WILL NO LONGER BE USED AFTER THE PROJECT IS COMPLETE.
25. CONTRACTOR IS RESPONSIBLE FOR RESTORING ANY DISTURBED SURFACE TO ITS ORIGINAL CONDITION. ANY ROAD, TRAFFIC, OR OTHER PAINTED OR ERECTED SIGNS DAMAGED AS A RESULT OF WORK PERFORMED IN THOSE AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
26. CUTTING AND PATCHING OF WALLS DAMAGED IN THE REMOVAL OF ITEMS SHALL BE DONE, WHETHER OR NOT DRAWINGS SPECIFICALLY CALL FOR SUCH REPAIRS.
27. FIELD-VERIFY EXACT LOCATIONS OF ALL EXISTING AND NEW UTILITIES, PRIOR TO CONDUCTING ANY WORK. COORDINATE WITH OWNERS PERSONNEL AND UTILITY COMPANIES. ALL EXPENSES INCURRED TO REPAIR DAMAGE CAUSED TO KNOWN UTILITIES AS A RESULT OF CONTRACTOR'S WORK SHALL BE BORNE BY THE CONTRACTOR. OWNER WILL NOT BE RESPONSIBLE FOR SUCH COSTS.
28. COORDINATE DEMOLITION WORK WITH NEW AND TEMPORARY CONSTRUCTION WITH MINIMAL INTERRUPTION OF POWER, AND OTHER UTILITIES. COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, PARTICULARLY THOSE THAT MIGHT AFFECT OCCUPANCY.

EQUIPMENT:

1. EQUIPMENT INSPECTION:

a. FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.

b. ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY EQUIPMENT CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.

c. EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.

d. COORDINATE CONCRETE HOUSEKEEPING PAD EXTENSIONS AS NEEDED.
2. EQUIPMENT ACCESS:

a. PROVIDE MANUFACTURER RECOMMENDED AND CODE ENFORCED CLEARANCES AROUND EQUIPMENT. MAINTAIN 36" CLEAR IN FRONT OF CONTROLLER, ELECTRIC HEATERS, ETC.

b. INSTALL ALL VALVES, CONTROLS, DAMPERS, FANS, ETC. IN ACCESSIBLE LOCATIONS. PROVIDE ADEQUATELY SIZED ACCESS DOORS WHERE REQUIRED.
3. EQUIPMENT INSTALLATION:

a. PROVIDE SPRING HANGER TYPE VIBRATION ISOLATORS TO SUPPORT POWERED VIBRATING EQUIPMENT. PROVIDE FLEXIBLE DUCT CONNECTORS.

b. COMPLETELY WEATHERPROOF ALL EQUIPMENT, DUCTS, PIPES AND OTHER DEVICES AND MATERIALS INSTALLED OUTSIDE THE BUILDING, CHILLER YARD AREA, OR OTHERWISE EXPOSED TO WEATHER. AS A MINIMUM, WEATHERPROOFING SHALL INCLUDE, BUT IS NOT LIMITED TO THE FOLLOWING: JACKETING FOR ALL PIPING INSULATION, VALVES AND ACCESSORIES RATED FOR OUTDOOR SERVICE; ELECTRICAL ENCLOSURES NEMA 4X-SS. PROVIDE ELECTRICAL HEAT TRACING FOR UTILITIES SUSCEPTIBLE TO FREEZING.

c. AFFIX ID TAGS TO ALL MECHANICAL EQUIPMENT FOR SPECIFICATIONS.
4. ELECTRICAL:

a. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH ELECTRICAL CONTRACTOR REGARDING EQUIPMENT SIZES AND TYPES OF ELECTRICAL INTERFACE EQUIPMENT REQUIRED.

b. DUE TO VARIATIONS IN EQUIPMENT CHARACTERISTICS BY DIFFERENT EQUIPMENT SUPPLIERS, MECHANICAL EQUIPMENT ULTIMATELY PROVIDED MAY DIFFER IN HORSEPOWER OR AMPERAGE REQUIREMENTS FROM THAT SPECIFIED IN THESE DRAWINGS. COORDINATE WITH GENERAL CONTRACTOR PRIOR TO BIDDING, AND PRIOR TO SUBMITTALS AND ORDERING EQUIPMENT, TO ENSURE THAT EQUIPMENT ELECTRICAL REQUIREMENTS ARE CONVEYED TO ELECTRICAL CONTRACTOR. IT IS SOLELY CONTRACTOR'S RESPONSIBILITY TO ENSURE COMPATIBILITY ISSUES ARE COORDINATED.

ELECTRICAL:

1. ALL ELECTRICAL WORK SHALL BE UNDER THE MASTER ELECTRICIAN WHO PULLED THE PERMIT AND ITS JOURNEYMAN ELECTRICIANS.
2. PERFORM ALL WORK PER ADOPTED N.E.C. AND APPLICABLE STATE STANDARDS, UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS.
3. MINIMUM CIRCUIT SIZE IS 2 #12 AND 1 #12 GROUND IN 3/4" CONDUIT FOR INDIVIDUAL CIRCUITS, 3/4" CONDUIT FOR MULTIPLE CIRCUITS, WITH THE EXCEPTION THAT ANY CIRCUIT LONGER THAN 100 FEET SHALL BE MINIMUM #10 AWG WITH #10 GROUND WIRE. CIRCUIT LONGER THAN 200 FEET SHALL BE MINIMUM #8 AWG WITH #10 GROUND WIRE MINIMUM. ALL CONDUCTORS SHALL BE 75 DEGREE (MINIMUM) COPPER THHN, COLOR CODED AS PER NEC AND LOCAL AMENDMENTS WITH SIZE, TEMPERATURE, AND VOLTAGE PERMANENTLY PRINTED ON THE JACKET. ALL JOINTS SHALL BE MADE UP USING SELF LOCKING, TWIST-ON, COLOR CODED, SQUARE WIRE SPRING GRAB, LONG SKIRT, WIRE CONNECTORS WITH SWEPT WINGS.
4. ALL EXISTING ID NAMETAGS AND CIRCUIT IDENTIFICATION MUST BE REVISED TO REFLECT CURRENT CONDITIONS FOR ALL EQUIPMENT WHICH IS NEW, REPLACED, OR DEMOLISHED. REMOVE ID NAMETAGS FOR DEMOLISHED EQUIPMENT. REPLACE EXISTING NAMETAGS WITH NEW FOR REPLACED EQUIPMENT, IF REPLACEMENT EQUIPMENT HAS DIFFERENT NAME. PROVIDE NEW NAMETAGS FOR ALL NEW EQUIPMENT. ALL CIRCUIT BREAKER DIRECTORIES FOR PANELS IN WHICH NEW WORK TAKES PLACE ARE TO BE REPLACED WITH NEW DIRECTORIES WHICH LIST EXISTING CIRCUITS AND NEW. ALL UNUSED CIRCUITS ARE TO BE MARKED AS 'SPARE' IN THE DIRECTORIES. DIRECTORIES ARE TO BE COMPUTER GENERATED; NO HAND WRITTEN DIRECTORIES ARE ACCEPTABLE.
5. HAND-WRITTEN CIRCUIT BREAKER DIRECTORIES WILL NOT BE ACCEPTED. DIRECTORIES MUST BE COMPUTER GENERATED AND PRINTED TO REFLECT FINAL INSTALLED CONDITIONS.
6. MARK ALL J-BOXES WITH INDELEIBLE INK, INDICATING POWER CIRCUITRY INFORMATION. LABEL ALL EQUIPMENT ITEMS PER SPECIFICATIONS.
7. ALL EXTERIOR RACEWAYS ABOVE GROUND SHALL BE RIGID GALVANIZED.
8. UNDER NO CIRCUMSTANCES SHALL MORE THAN THREE CIRCUITS SHARE THE SAME NEUTRAL, AND SUCH CIRCUITS MUST BE SEPARATE PHASE.
9. SINCE ELECTRICAL CHARACTERISTIC OF EQUIPMENT (SUCH AS HORSEPOWER, KW, AMPERAGE, VOLTAGE, ETC.) SUBMITTED MAY DIFFER FROM THOSE SPECIFIED IN DRAWINGS, CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH MECHANICAL AND OTHER CONTRACTORS TO ENSURE COMPATIBILITY BETWEEN ELECTRICAL AND MECHANICAL EQUIPMENT SIZES AND TYPES OF ELECTRICAL INTERFACE EQUIPMENT REQUIRED.
10. USE LONG-SWEEPS FOR ALL CHANGES IN DIRECTION ON CONDUIT RUNS.
11. ALL INTERIOR RACEWAYS SHALL BE EMT.
12. FIELD VERIFY PROJECT SITE EXISTING CONDITIONS AND ELEVATIONS PRIOR TO BEGINNING ANY WORK.
13. PHASING AND SEQUENCE OF CONSTRUCTION SHALL BE PER DRAWINGS AND SPECIFICATIONS.
14. ALL MATERIALS AND LABOR, WHETHER SPECIFICALLY INDICATED ON PLANS OR NOT, WHICH ARE NECESSARY FOR THE PROPER INSTALLATION AND FUNCTION OF THE SYSTEM SHALL BE FURNISHED BY THIS CONTRACTOR. INCLUDE ALL COSTS OF CHANGES, IF/AS REQUIRED IN BID PROPOSAL.
15. ELECTRICAL WIRING SHALL NOT BE SPICED BELOW GRADE.
16. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.
17. CONTRACTOR WHO WILL ACTUALLY PERFORM WORK MUST APPLY FOR ALL REQUIRED PERMITS.
18. NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.
19. COORDINATE ALL WORK WITH OTHER TRADES; COORDINATE SCHEDULE OF WORK WITH ALL SUB-CONTRACTORS TO ACHIEVE SMOOTH FLOW OF CONSTRUCTION.
20. SEAL AROUND ELECTRICAL RACEWAYS AT ALL WALLS AND WALL LOUVER PENETRATIONS WITH FIREPROOF CAULKING. RE: SPECS. PROVIDE FLASHING AROUND PENETRATION, BOTH INSIDE AND OUTSIDE, TO PROVIDE FINISHED LOOK.
21. CONTRACTOR SHALL REVIEW COMPLETE DOCUMENTS PRIOR TO SUBMITTAL OF PROPOSAL TO GAIN COMPLETE UNDERSTANDING OF PROJECT SCOPE, WORK BY OTHERS, AND ELECTRICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.
22. MAINTAIN MANUFACTURER RECOMMENDED CLEARANCE AROUND ALL EQUIPMENT.
23. PLACE ID TAGS TO ALL DIVISION 26 EQUIPMENT.
24. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH MECHANICAL AND PLUMBING CONTRACTOR REGARDING EQUIPMENT SIZES AND TYPES OF ELECTRICAL INTERFACE EQUIPMENT REQUIRED.
25. FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.
26. ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY THEIR CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.
27. EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.
28. SLEEVE ALL EXTERIOR WALL PENETRATIONS.
29. MINIMUM CIRCUIT SIZE IS 2 #12 AND 1 #12 GROUND IN 3/4" CONDUIT. MAXIMUM FIXTURE WHIP LENGTH FROM ANY J-BOX 6 FEET. LIGHTING CIRCUITS JOINTS SHALL BE MADE UP IN OVERHEAD J-BOXES SECURED TO STRUCTURE WITH LIGHTING WHIPS FROM THE J-BOXES. FIXTURES DESIGNED TO BE QUICK-CLIPPED TOGETHER SHALL BE CONNECTED AS PER MANUFACTURER.
30. COORDINATE LIGHT LOCATIONS WITH OTHER CEILING ITEMS OR JOIST ITEMS PRIOR TO INSTALLATION. LIGHT LOCATIONS TAKE PRECEDENCE OVER AIR DEVICES.
31. PROVIDE SECONDARY SUPPORT WIRES FROM ALL FOUR (4) CORNERS OF THE LIGHTING FIXTURES TO THE STRUCTURE ABOVE.
32. ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 250 OF THE CURRENT NEC WITH ALL CITY AMENDMENTS.
33. THE PERIMETER GROUND LOOP CONDUCTOR SHALL BE MINIMUM 4/0 STRANDED BARE COPPER, BURIED NOT LESS THAN 24 INCHES BELOW GRADE AND 36 INCHES FROM THE BUILDING. IT SHALL BE EXOTHERMICALLY WELDED (CAD) TO COLUMN GROUNDS AND PERIMETER GROUND RODS.
34. PERIMETER GROUND RODS SHALL BE MINIMUM 3/4 INCH AND 8 FOOT LONG COPPER OR COPPER CLAD, BURIED VERTICALLY TO A MINIMUM DEPTH OF 8 FOOT 6 INCH BELOW GRADE. DRIVE ALL GROUND RODS INTO EXPOSED EARTH. IF DUE TO CONSTRUCTION, THE EARTH HAS BEEN DISTURBED AT THE GROUND ROD POINT, COMPACT THE LOCATION AND INSTALL GROUND ROD.
35. EXPOSED GROUNDING CONDUCTORS SHALL BE SUPPORTED BY MECHANICAL MEANS AND PROPERLY PROTECTED FROM DAMAGE. ALL GROUNDING CONDUCTORS SHALL BE SLEEVED THROUGH BUILDING WALLS.
36. BOND THE GROUND LOOP TO THE BUILDING COLUMN CASINGS. EXOTHERMICALLY WELD THE CONNECTIONS. IF THE COLUMN STEEL DOES NOT PENETRATE THE EARTH MORE THAN 4 FEET, PROVIDE COPPER BONDING JUMPER FROM THE CASING TO THE COLUMN.
37. BOND BUILDING GROUND SYSTEM TO ALL BUILDING STEEL, TO INCLUDE BAR JOISTS OFF MASONRY WALLS. MECHANICAL BONDING CLAMPS ARE PERMITTED. ALL CONDUCTORS ON BEAMS SHALL BE SECURED 48" INTERVALS WITH MALLEABLE CABLE STRAPS. SAND AND CLEAN ALL BOLT-ON CONNECTIONS.
38. PROVIDE GROUNDING SYSTEM PER NEC 250.32 FOR ALL STANDALONE STRUCTURES.

CODES AND ORDINANCES:

1. GENERAL:

a. UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS, PERFORM ALL WORK PER APPLICABLE VERSION OF INTERNATIONAL BUILDING CODES, AND LOCAL CODES AND ORDINANCES.

b. PRIOR TO SUBMITTING PROPOSAL, NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.
2. PERMITS:

a. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.

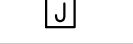
b. CONTRACTOR WHO WILL ACTUALLY PERFORM WORK MUST APPLY FOR ALL REQUIRED PERMITS.
3. APPROVALS AND INSPECTIONS:

a. OBTAIN APPROVAL FROM CITY FIRE DEPARTMENT AND BUILDING AND SAFETY DEPARTMENT PRIOR TO INSTALLATION OF ANY FIRE RELATED ITEMS.

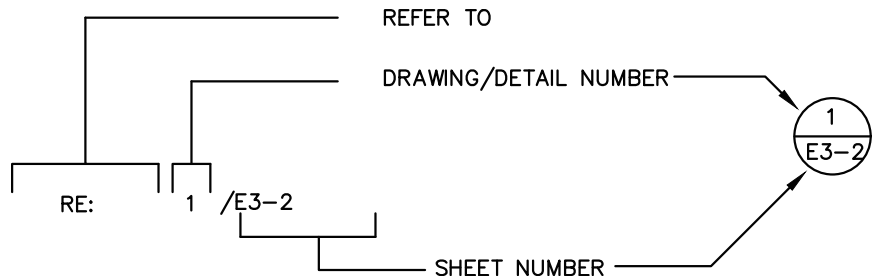
b. COORDINATE PRESSURE TESTS, INSPECTIONS AND APPROVAL FOR ALL SYSTEMS WITH PERMITTING OFFICER, OWNER AND ENGINEER.

c. FOR ALL EQUIPMENT INSTALLED OUTDOORS, PROVIDE WIND RESTRAINTS TO MEET IBC REQUIREMENTS.

ELECTRICAL LEGEND:

LEGEND:			
	EXISTING EQUIP. TO REMAIN		DISCONNECT SWITCH – NON FUSED
	EXISTING EQUIP. TO BE DEMOLISHED		DISCONNECT SWITCH – FUSED
	NEW EQUIPMENT		COMBINATION MOTOR STARTER/DISCONNECT SWITCH
	EXISTING CIRCUIT		SINGLE OR THREE PHASE MOTOR NUMBER INDICATES HORSPPOWER
	NEW CIRCUIT (ABOVE GROUND)		VARIABLE FREQUENCY DRIVE PROVIDED BY DIVISION 15 AND INSTALLED BY DIVISION 16.
	NEW CIRCUIT (UNDERGROUND)		CEILING MOUNTED SPEAKER. "VC" INDICATES VOLUME CONTROL ON SPEAKER
	ELECTRICAL PANEL		AUDIO VISUAL FIRE ALARM HORN-CEILING MOUNTED
	SWITCHBOARD, MAIN DISTRIBUTION PANEL OR MOTOR CONTROL CENTER		DATA WALL OUTLET.
	HOMERUN TO PANEL		FIRE ALARM CONTROL PANEL
	FOURPLEX WALL RECEPTACLE. NEMA 5-20R, 20A,125V.		AUDIO VISUAL FIRE ALARM HORN +80° AFF
	DUPLEX WALL RECEPTACLE.		8" x 4" LINEAR LED LIGHT FIXTURE.
	JUNCTION BOX (SQUARE)		2' x 4' LED LIGHT FIXTURE.
	INGROUND PULL BOX (SQUARE)		LIGHT POLE WITH LED LIGHT FIXTURE
	POINT OF CONNECTION.		PUSHBUTTON SWITCH WITH TIMER

NOT ALL SYMBOLS SHOWN ON THIS SYMBOL LIST ARE USED IN THE CONTRACT DOCUMENTS.



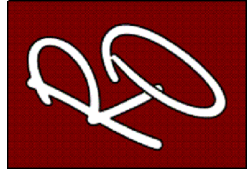
ABBREVIATIONS:

A	AMPERES	MCC	MOTOR CONTROL CENTER
ABV	ABOVE	MD	MOTORIZED DAMPER
ACC	AIR COOLED CHILLER	MDP	MAIN DISTRIBUTION PANEL
ACCU	AIR COOLED CONDENSING UNIT	MFR	MANUFACTURER
AFC	ABOVE FINISHED CEILING	MLO	MAIN LUGS ONLY
AFF	ABOVE FINISHED FLOOR	MSB	MAIN SWITCHBOARD
AFG	ABOVE FINISHED GRADE	N3R	NEMA 3R ENCLOSURE
AHU	AIR HANDLING UNIT	N4X	NEMA 4X ENCLOSURE
AIC	AMPERE INTERRUPT CAPACITY	NEC	NATIONAL ELECTRICAL CODE
AL	ALUMINUM	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
AP	ACCESS PANEL, ALARM PANEL	NF	NON-FUSED
ATS	AUTOMATIC TRANSFER SWITCH	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
AUX.	AUXILIARY	NFS	NON-FUSED SWITCH
BAS	BUILDING AUTOMATION SYSTEM	NTS	NOT TO SCALE
BKR	BREAKER	OUA	OUTSIDE AIR UNIT
BLDG.	BUILDING	P	POLE, PUMP
C	CONDUIT	PH	PHASE
CLG	CEILING	PNL	PANEL
CU	COPPER	POS	POINT OF SALE
dB	DECIBEL	PP	POWER POLE
DC	DIRECT CURRENT	PR	PAIR
DDC	DIRECT DIGITAL CONTROL	PWR	POWER
DIA	DIAMETER	RA	RETURN AIR
DISC	DISCONNECT	RE	REFERENCE, REFER
DP	DISTRIBUTION PANEL	RGS	RIGID GALVANIZED STEEL
DWG	DRAWING	RTU	ROOFTOP UNIT
(E)	EXISTING	SECT	SECTION
EMS	ENERGY MANAGEMENT SYSTEM	SPKR	SPEAKER
EUH	ELECTRIC UNIT HEATER	SS	STAINLESS STEEL
EWI	ELECTRIC WATER HEATER	SW	SWITCH
EF	EXHAUST FAN	SWBD	SWITCHBOARD
FACP	FIRE ALARM CONTROL PANEL	TC	TEMPERATURE CONTROL
FCU	FAN COIL UNIT	TEL	TELEPHONE
GA	GAUGE	SA	SUPPLY AIR
GALV	GALVANIZED	TAB	TEST AND BALANCE
GC	GENERAL CONTRACTOR	TS&T	THERMOSTAT
GPCI	GROUND FAULT CIRCUIT INTERRUPTER	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
HD	ELECTRIC HAND DRYER	TYP	TYPICAL
HP	HORSEPOWER	UG	UNDERGROUND
ID	INSIDE DIAMETER	V	VOLT
IN	INCH	VAV	VARIABLE AIR VOLUME
JB	JUNCTION BOX	VFD	VARIABLE FREQUENCY DRIVE
KVA	KILOVOLT- AMPS	WP	WEATHERPROOF
KW	KILOWATT	XFMR	TRANSFORMER
KWH	KILOWATT-HOUR		
MCB	MAIN CIRCUIT BREAKER		

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Edinburg, Texas 78540
TBE Firm Registration No. 12179



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE E. OLIVAREZ, P.E. 102302
TBE REGISTRATION NO. 12179



02-21-23

PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
HEAD START
PARKING LOT IMPROVEMENTS

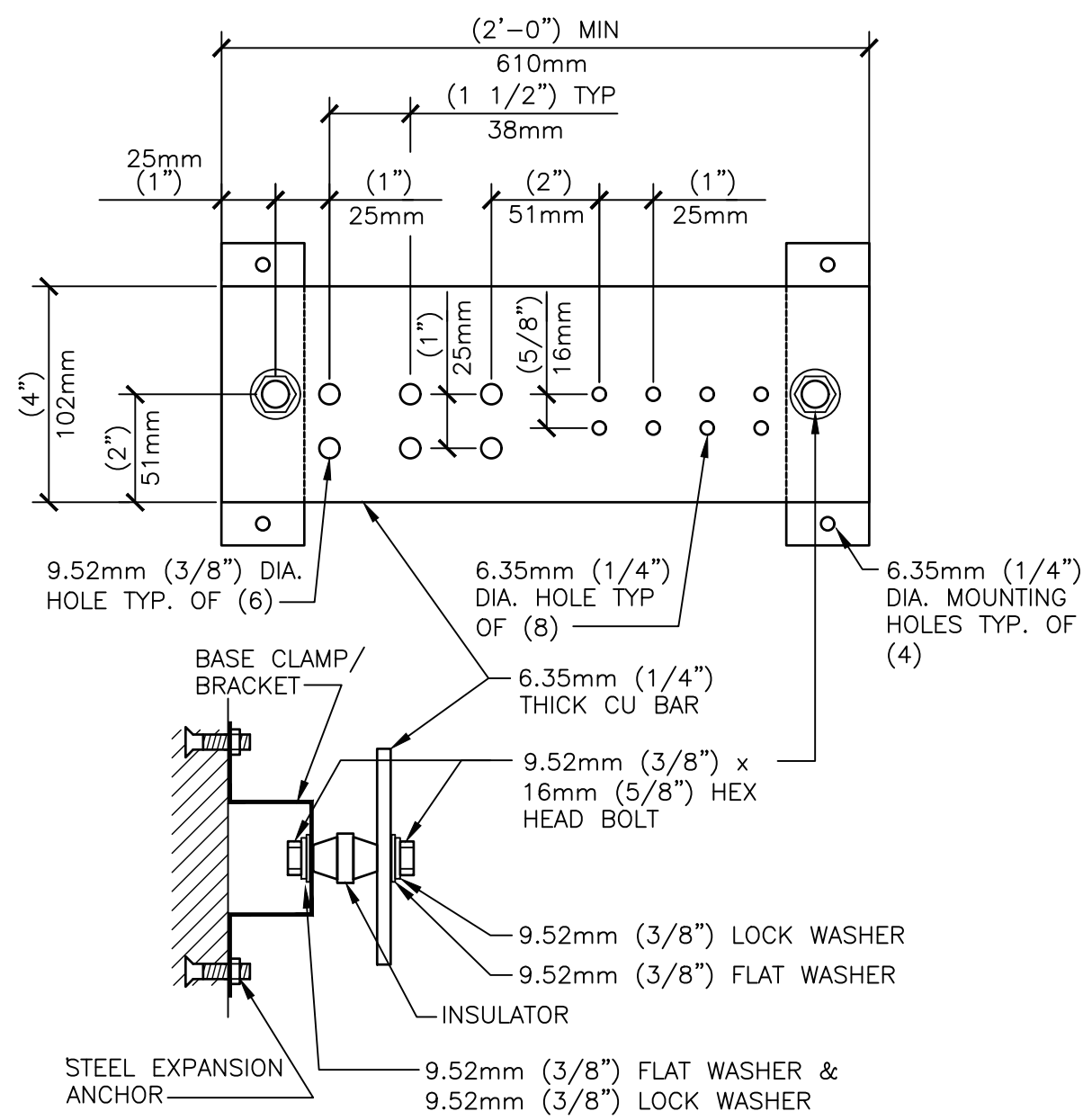
DESCRIPTION									
DATE									
NO.									

PROJECT NO.:	22011B
DRAWN BY:	RDL
CHECKED BY:	R.O.
SHEET TITLE:	

ELECTRICAL
SYMBOLS & GENERAL
NOTES

S H E E T

E0.0

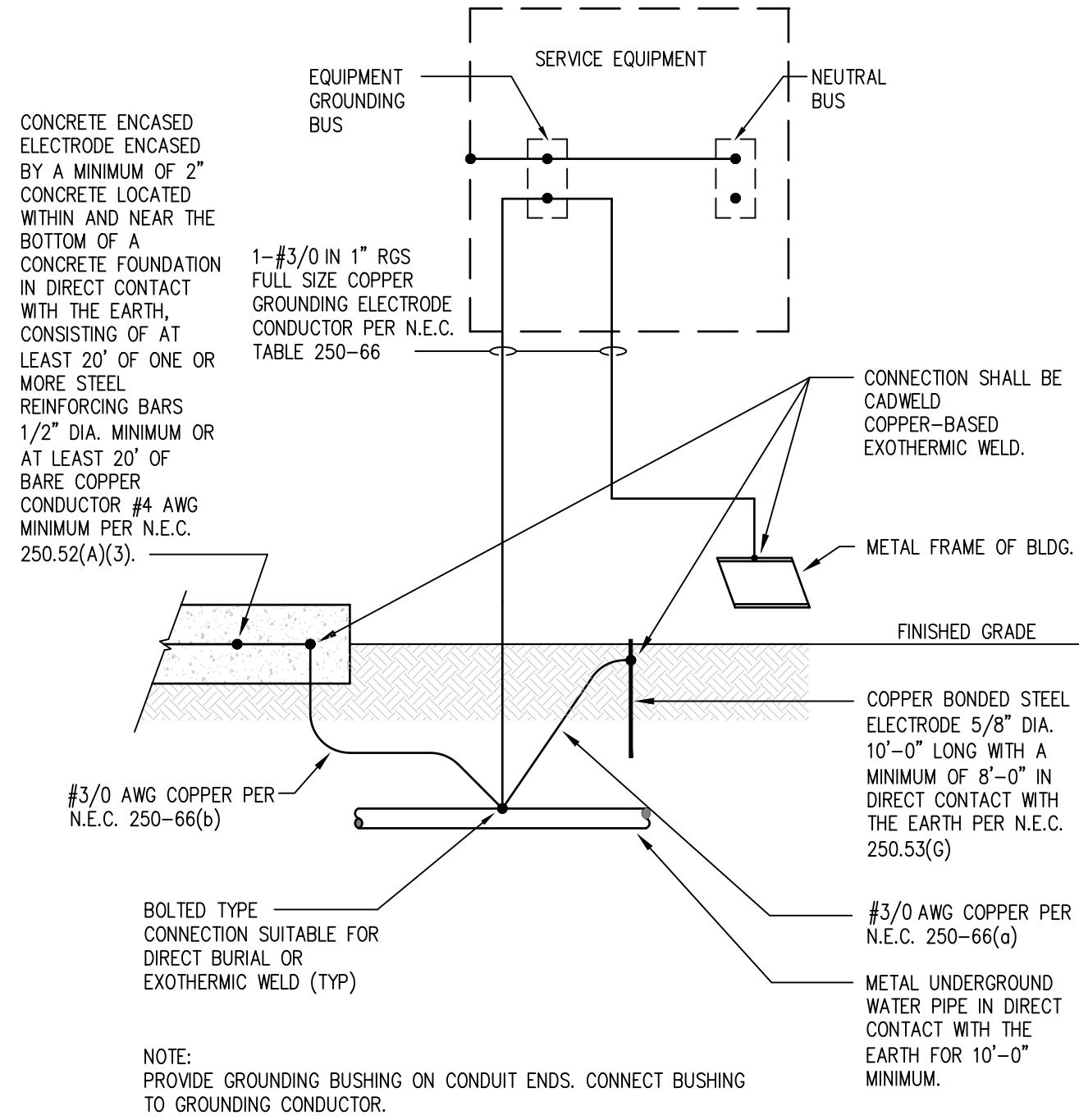


GENERAL NOTES:

1. ALL HARDWARE SHALL BE STAINLESS STEEL.
2. PROVIDE 1 MOUNTING POINT PER 305mm (12") OF BAR LENGTH.
3. HOLES MAY BE ADDED IF REQUIRED.

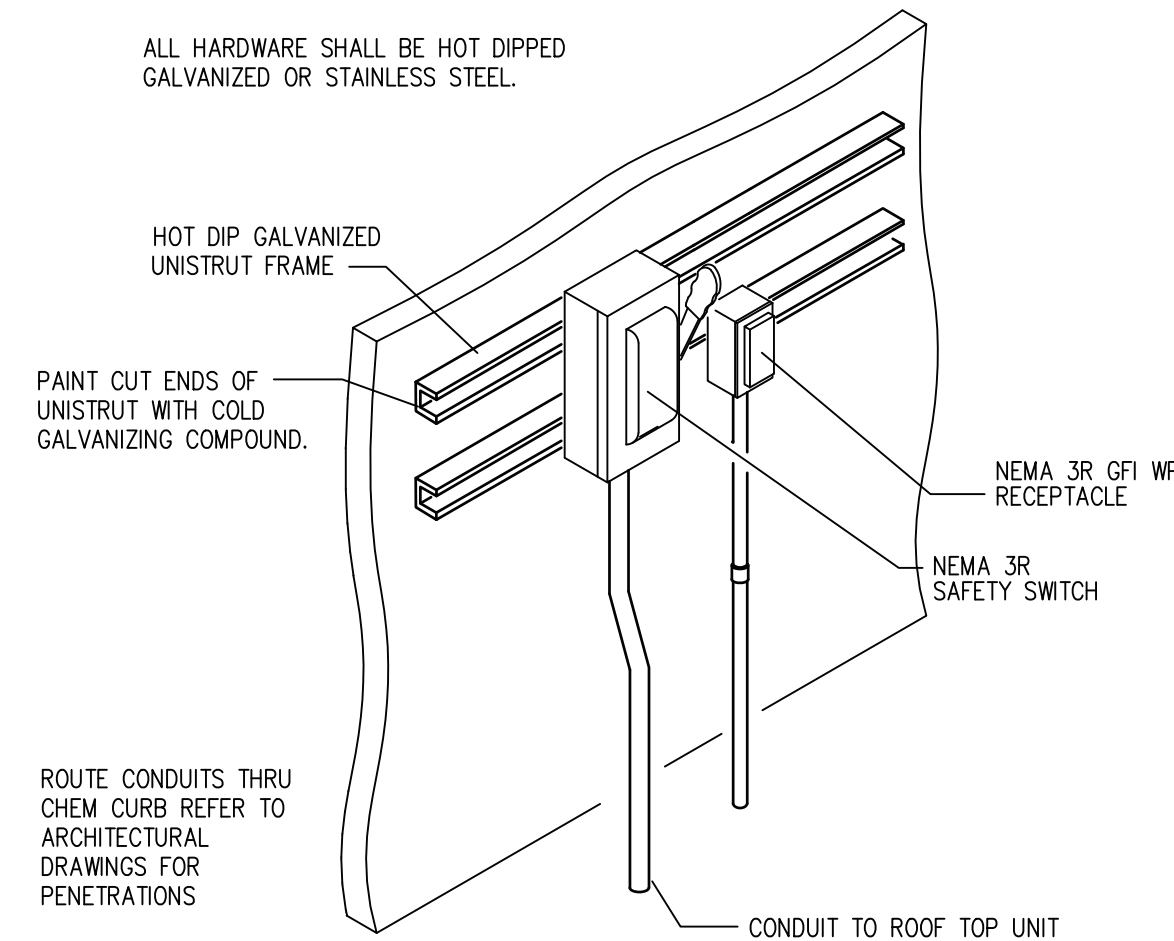
1 GROUNDING BAR DETAIL

NTS



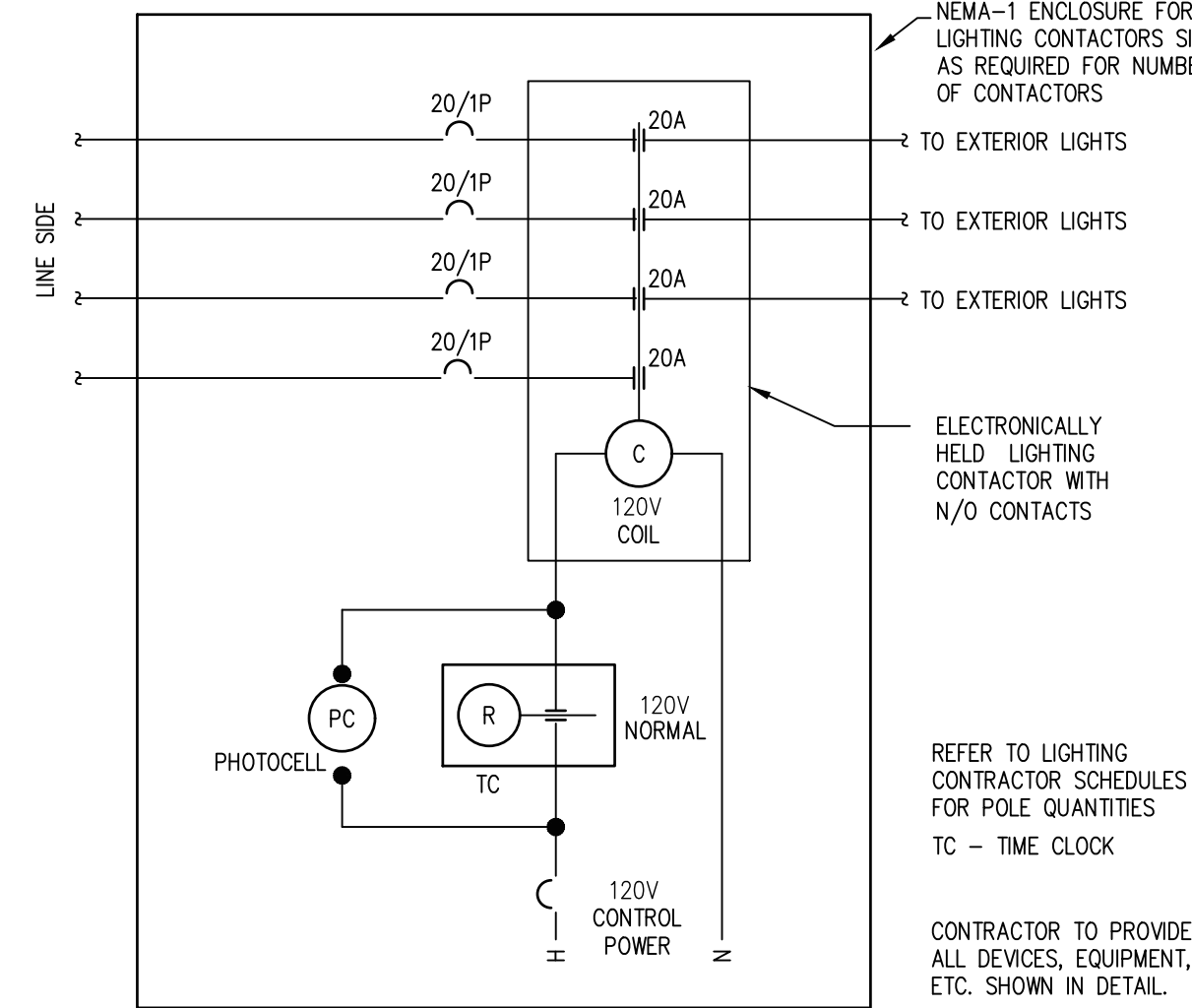
2 GROUNDING ELECTRODE SYSTEM

NTS



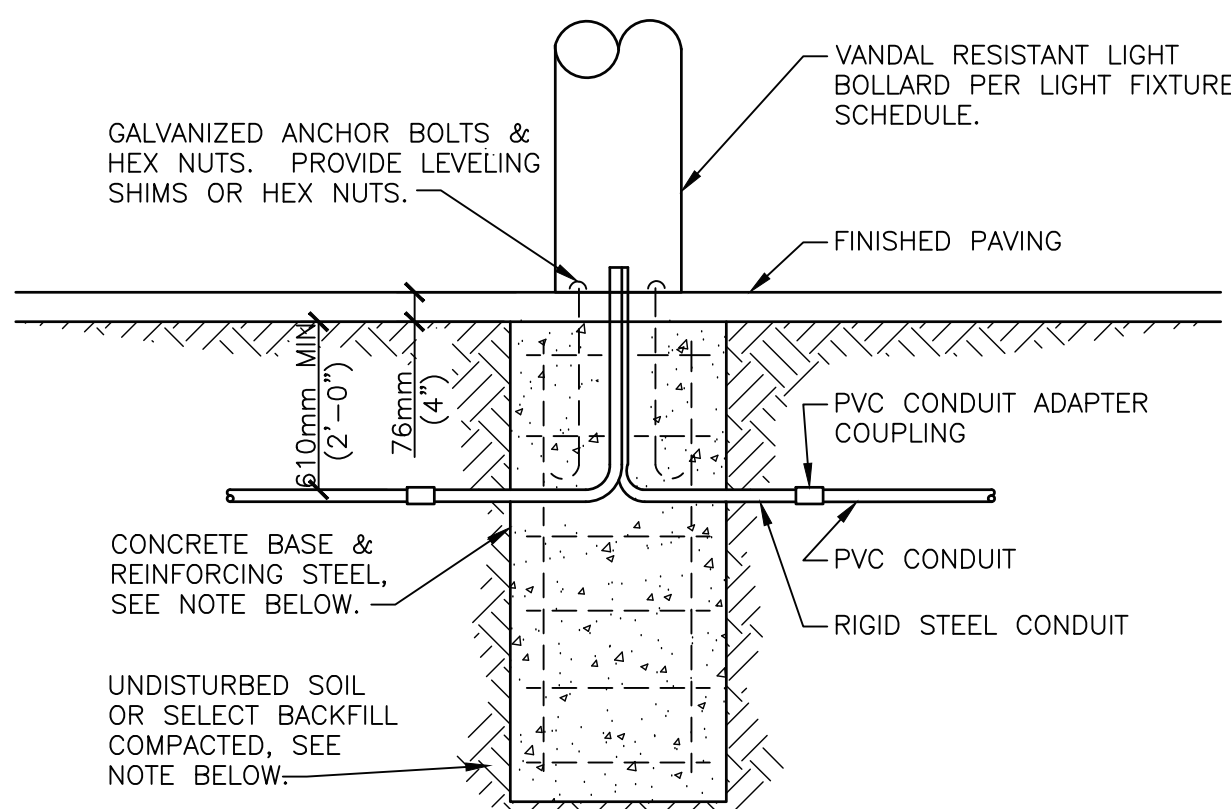
3 EXTERIOR WALL DISCONNECT DETAIL

NTS



4 EXTERIOR LIGHTING CONTACTOR DETAIL

NTS

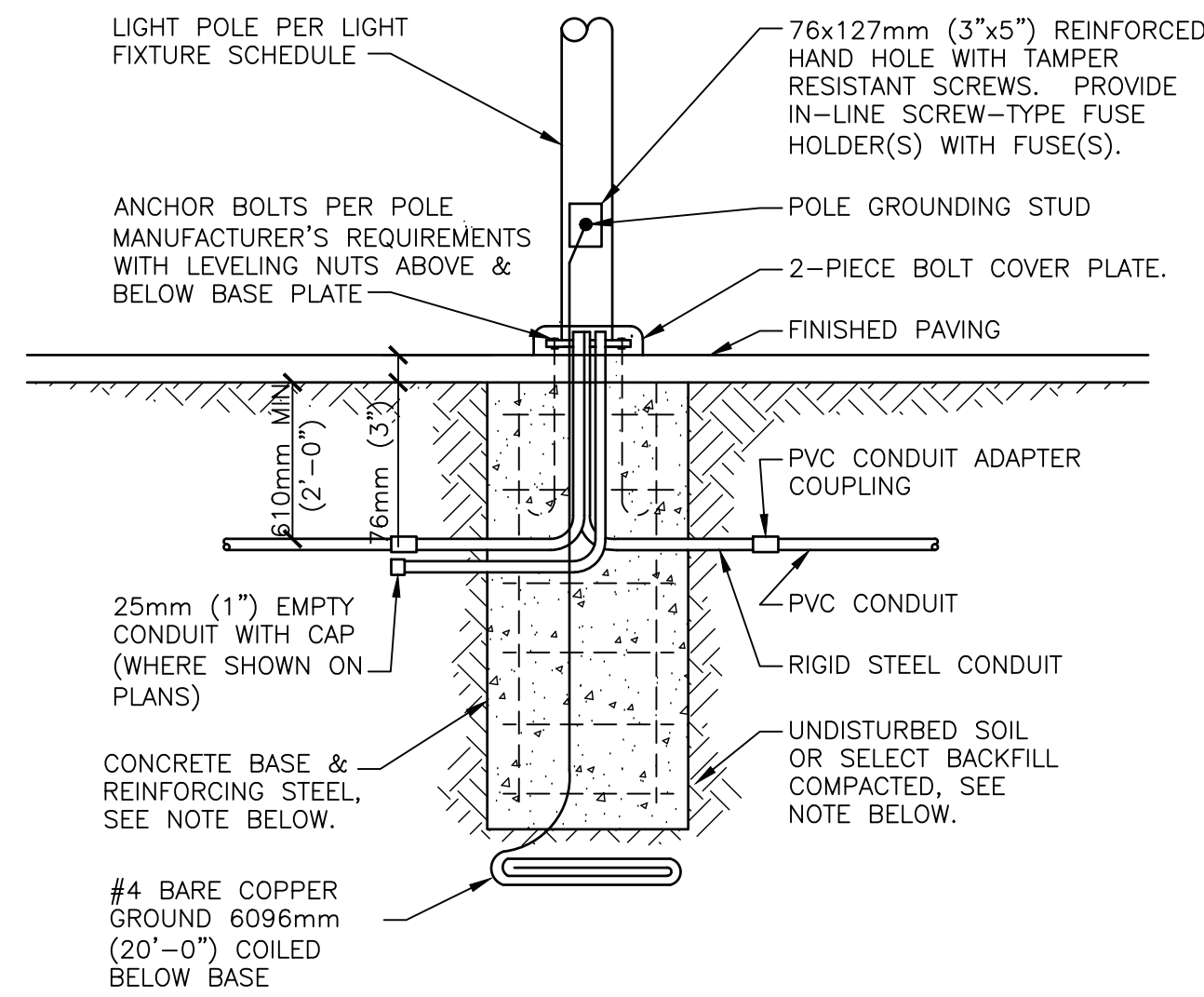


GENERAL NOTES:

1. BACKFILL, CONCRETE, REINFORCING STEEL, AND ANCHOR BOLTS ARE SHOWN FOR REFERENCE ONLY. STRUCTURAL DESIGN IS SHOWN ON STRUCTURAL DRAWINGS.
2. REFER TO SPECIFICATIONS FOR MOUNTING AND LEVELING REQUIREMENTS.
3. REFER TO LANDSCAPE DETAILS FOR INSTALLATION OF PAVERS AND INTERFACE BETWEEN PAVERS AND POLE BASE.

4 BOLLARD BASE DETAIL - PAVED AREAS

NTS

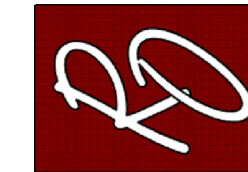


GENERAL NOTES:

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2. REFER TO SPECIFICATIONS FOR MOUNTING AND LEVELING REQUIREMENTS.
3. REFER TO LANDSCAPE DETAILS FOR INSTALLATION OF PAVERS AND INTERFACE BETWEEN PAVERS AND POLE BASE.

5 POLE BASE DETAIL - PAVED AREAS

NTS



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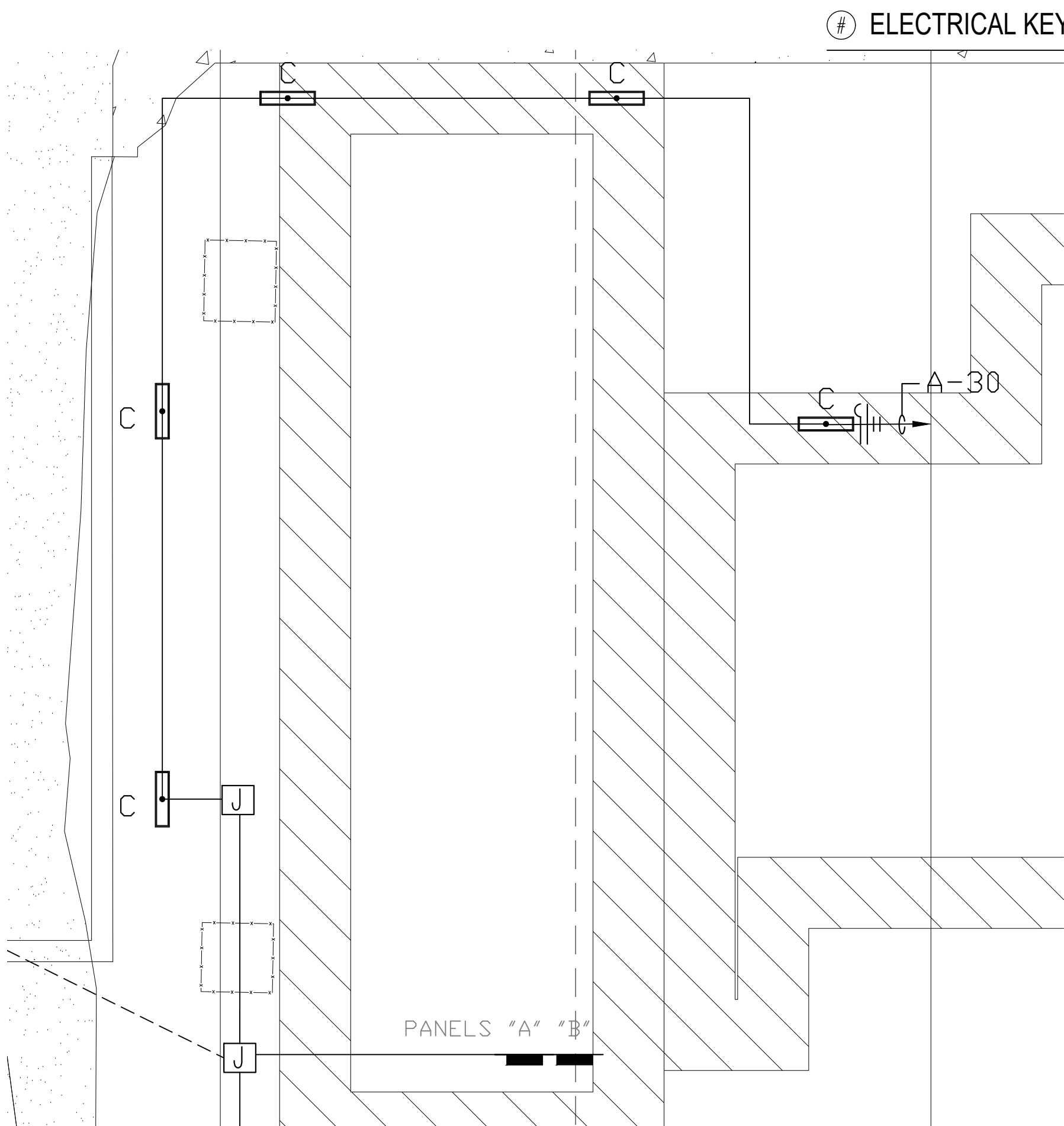
CHECKED BY: R.O.

SHEET TITLE:

ELECTRICAL DETAILS

S H E E T

E0.1



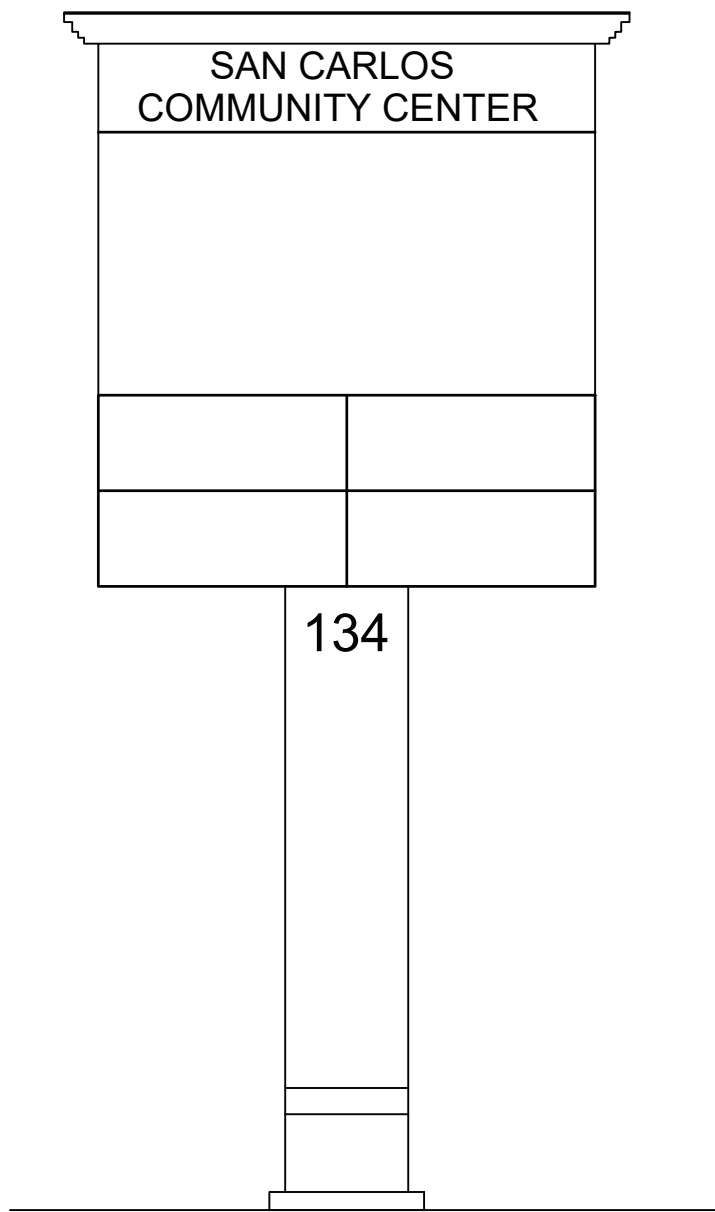
1 CANOPY LIGHTING PLAN ENLARGED
1/8" = 1'-0"

ELECTRICAL KEYED NOTES:

1. APPROXIMATE LOCATION OF EXISTING PANEL "LP". VERIFY EXISTING CONDITIONS BEFORE START OF CONSTRUCTION.
2. ROUTE NEW CONDUITS ABOVE CEILING ALONG EXTERIOR WALL. ALL EXPOSED CONDUIT ON INTERIOR AND EXTERIOR SHALL BE PAINTED TO MATCH ATTACHED FINISHED SURFACE COLOR. COORDINATE ROUTING AND SUPPORTS WITH ALL TRADES BEFORE STARING CONSTRUCTION.
3. PROVIDE NEMA-3R PULLBOX. REFER TO DETAIL 5/E0.1.
4. PROVIDE (1) 1" CONDUIT WITH (2) #10 AWG, (1) #12 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING. COORDINATE ALL ROUTING WITH EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
5. PROVIDE (1) 1" CONDUIT WITH (2) #6 AWG, (1) #8 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING AND (1) 1-1/4" CONDUIT WITH (2) #4 AWG, (1) #8 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING. COORDINATE ALL ROUTING WITH EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
6. PROVIDE NEW 20AMP, 120V, 1PHASE BREAKER IN EXISTING PANELBOARD.
7. PROVIDE NEW NEMA-3R JUNCTION BOX ON EXTERIOR CONDUIT SHALL BE SECURED TO EXTERIOR WALL. ALL EXPOSED CONDUIT AND BOXES SHALL BE PAINTED TO MATCH EXTERIOR FINISH.

LIGHT FIXTURE SCHEDULE

TYPE	MANUF.	CATALOG No.	MOUNTING	LAMPS		VOLTAGE	INPUT W	REMARKS	NOTES
				LEDs	TYPE				
S1	GARDCO By Signify	ECF-S-32L-1A-NW-G2-AR-3-UNV-Z	25' Pole	32	TYPE 3	120-277V	127	Area luminaire ECF-S EcoForm small	
S5	GARDCO By Signify	ECF-S-32L-1A-NW-G2-AR-5-UNV-BZ	25' Pole	32	TYPE 5	120-277V	136	Area luminaire ECF-S EcoForm small	
C	DAY-BRITE CFI By Signify	FSX460840-UNV-DIM	Surface	LED	TYPE C	120-277V	52	Linear FluxStream sealed strip 4' length	



3 PROPOSED NEW SIGNAGE
N.T.S.

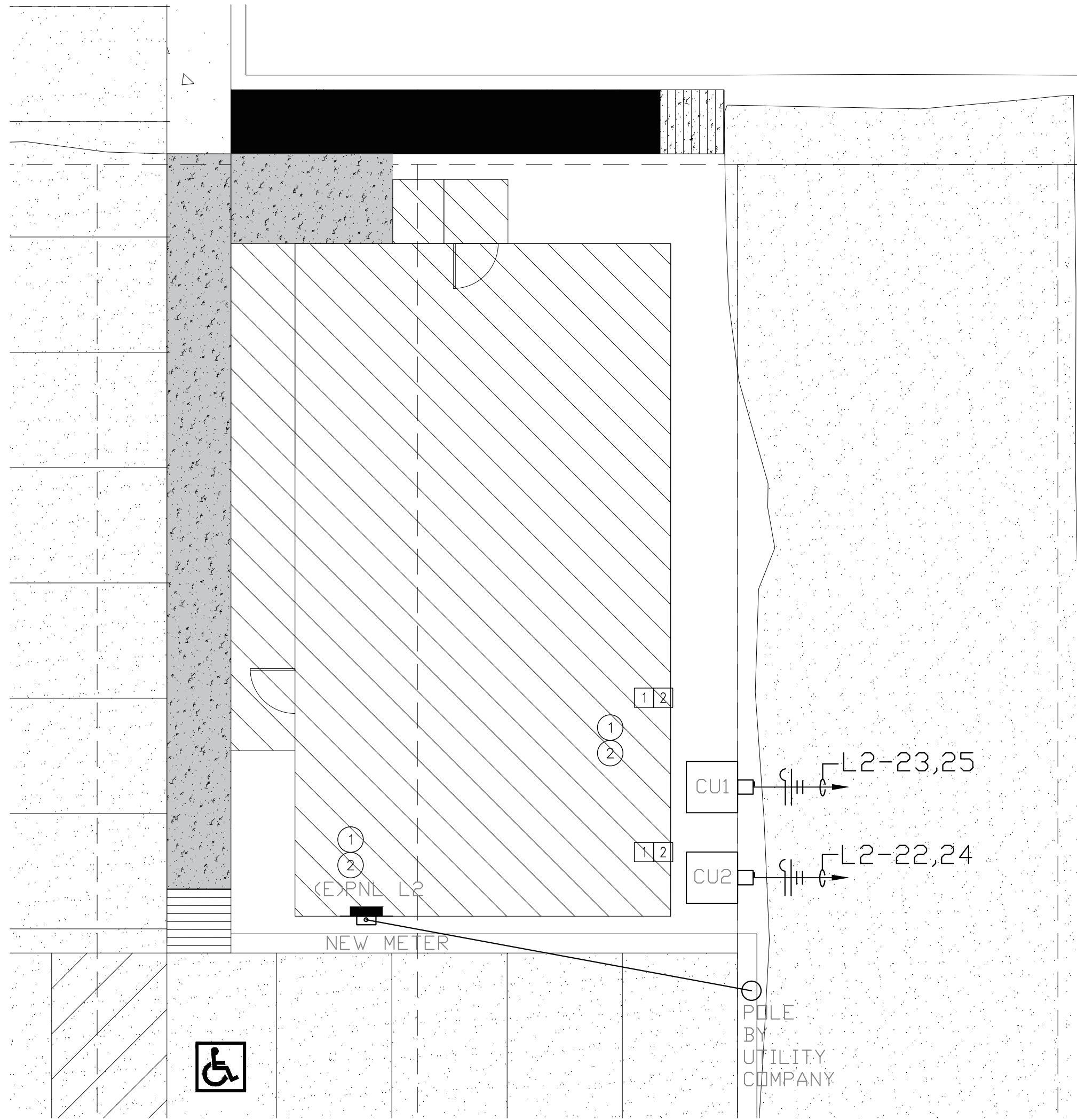
ELECTRICAL KEYED NOTES:

1. PROVIDE NEW CONCRETE FOUNDATION. CONTRACTOR TO PROVIDE SHOP DRAWINGS AND RETAIN STRUCTURAL ENGINEER TO VERIFY IF EXISTING FOUNDATION IS STRUCTURALLY SOUND FOR NEW PROPOSED DIGITAL SIGN.
2. FURNISH AND INSTALL NEW DIGITAL SIGN. COORDINATE SIGNAGE LETTERING WITH OWNER. PROVIDE SHOP DRAWINGS WITH STRUCTURAL ENGINEER DESIGN FOR WIND RATED STRUCTURE. REFER TO 10 14 63 - DIGITAL EXTERIOR MARQUEE SIGN.
3. FIXED LIGHTED SIGNS. VERIFY WITH OWNER FOR EXACT LETTERING AND DESIGN FEATURES.

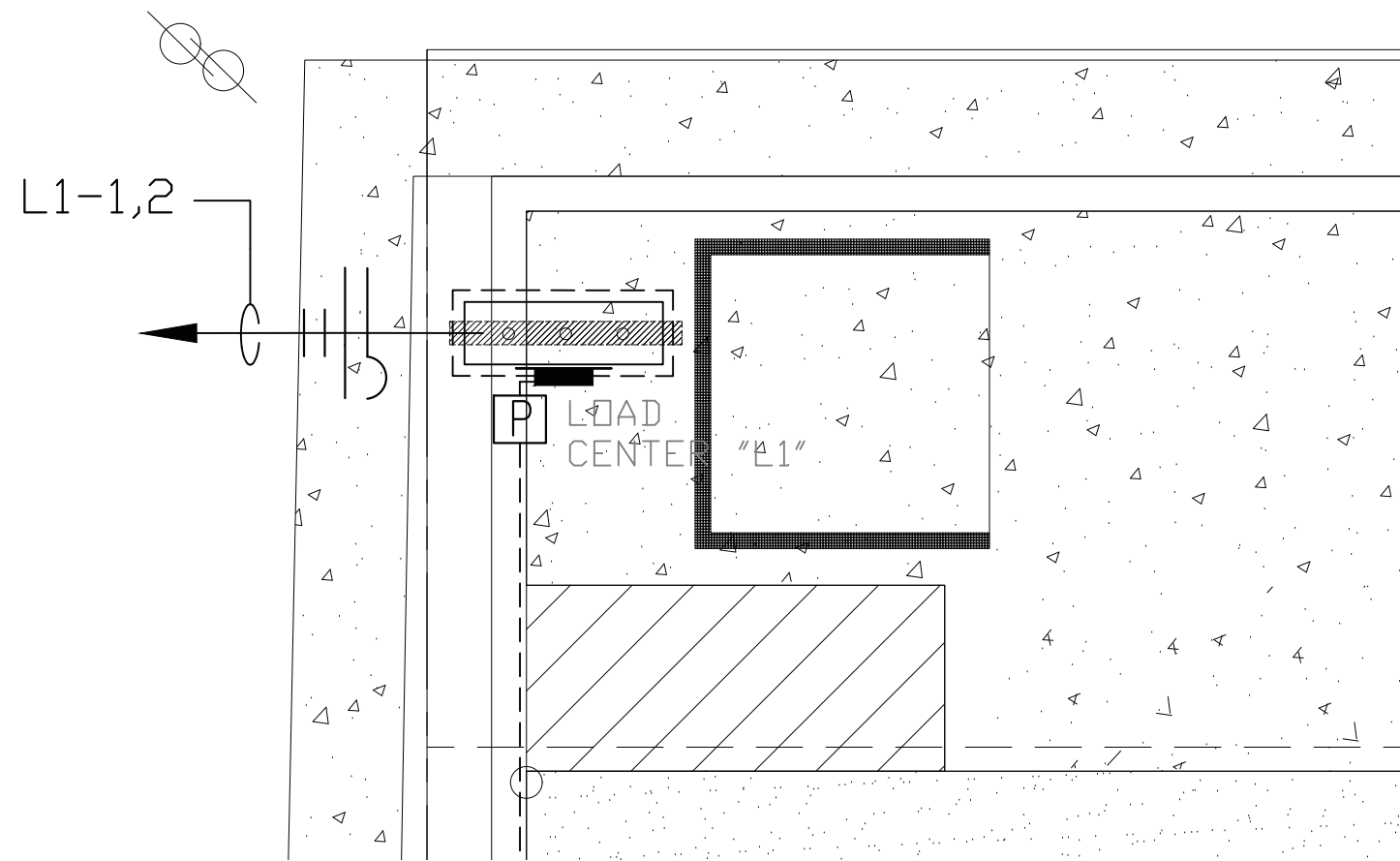
DESCRIPTION	DATE	NO.

PROJECT NO.:	22011B
DRAWN BY:	RDL
CHECKED BY:	R.O.
SHEET TITLE:	

LIGHTING PLAN



3 POWER PLAN PORTABLE BLDG ENLARGED
3/32" = 1'-0"



2 POWER PLAN MARQUEE ENLARGED
3/32" = 1'-0"

MECHANICAL KEYED NOTES:

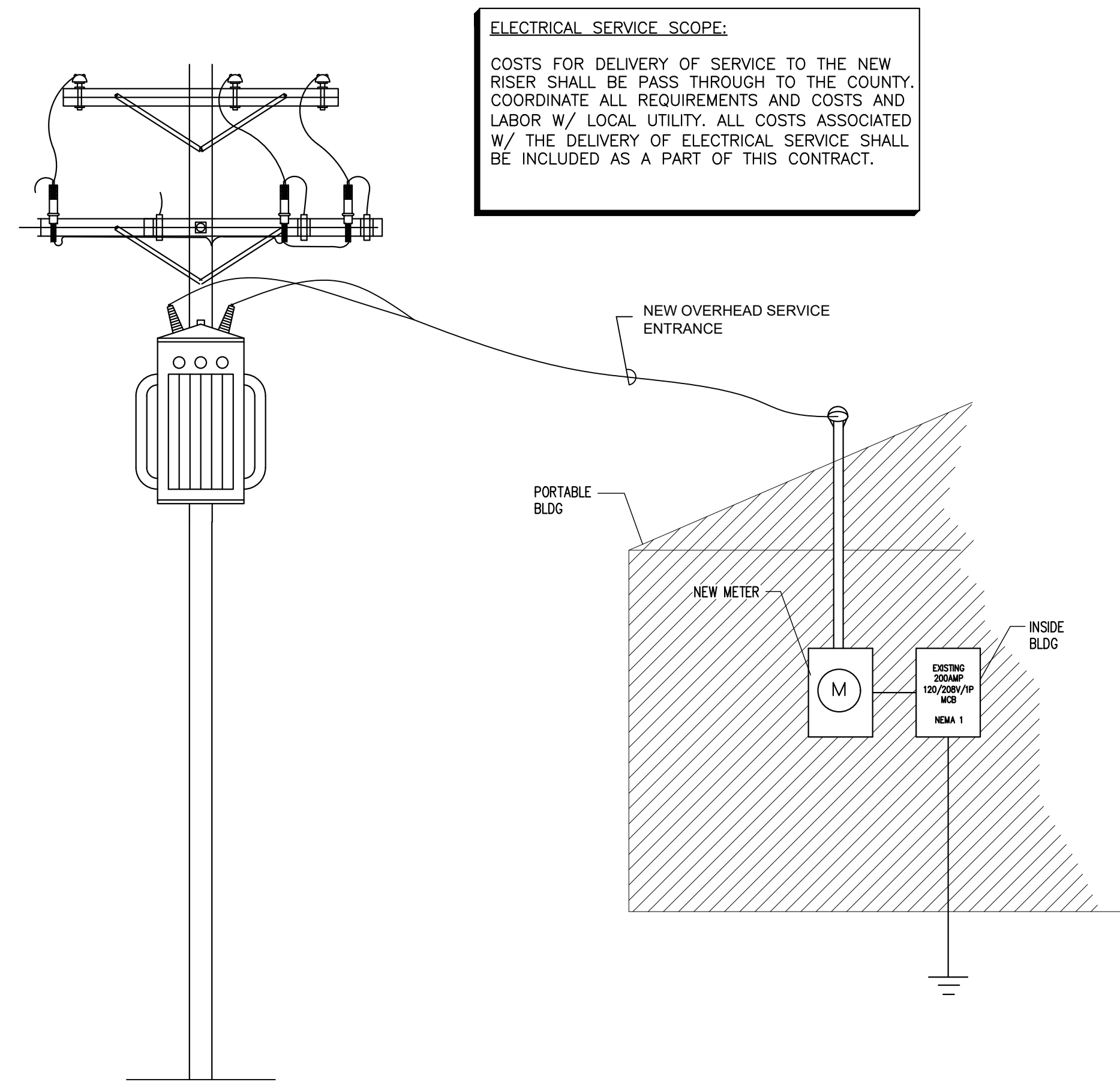
- EXISTING AC UNITS TO BE REINSTALLED. RUN NEW COPPER LINES FROM UNIT TO EXISTING LINES.
- MOUNT UNITS ON CONCRETE PADS.

ELECTRICAL KEYED NOTES:

- APPROXIMATE LOCATION OF EXISTING PANEL L2.
- CONTRACTOR SHALL PROVIDE NEW METER WITH WEATHER HEAD ATTACHED TO BUILDING. COORDINATE NEW ELECTRICAL SERVICE WITH UTILITY COMPANY.

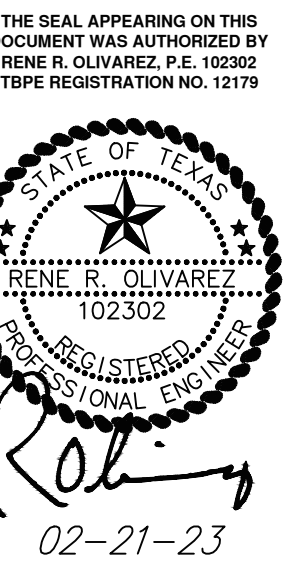
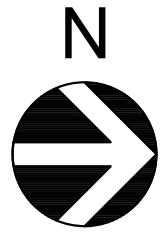
ELECTRICAL KEYED NOTES:

- EXISTING SIGNAGE TO BE REMOVED AND DISPOSED OFFSITE.
- PROVIDE NEW CONCRETE FOUNDATION. CONTRACTOR TO PROVIDE SHOP DRAWINGS AND RETAIN STRUCTURAL ENGINEER TO VERIFY IF EXISTING FOUNDATION IS STRUCTURALLY SOUND FOR NEW PROPOSED DIGITAL SIGN.
- FURNISH AND INSTALL NEW DIGITAL SIGN. PROVIDE SHOP DRAWINGS WITH STRUCTURAL ENGINEER DESIGN FOR 110MPH WIND RATED STRUCTURE. REFER TO 10 14 63 - DIGITAL EXTERIOR MARQUEE SIGN.
- FIXED LIGHTED SIGNS. VERIFY WITH OWNER FOR EXACT LETTERING AND DESIGN FEATURES.



3 ONE-LINE FOR PORTABLE BLDG
N.T.S.

ELECTRICAL SERVICE SCOPE:
COSTS FOR DELIVERY OF SERVICE TO THE NEW RISER SHALL BE PASS THROUGH TO THE COUNTY. COORDINATE ALL REQUIREMENTS AND COSTS AND LABOR W/ LOCAL UTILITY. ALL COSTS ASSOCIATED W/ THE DELIVERY OF ELECTRICAL SERVICE SHALL BE INCLUDED AS A PART OF THIS CONTRACT.



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SHEET TITLE:

POWER PLAN &
ONE-LINE

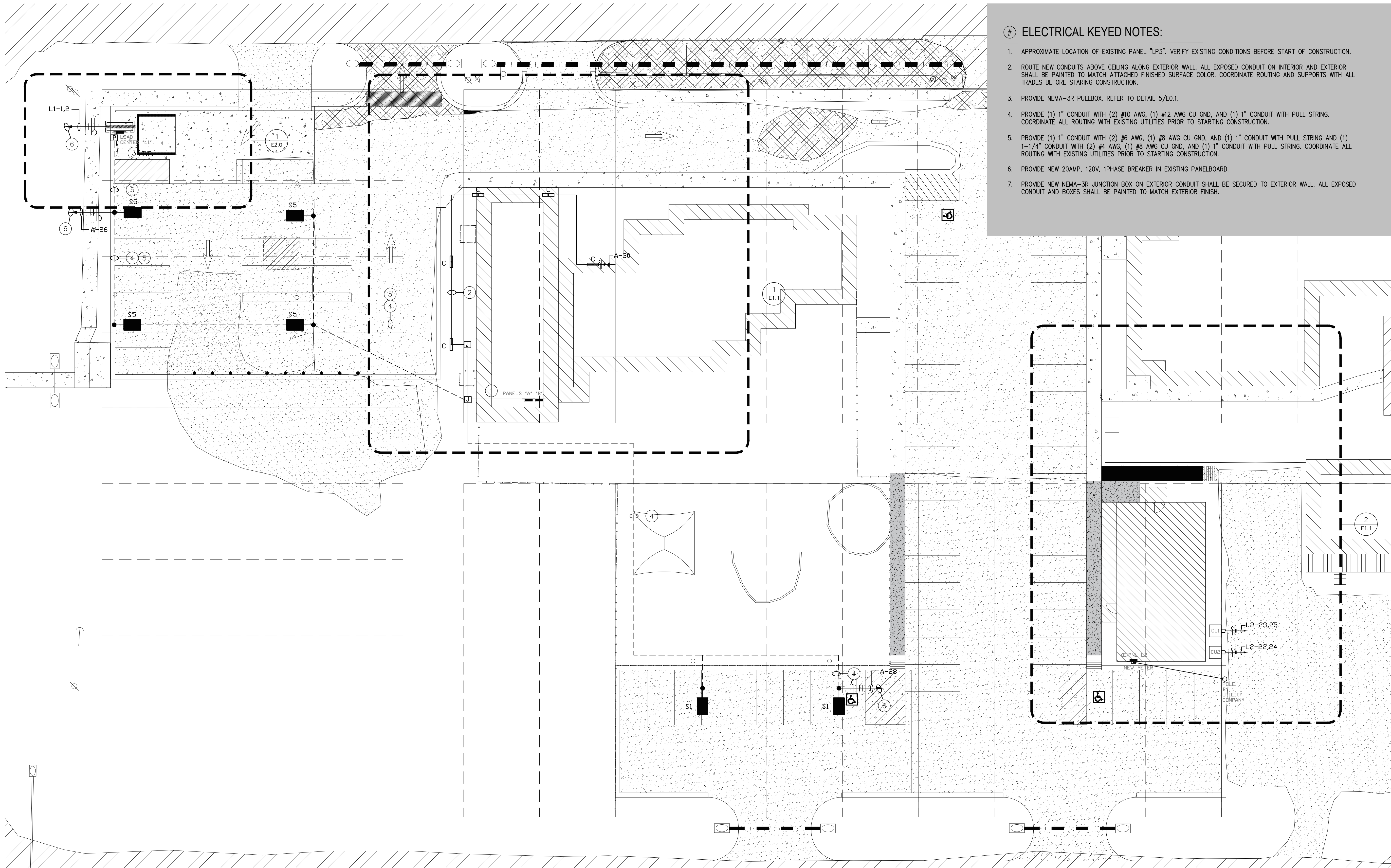
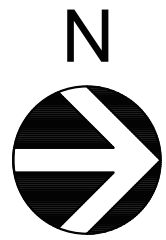
EXISTING PANELBOARD A

VOLTAGE: 120/208 Volt 3 Phase,4-Wire										LOCATION: ROOM									
MCB: 225 MAIN; NEUTRAL - 100%; EQUIPMENT GROUND										MOUNTING: SURFACE									
MLO: 225 MAIN; NEUTRAL - 100%; EQUIPMENT GROUND										Isc = 10,000A RMS SYS AVAILABLE									
Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)							
1152	LTS Classroom	L	12	20/1	1	A	2	20/1	12	R	Receptacles	1260							
1152	LTS Classroom	L	12	20/1	3	B	4	20/1	12	R	Receptacles	1260							
256	LTS Storage, Toilet	L	12	20/1	5	C	6	20/1	12	R	Receptacles	1260							
768	LTS Corridor	L	12	20/1	7	A	8	20/1	12	R	Receptacles	1260							
512	LTS Kitchen, Storage	L	12	20/1	9	B	10	20/1	12	R	Receptacles	1260							
256	LTS Storage, Toilet	L	12	20/1	11	C	12	20/1	12	R	Receptacles	1260							
1152	LTS Classroom	L	12	20/1	13	A	14	20/1	12	R	Receptacles	1260							
256	LTS Storage, Toilet	L	12	20/1	15	B	16	20/1	12	R	Receptacles	1260							
1152	LTS Classroom	L	12	20/1	17	C	18	20/1	12	R	Receptacles	1260							
1050	LTS Exterior	L	12	20/1	19	A	20	20/1	12	R	Receptacles	1260							
3328	Hand dryers Room 3,4	M	12	20/1	21	B	22	20/1	12	M	FACP	480							
3328	Hand dryers Room 1,2	M	12	20/1	23	C	24	20/1	12	M	Hand dryer Adult RR	1664							
600	Water cooler	M	12	20/1	25	A	26	20/1	12	L	South Parking Lot Lights	544							
	Spare				27	B	28	20/1	12	L	East Parking Lot Lights	254							
	Spare				29	C	30	20/1	12	L	Canopy Lights	864							
					31	A	32	50/2	8	M	Load center	4800							
					33	B	34	50/2	8	M	--	4800							
					35	C	36												
					37	A	38												
					39	B	40												
					41	C	42												
14,962	Subtotal										Subtotal	26,006							
Load Type		Conn.	Fct.	Diversity					Conn.	Fct.	Diversity								
(R) Recept		12,600	100%	11,300	(L) Lighting		9,368	125%	11,710										
(K) Kitchen		0	100%	0	(EL) Ext. Ltg.		0	125%	0										
(C) Cooling		0	0%	0	(E) Elevators		0	100%	0										
(H) Heating		0	0%	0	(WH) Water Ht.		0	100%	0										
(F) Fans		0	100%	0	(MT) Lrg. Mot.		0	125%	0										
(M) Misc.		19,000	100%	19,000	(SP) Sub Panel		0	100%	0										
*=FURNISH AND INSTALL CIRCUIT BREAKER AS INDICATED. MATCH AIC RATING.																			
Total Connected Load =		40,968	VA =	113.7	AMPS	VA CONNECTED TO A PHASE =		15,106											
Total Load (Diversified)=		42,010	VA =	116.6	AMPS	VA CONNECTED TO B PHASE =		14,562											
						VA CONNECTED TO C PHASE =		11,300											

NEW LOAD CENTER L1

VOLTAGE: 120/208 Volt										1 Phase,4-Wire										LOCATION: ROOM									
MCB:																				MOUNTING: SURFACE									
MLO: 50										MAIN; NEUTRAL - 100%; EQUIPMENT GROUND										Isc = 10,000A RMS SYS AVAILABLE									
Load (VA)		Description		Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description		Load (VA)														
2880		DIGITAL MARQUEE		EL	10	30/2	1	A	2	20/1	12	R	RECEPTACLE		180														
2880				EL	10	30/2	3	B	4				SPARE		0														
0		SPARE					5	C	6				SPARE		0														
5,760		Subtotal											Subtotal		180														
Load Type		Conn.		Fct.		Diversity						Conn.		Fct.		Diversity													
(R) Recept.		180		100%		180				(L) Lighting		0		125%		0													
(K) Kitchen		0		100%		0				(EL) Ext. Ltg.		5,760		125%		7,200													
(C) Cooling		0		0%		0				(E) Elevators		0		100%		0													
(H) Heating		0		0%		0				(WH) Water Ht.		0		100%		0													
(F) Fans		0		100%		0				(MT) Lrg. Mot.		0		125%		0													
(M) Misc.		0		100%		0				(SP) Sub Panel		0		100%		0													
*=FURNISH AND INSTALL CIRCUIT BREAKER AS INDICATED. MATCH AIC RATING.																													
Total Connected Load =		5,940		VA =		28.6		AMPS		VA CONNECTED TO A PHASE =		3,060																	
Total Load (Diversified)=		7,380		VA =		35.5		AMPS		VA CONNECTED TO B PHASE =		2,880																	
										VA CONNECTED TO C PHASE =		0																	

ELECTRICAL LOAD ANALYSIS - PANEL "A"						
120 / 208 ,		3 -PHASE,		4 -WIRE		
DESCRIPTION	LOAD	DIV.	NEC		KVA	
PEAK KVA DEMAND	0 VA	X 125%	220-87		0.0	
REMOVED	0 VA				0.0	
LIGHTING:						
INTERIOR =	9,368	VA	X 125%	210.20(a)	11.7	
EXTERIOR =	0	VA	X 125%	210.20(a)	0.0	
POWER:						
RECEPTACLES =	12,600	VA		220.44	11.3	
MISCELLANEOUS =	19,000	VA			19.0	
ELEVATORS =	0	VA		620-14	0.0	
		QTY.	DIV.			
KITCHEN =	0	VA	1	100%	220.56	0.0
HVAC:						
COOLING =	0	VA		220.60	0.0	
HEATING =	0	VA		220.60	0.0	
FANS =	0	VA		220.60	0.0	
25% LARGEST MOTOR =	0	VA		430.24	0.0	
PLUMBING:						
WATER HEATER =	0	VA			0.0	
					TOTAL =	42.0
					TOTAL AMPS:	116.6
					SERVICE SIZE:	225.0
					SPARE AMPACITY:	108.4



ELECTRICAL KEYED NOTES:

1. APPROXIMATE LOCATION OF EXISTING PANEL "LP3". VERIFY EXISTING CONDITIONS BEFORE START OF CONSTRUCTION.
2. ROUTE NEW CONDUITS ABOVE CEILING ALONG EXTERIOR WALL. ALL EXPOSED CONDUIT ON INTERIOR AND EXTERIOR SHALL BE PAINTED TO MATCH ATTACHED FINISHED SURFACE COLOR. COORDINATE ROUTING AND SUPPORTS WITH ALL TRADES BEFORE STARING CONSTRUCTION.
3. PROVIDE NEMA-3R PULLBOX. REFER TO DETAIL 5/E0.1.
4. PROVIDE (1) 1" CONDUIT WITH (2) #10 AWG, (1) #12 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING. COORDINATE ALL ROUTING WITH EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
5. PROVIDE (1) 1" CONDUIT WITH (2) #6 AWG, (1) #8 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING AND (1) 1-1/4" CONDUIT WITH (2) #4 AWG, (1) #8 AWG CU GND, AND (1) 1" CONDUIT WITH PULL STRING. COORDINATE ALL ROUTING WITH EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
6. PROVIDE NEW 20AMP, 120V, 1PHASE BREAKER IN EXISTING PANELBOARD.
7. PROVIDE NEW NEMA-3R JUNCTION BOX ON EXTERIOR CONDUIT SHALL BE SECURED TO EXTERIOR WALL. ALL EXPOSED CONDUIT AND BOXES SHALL BE PAINTED TO MATCH EXTERIOR FINISH.

1 ELECTRICAL SITE PLAN
3/16" = 1'-0"

LIGHT FIXTURE SCHEDULE

TYPE	MANUF.	CATALOG No.	MOUNTING	LAMPS		VOLTAGE	INPUT W	REMARKS	NOTES
				LEDs	TYPE				
S1	GARDCO By Signify	ECF-S-32L-1A-NW-G2-AR-3-UNV-Z	25' Pole	32	TYPE 3	120-277V	127	Area luminaire ECF-S EcoForm small	
S5	GARDCO By Signify	ECF-S-32L-1A-NW-G2-AR-5-UNV-BZ	25' Pole	32	TYPE 5	120-277V	136	Area luminaire ECF-S EcoForm small	
C	DAY-BRITE CFI By Signify	FSX460840-UNV-DIM	Surface	LED	TYPE C	120-277V	52	Linear FluxStream sealed strip 4' length	



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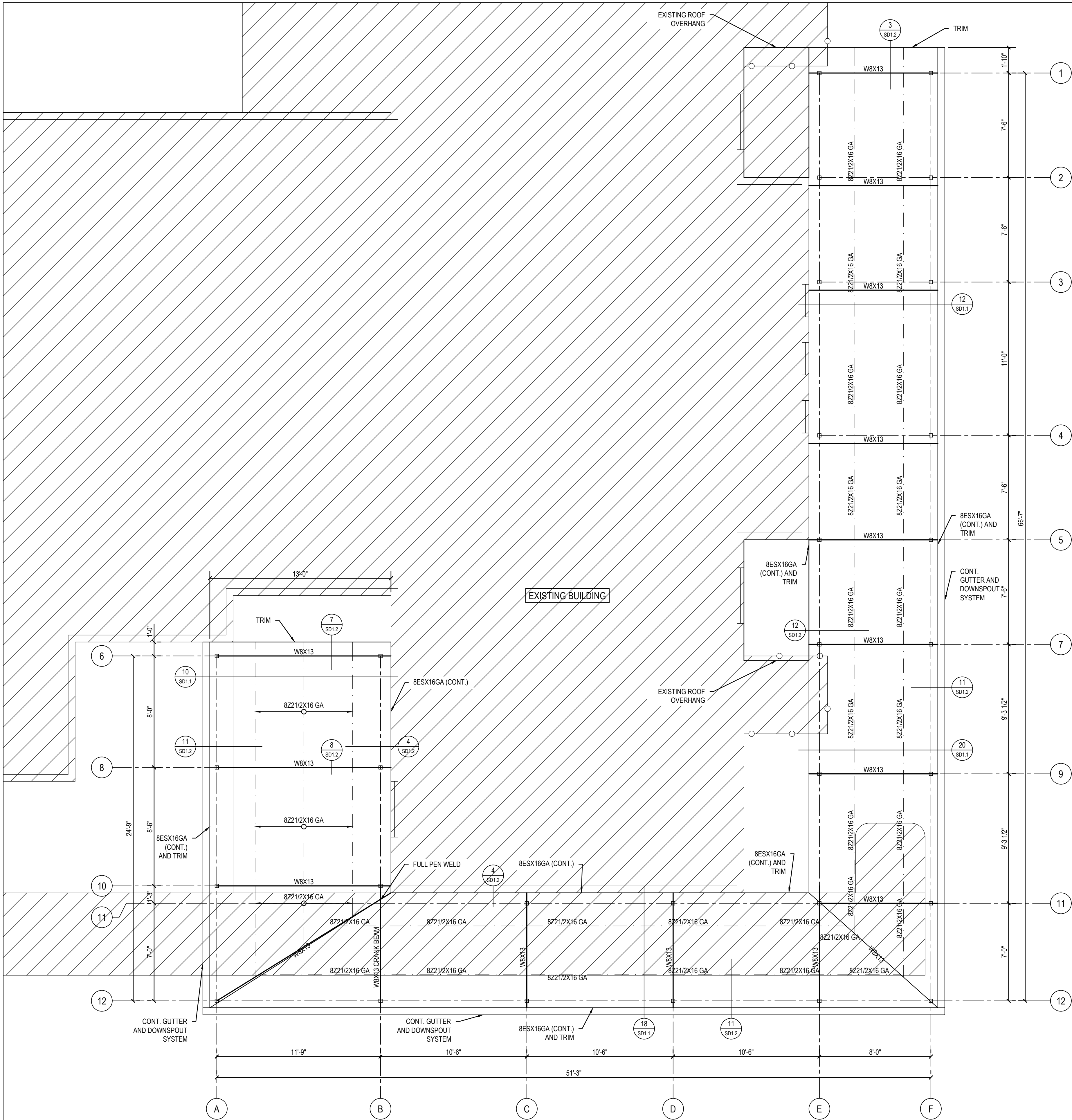
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ELECTRICAL SITE PLAN

S H E E T

ES1.0



1 CANOPY FRAMING PLAN
1/4"=1'-0"

STRUCTURAL STEEL

- MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.
- STRUCTURAL STEEL SHALL COMPLY WITH THE FOLLOWING ASTM DESIGNATIONS:

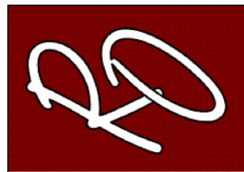
PLATES A36 (FY = 36ksil)
STEEL TUBES (HSS) A500, GRADE B (FY = 46ksi)
STEEL PIPES A53, GRADE B (FY = 36ksi)
STEEL ANGLES ASTM A36, GRADE B (36ksi)
HOT ROLLED SHAPES ASTM A992 (50ksi)
SECONDARY FRAMING ASTM A1011 GRADE 55

- ALL STRUCTURAL STEEL SHALL BE FABRICATED, ERECTED, AND PAINTED IN 3. ACCORDANCE WITH THE SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDING AS AMENDED TO DATE AND THE CODE OF STANDARD PRACTICE, LATEST EDITION AS ADOPTED BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
- 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 ARE PROCESS. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS AND SHALL CONFORM TO ANSI/AWS D1.1-98.
- DETAILED AND OR SCHEDULED CONNECTIONS HAVE BEEN DESIGNED BY A 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 ON-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.
- ALL WELDED CONNECTIONS SHALL BE MADE USING 5/16" FILLET WELD, U.N.O. OR AS 6. SPECIFIED ON THE PLANS.
- 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.
- ALL CONNECTION PLATES AND STIFFENERS SHALL BE MADE WITH 1/4" THICK PLATES, 8. UNLESS OTHERWISE NOTED ON THE PLANS.
- ALL STEEL (INCLUDING BOLTS) EXPOSED TO THE WEATHER SHALL BE HOT-DIPPED 9. GALVANIZED. (INCLUDES STEEL THAT IS ONLY COVERED WITH PLASTER OR STUCCO).
- 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).
- WHERE STEEL JOISTS PASS THROUGH CMU WALLS, PROVIDE HALF INCH GAP BETWEEN THE CMU AND THE STEEL JOIST. PROVIDE ELASTOMERIC MATERIAL BETWEEN THE STEEL JOIST AND CMU WALL.
- ALL STEEL MEMBERS, UNLESS NOTED OTHERWISE, SHALL BE PAINTED W/ ONE COAT OF SHOP PRIMER. DO NOT PRIME ITEMS TO BE EMBEDDED IN CONCRETE OR FIRE PROOFED W/ SPRAY ON MATERIAL WITHOUT COORDINATION W/ THE ARCHITECT.
- FIELD WELDS AND BOLTED CONNECTIONS SHALL BE VISUALLY INSPECTED BY A QUALIFIED INDEPENDENT INSPECTOR. THE INSPECTOR SHALL PROVIDE A WRITTEN REPORT TO THE STRUCTURAL ENGINEER.
- CONTRACTOR SHALL PROVIDE SHOP DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCING ANY STRUCTURAL CONSTRUCTION.

METAL ROOF

- SHEET METAL:
MATERIAL: ASTM A446, GRADE A
GALVANIZING G90 ZINC COATED, ACCORDING TO ASTM A525
LOCATION TYPICAL
- ATTACHMENT:
DECK PROFILE:B
PROFILE DEPTH:1.5"
GAUGE 24
MAX SPAN: 5'-0"
- INSTALL DECK ENDS OVER SUPPORTING FRAMING WITH A MINIMUM END BEARING OF 1.5" WITH END JOINTS LAPPED AT A MINIMUM OF TWO INCHES AND SHALL OCCUR OVER SUPPORTS.
- SCREWS MUST BE INSTALLED USING PROPERLY CALIBRATED TOOLS TO AVOID OVERDRIVING WHICH CAN STRIP THE THREADS AT SIDE LAPS OR SEVER THE SCREW WHEN IT IS PLACED INTO HEAVIER SUBSTRATE.
- DECK UNITS SHALL BE 3 OR MORE SPANS AND SHALL BE ATTACHED TO THE STRUCTURAL SUPPORT.
- PROVIDE CLOSURE OVER WALLS AND UNDER DECKS, ALSO OVER STEEL BEAMS AND DECKS.
- PROVIDE FILLER SHEETS AS REQUIRED.
- AT VALLEYS, RIDGES AND WHERE DECK CHANGES DIRECTIONS, PROVIDE 9" WIDE x 1/4" THICK CONTINUOUS FLAT PLATES. (BEND AS REQUIRED).
- BUILDING ROOF CORNERS AND PERIMETERS SHALL BE FASTENED PER NOT 2 ABOVE OR PER ROOF SYSTEM REQUIREMENTS, WHICHEVER HAS THE MOST STRINGENT REQUIREMENTS.

RO ENGINEERING, PLLC
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2705 E. Davis Rd., Suite A
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TBPE Firm Registration No. 12179



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RENE R. OLIVAREZ, P.E. 102302
TBPE REGISTRATION NO. 12179



HIDALGO CO. PRECINCT NO. 4

HEAD START
PARKING LOT IMPROVEMENTS

PROJECT NAME

PROJECT LOCATION

NO.	DATE	DESCRIPTION

PROJECT NO.: 22011B

DRAWN BY: RDL

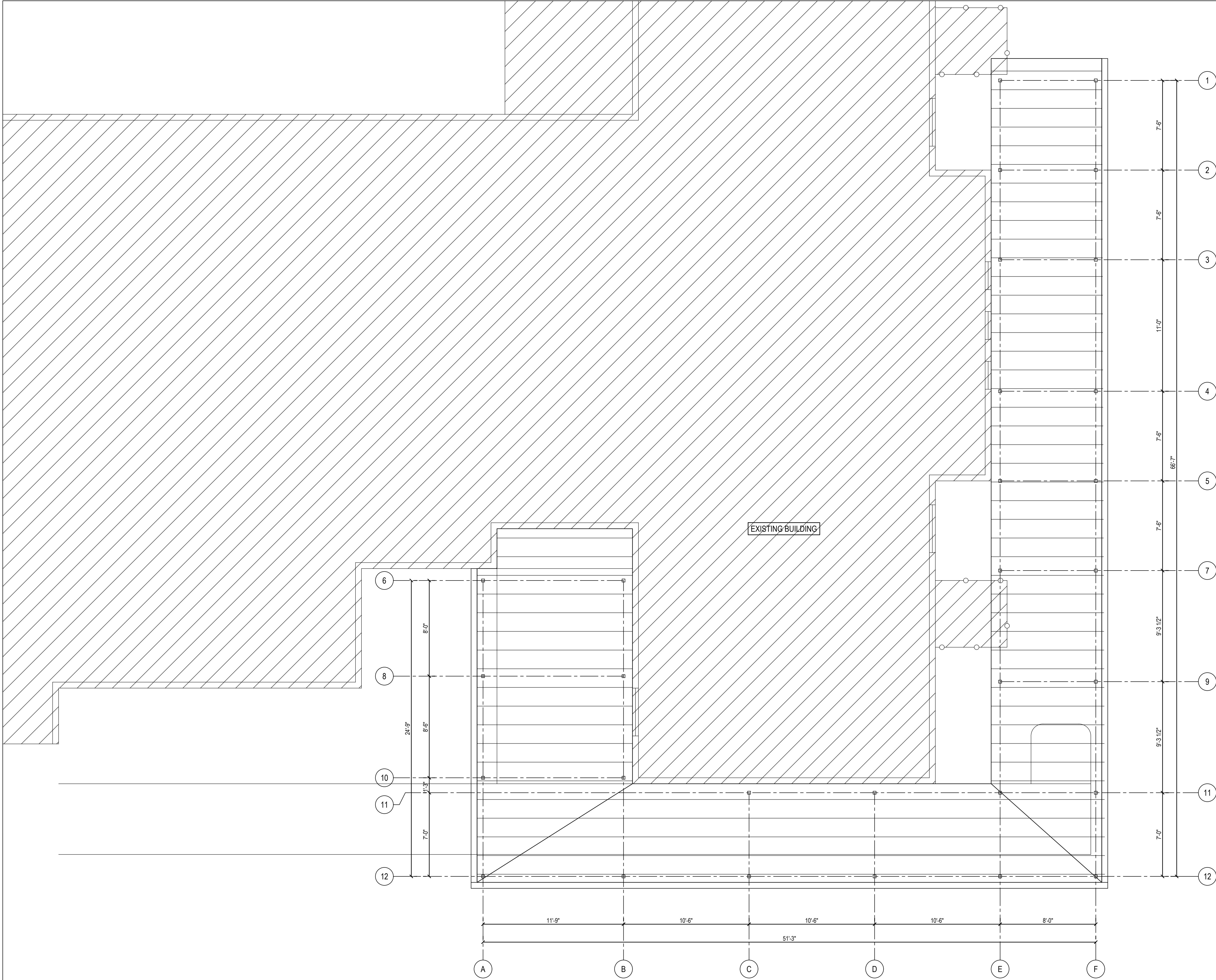
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SHEET TITLE:

CANOPY FRAMING PLAN

S H E E T

S3.1



PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
HEAD START
PARKING LOT IMPROVEMENTS

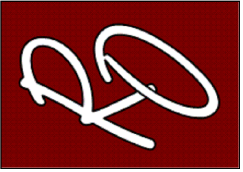
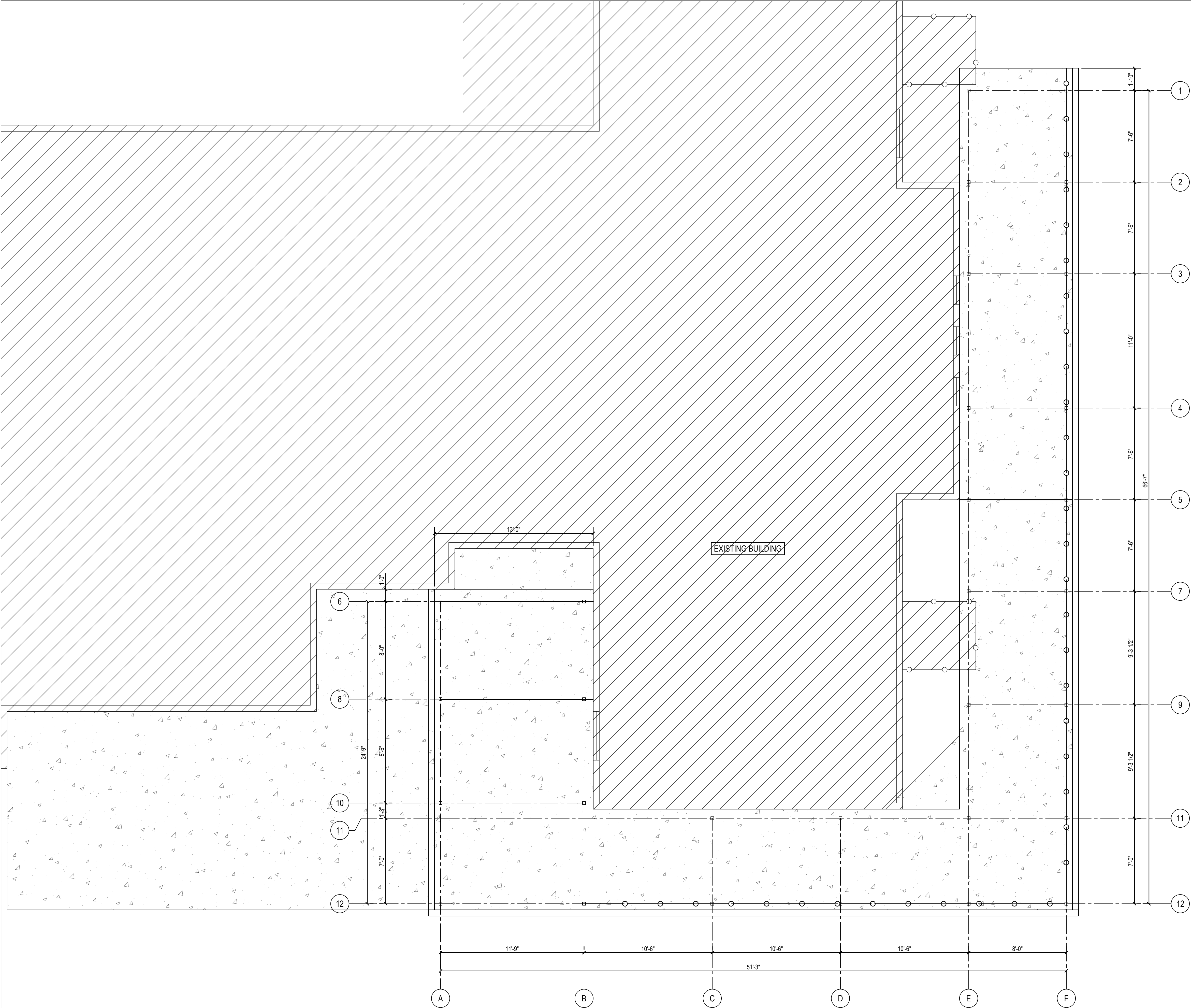
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DRAWN BY: RDL
CHECKED BY: R.O.
SHEET TITLE:

CANOPY ROOF PLAN

S H E E T

S5.1



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R. Olivarez
02-21-23

PROJECT NAME
HIDALGO CO. PRECINCT NO. 4

PROJECT LOCATION
**HEAD START
PARKING LOT IMPROVEMENTS**

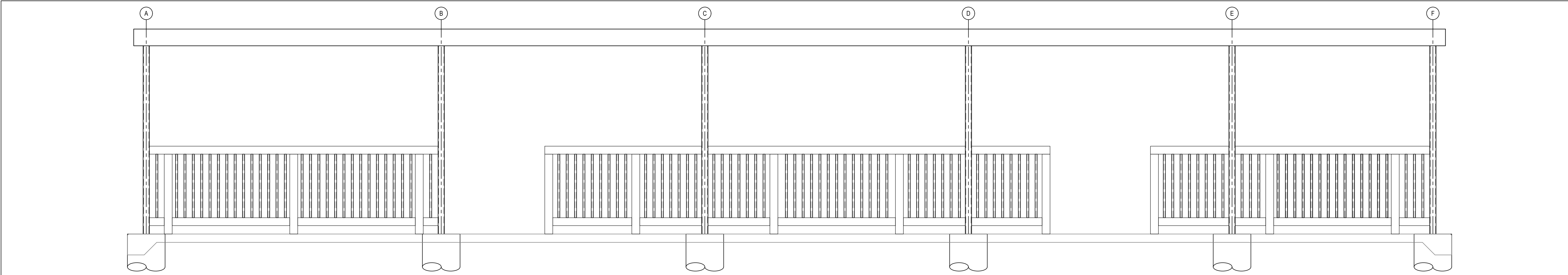
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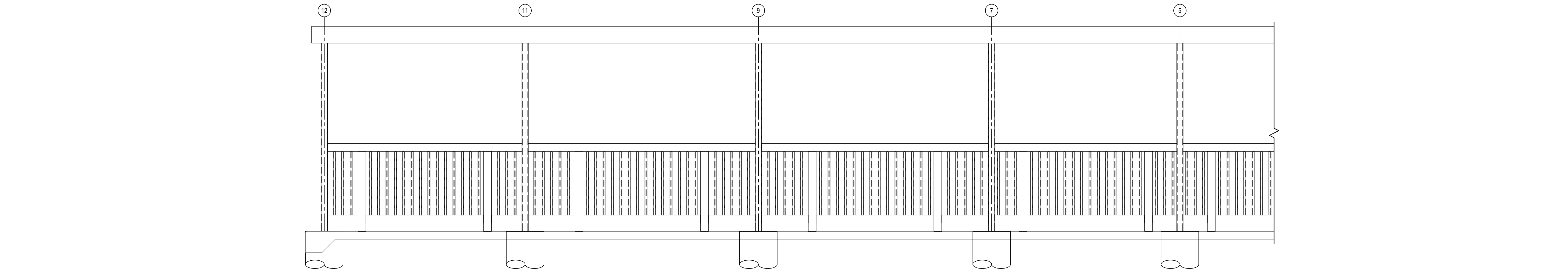
RAILING ELEVATIONS

S H E E T

SD1.3



17 | ELEVATION ALONG GRIDLINE 12



18 | ELEVATION ALONG GRIDLINE F



19 | ELEVATION ALONG GRIDLINE F



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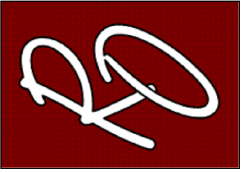
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12 | NOT USED

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4 | NOT USED

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PROJECT NAME
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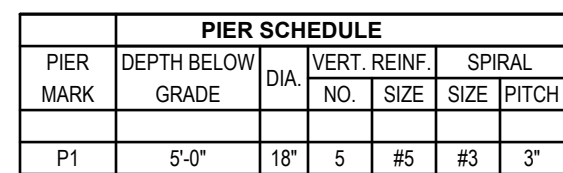
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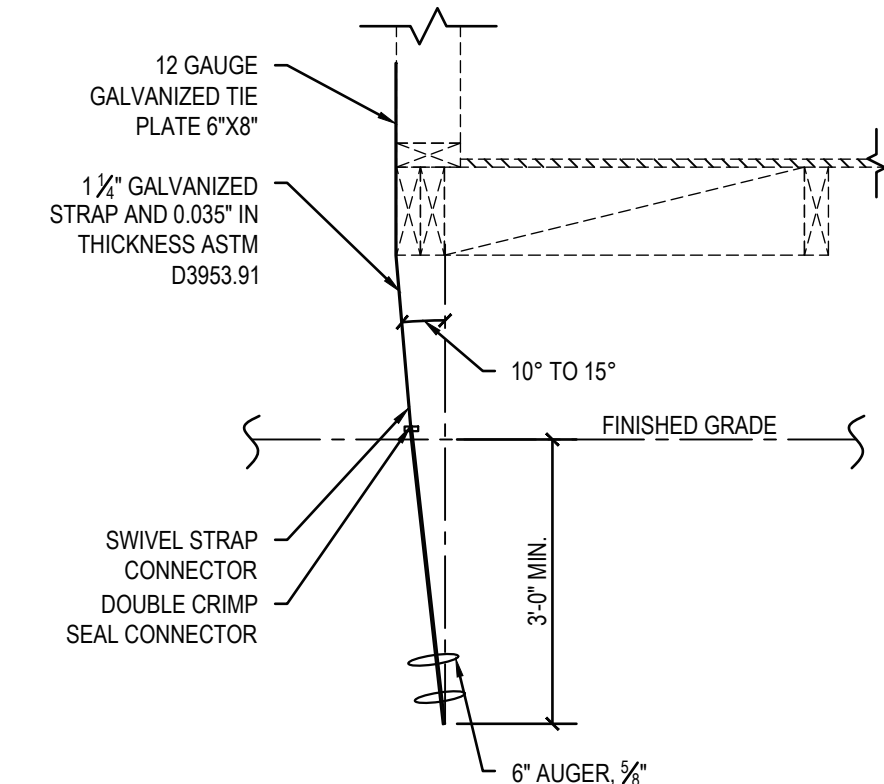
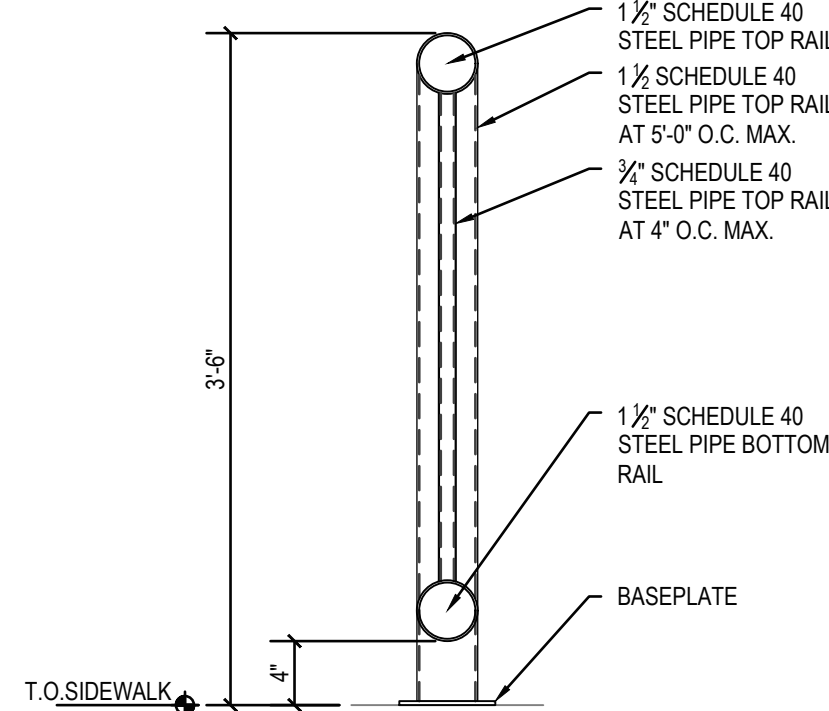
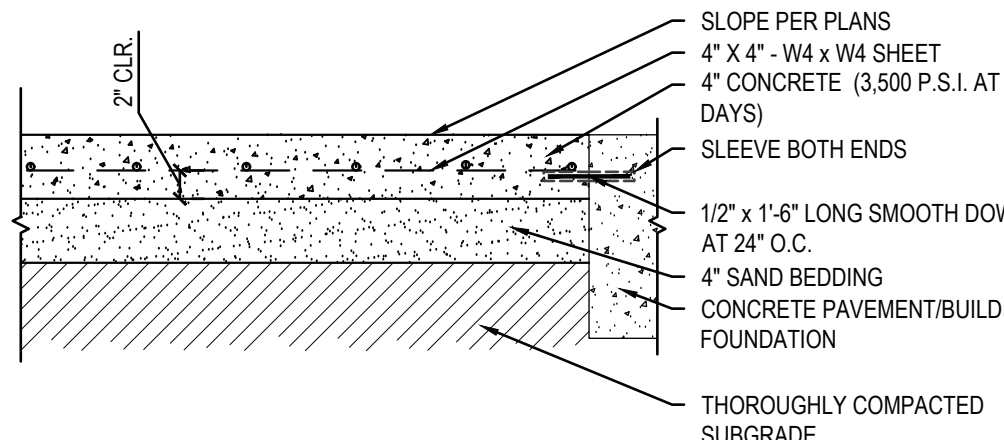
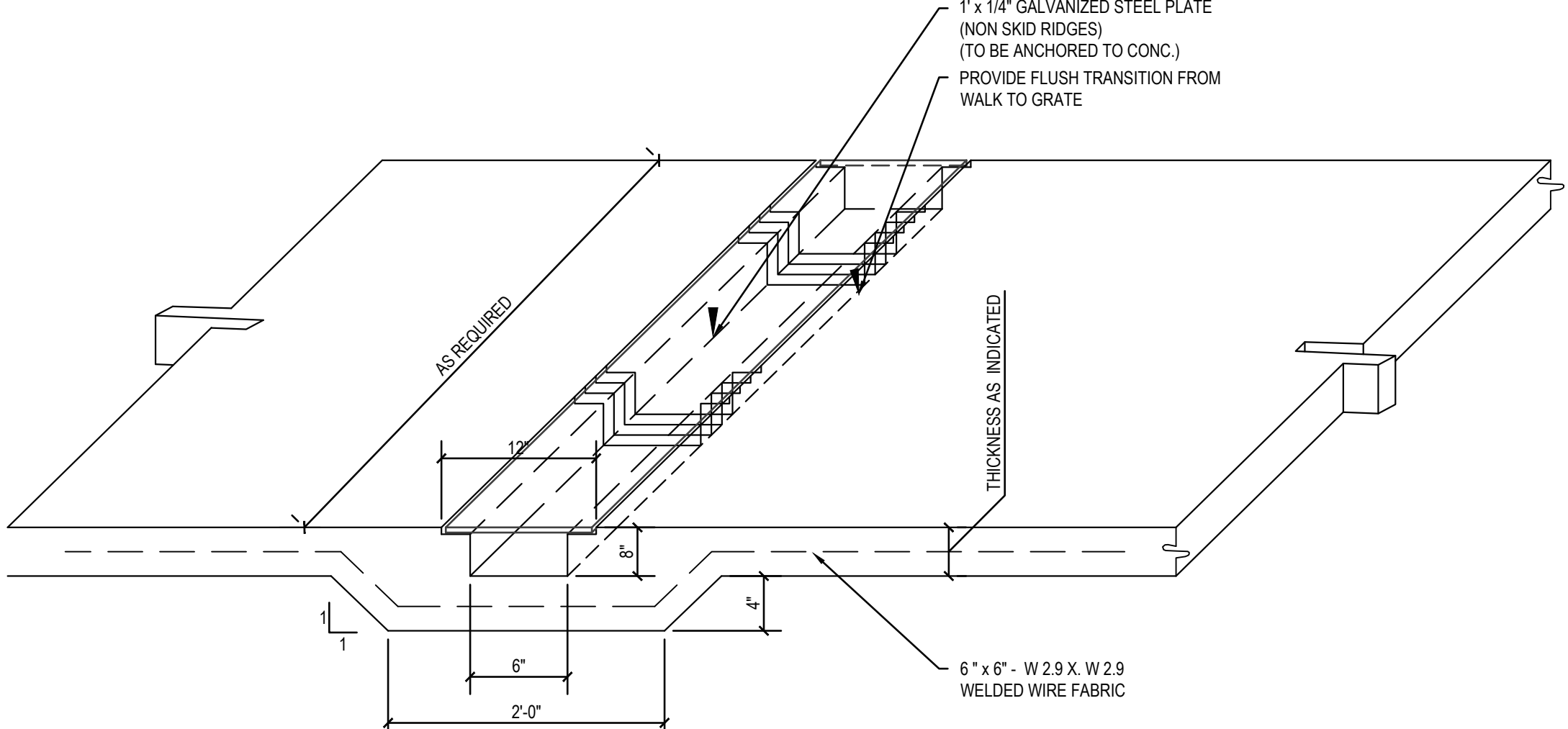
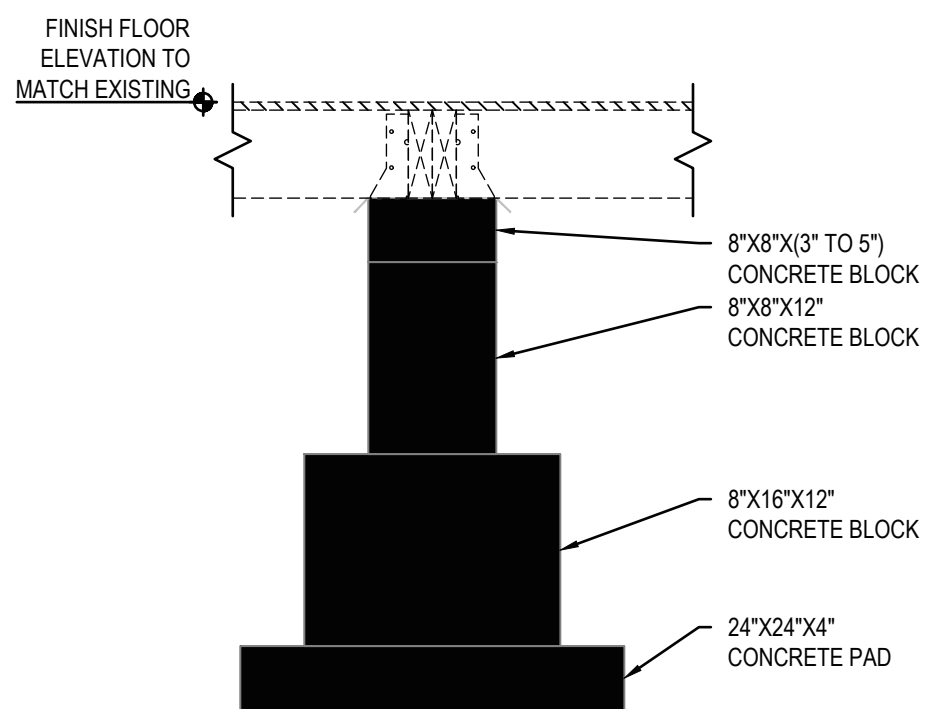
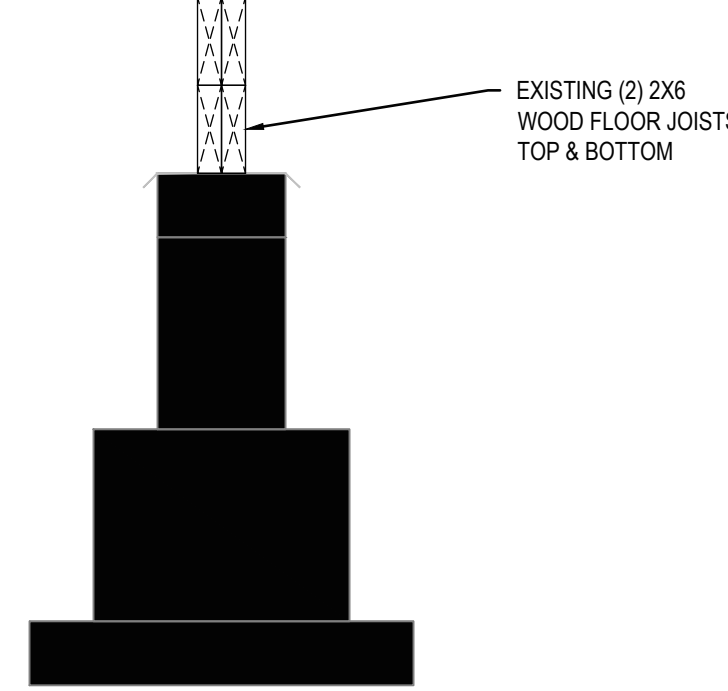
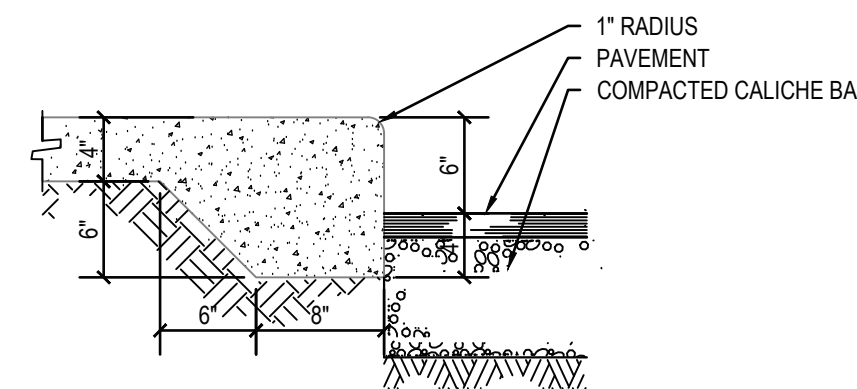
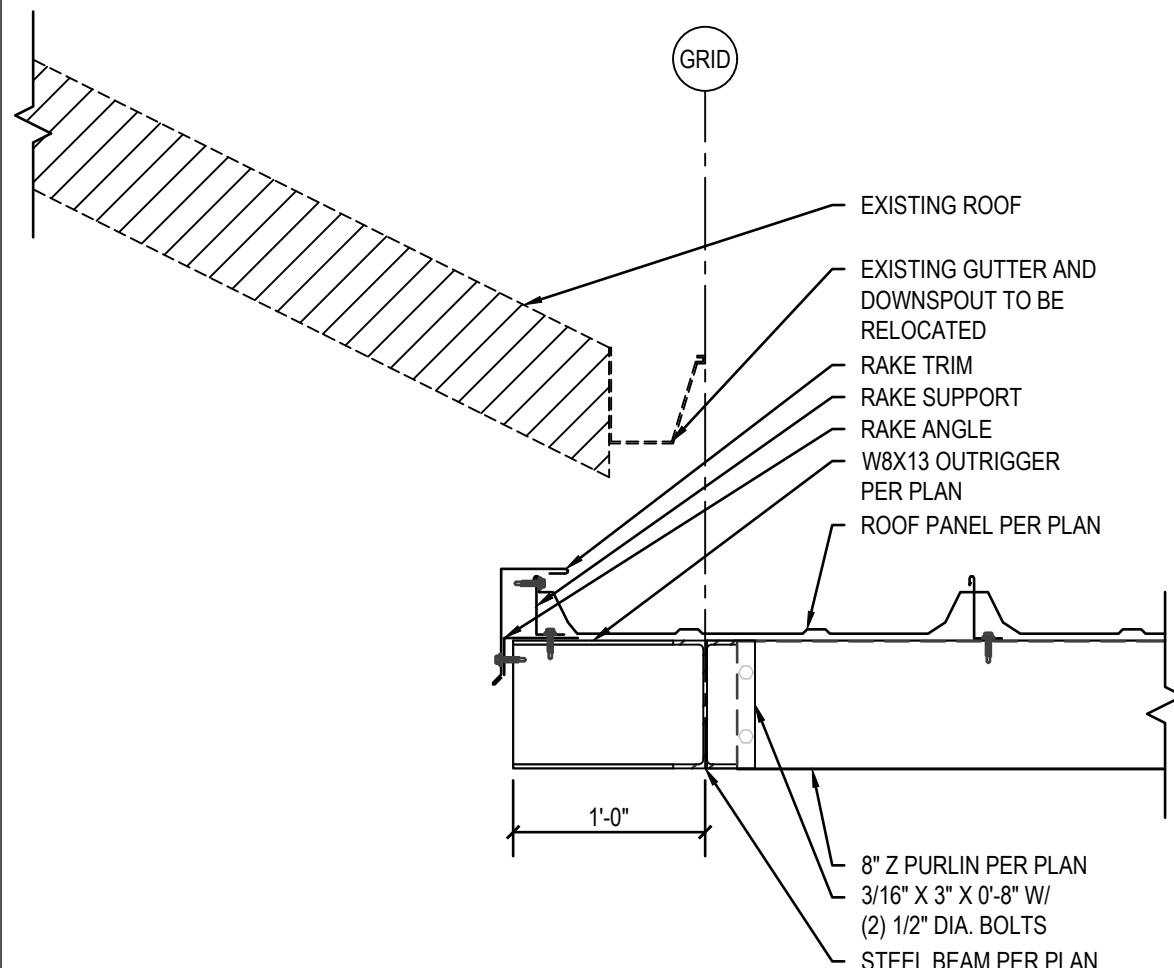
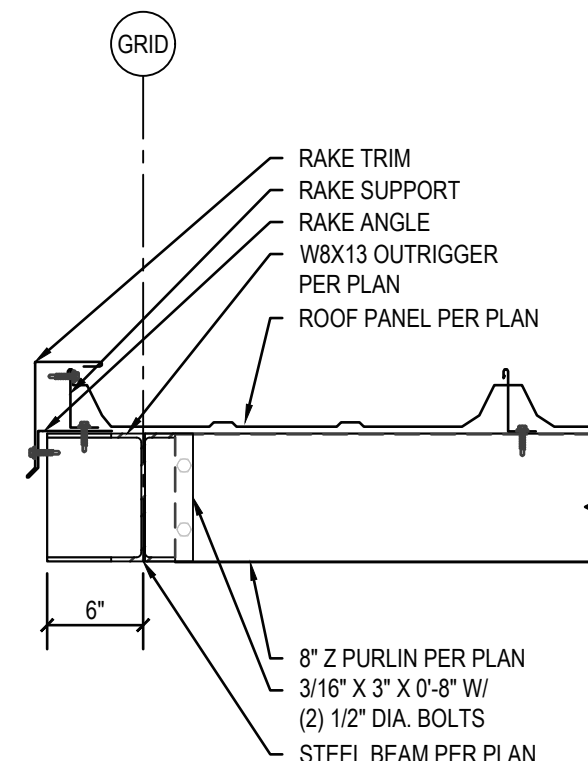
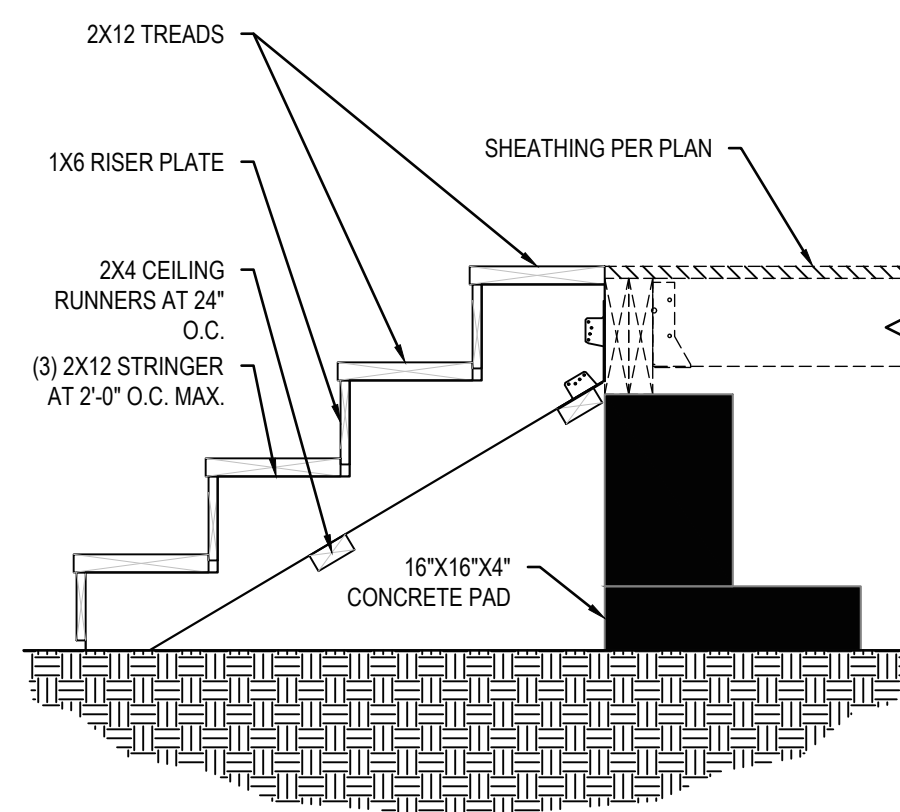
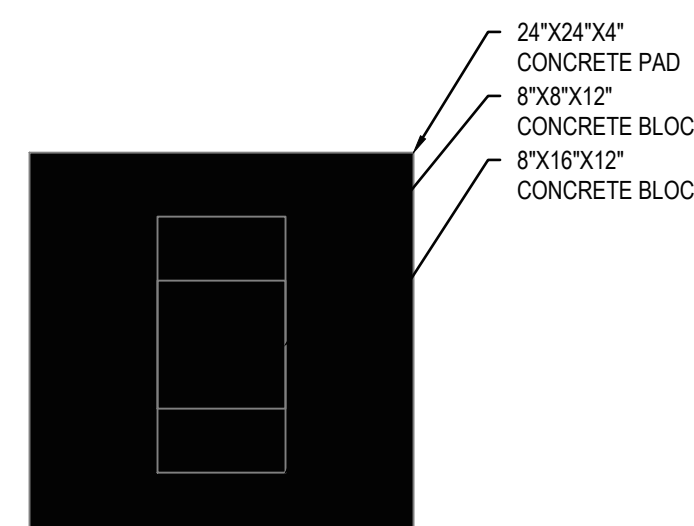
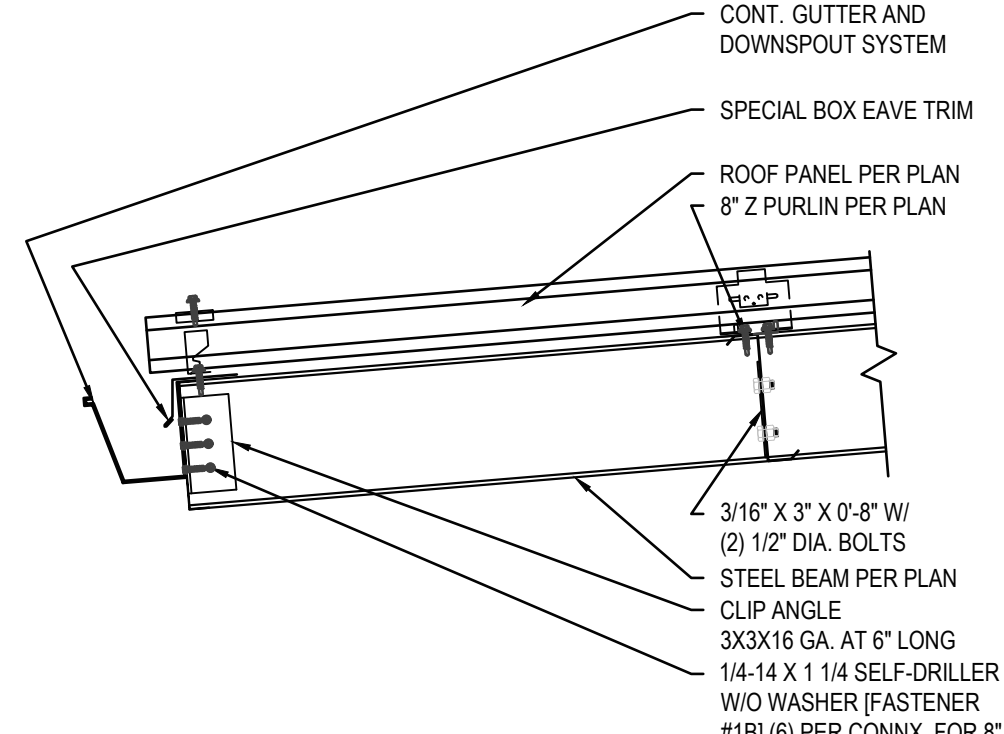
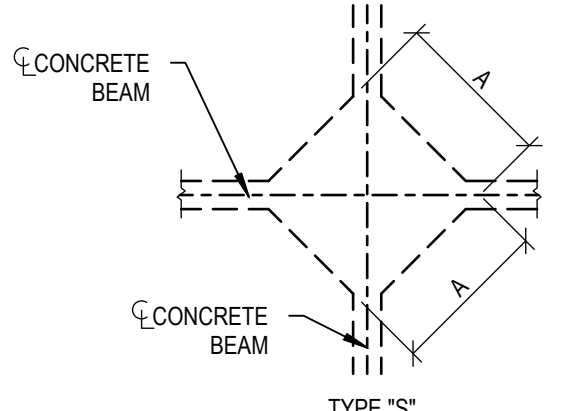
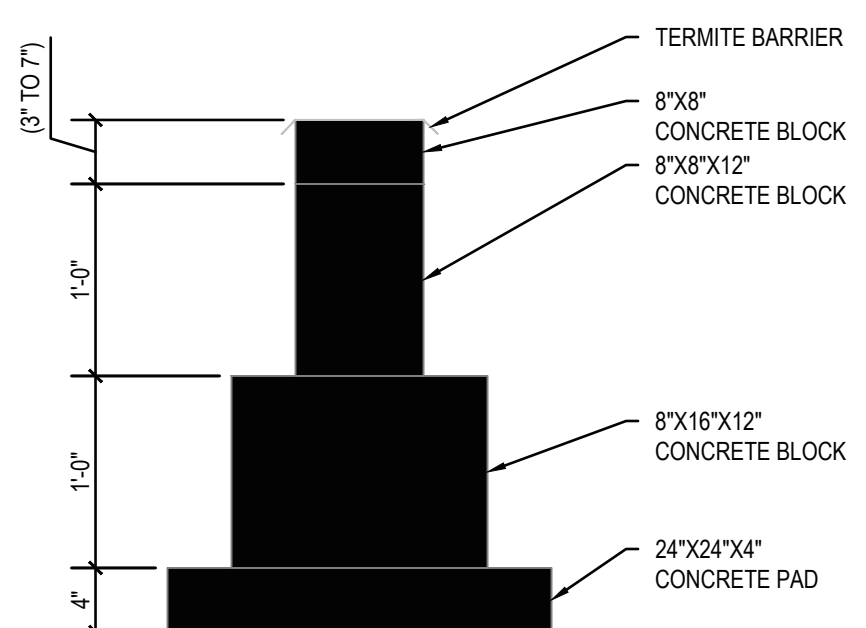
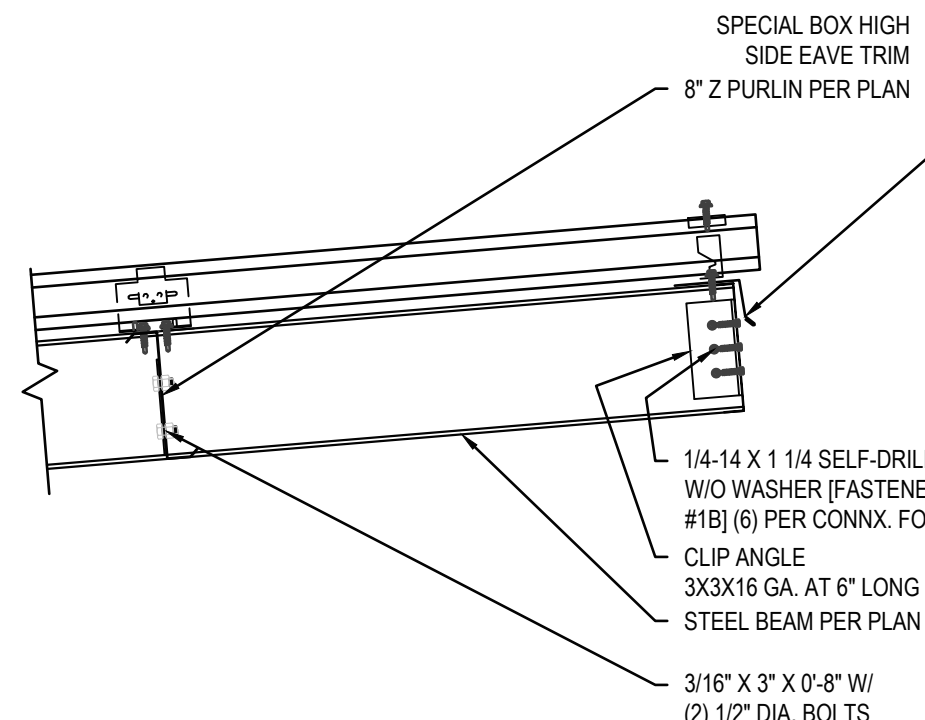
RAILING ELEVATIONS

S H E E T

SD1.3



SD1.1

								RO ENGINEERING, PLLC ENGINEERING & CONSTRUCTION MANAGEMENT 2705 E. Davis Rd., Suite A Edinburg, Texas 78540 TBPE Firm Registration No. 12179 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RENE R. OLIVAREZ, P.E. 102302 TBPE REGISTRATION NO. 12179 STATE OF TEXAS RENE R. OLIVAREZ 102302 REGISTERED PROFESSIONAL ENGINEER Robins 02-21-23													
17 WOOD BEAM TO FLOOR JOIST AT CONCRETE PEDESTAL		13 TYP. RAILING SECTION		9 CONCRETE WALK																	
																					
18 WOOD BEAM TO FLOOR JOIST AT CONCRETE PEDESTAL		14 FLOOR JOISTS AT CONCRETE PEDESTAL		10 THICKENED EDGE WALK (WHERE ADJACENT TO PAVEMENT)																	
						7 SECTION AT ENTRY		3 RAKE TRIM DETAIL													
FOOTING SCHEDULE <table><tr><th>TYPE</th><th>A</th><th>B</th><th>C</th><th>D</th><th>REINFORCING</th></tr><tr><td>S2</td><td>2'-0"</td><td></td><td></td><td>2'-0"</td><td>#5'S @ 10" O.C. E.W. TOP & BOT.</td></tr></table> NOTES: 1. D= FOOTING 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 (#5'S @ 12" O.C. E.W. TOP & BOT.) WIDENED BEAM CONCRETE FOOTINGS. 		TYPE	A	B	C	D	REINFORCING	S2	2'-0"			2'-0"	#5'S @ 10" O.C. E.W. TOP & BOT.	NOTE: CONTRACTOR TO COORDINATE FINISH FLOOR ELEVATION WITH EXISTING PORTABLE BUILDING 				8 PURLIN TO BEAM CONNECTION		4 EAVE DETAIL (HIGH SIDE)	
TYPE	A	B	C	D	REINFORCING																
S2	2'-0"			2'-0"	#5'S @ 10" O.C. E.W. TOP & BOT.																
20 FOOTING SCHEDULE		16 CONCRETE PEDESTAL FRONT VIEW		12 EAVE DETAIL (HIGH SIDE)		8 PURLIN TO BEAM CONNECTION		4 EAVE DETAIL (HIGH SIDE)													

