



City of Chandler, Arizona
Public Works & Utilities Department
Capital Projects Division

CONSTRUCTION BID

TUMBLEWEED RANCH PHASES 1 AND 2

CITY PROJECT NO.: CA2301.401

MAYOR

Kevin Hartke

VICE MAYOR

Angel Encinas

COUNCIL

OD Harris Matt Orlando

Christine Ellis Jane Poston Jennifer Hawkins

Daniel Haskins, P.E.
CIP City Engineer

CITY OF CHANDLER, ARIZONA

CONSTRUCTION BID

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INVITATION TO BID

**TUMBLEWEED RANCH PHASES 1 AND 2
CITY PROJECT NO.: CA2301.401**

NOTICE IS HEREBY GIVEN that sealed bids will be received and date/time stamped by the City of Chandler Capital Projects Office, 215 East Buffalo Street, Chandler, Arizona 85225 until the bid submission date specified below.

Solicitation documents and addenda may be downloaded at the Arizona Procurement Portal - <https://app.az.gov/>. It is the contractor's sole responsibility to obtain all addenda from the Arizona Procurement Portal prior to submitting their bid proposal, and to acknowledge receipt and acceptance of the addenda in their bid proposal submittal. No separate notification of addenda will be issued. The City recommends Contractors regularly check Arizona Procurement Portal - <https://app.az.gov/> for updated information.

PRE-BID CONFERENCE:

June 24, 2026 1:30 p.m. Arizona time	The pre-bid conference will be a mandatory site visit at 2250 S. McQueen Road, Chandler, Arizona, 85286.
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SOLICITATION QUESTIONS DUE DATE:

June 30, 2026 5:00 p.m. Arizona time	All solicitation questions must be emailed to Bid.Questions@chandleraz.gov with the subject line of: "CA2301.401 Tumbleweed Ranch Phases 1 and 2 BID QUESTION". Questions received after the due date and time will NOT be considered.
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BID SUBMISSION:

July 15, 2026 3:00 p.m. Arizona time	Sealed bids must be delivered to the City of Chandler Capital Projects Office located at 215 East Buffalo Street, Chandler, Arizona, 85225. Bids must be received on or before date and time specified. At that time, bids will be publicly opened and read aloud in the Saguaro Conference Room. Bids received after the due date and time will be returned unopened without consideration. All bids must be submitted in a sealed envelope plainly marked as follows: BID OF _____, CONTRACTOR FOR: "Tumbleweed Ranch Phases 1 and 2" "CA2301.401"
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Work must be completed within **550** consecutive calendar days from the Notice to Proceed. The Engineer's Estimate range is \$4M - \$5M.

Bids must be submitted on the Proposal Form provided and be accompanied by the Bid Bond for not less than ten percent (10%) of the total bid, payable to the City of Chandler, Arizona, or a certified or cashier's check. PERSONAL OR INDIVIDUAL SURETY BONDS ARE NOT ACCEPTABLE.

The successful bidder will be required to execute the standard form of agreement for construction prior to Council award

The successful bidder must furnish a Payment Bond and Performance Bond in the amount equal to one hundred percent (100%) of the Agreement Price.

The right is hereby reserved to accept or reject any or all bids or parts thereto, to waive any informalities in any proposal and reject the bids of any persons who have been delinquent or unfaithful to any agreement with the City of Chandler.

All Bids will remain open for 90 days after the Bid opening day, but the City may, in its sole discretion, release any Bid and return the bid security prior to that date. No Bidder may withdraw his Bid during this period without written permission from the City.

Find PRELIMINARY BID RESULTS at: <https://www.chandleraz.gov/business/vendor-services/capital-projects>

Protest Policy - A protest of a proposed award must be filed WITH THE PURCHASING OFFICE within 5 calendar days of the first posting of the award recommendation. Award recommendations are posted on the Capital Projects web site or the City Clerk web site. If the due date occurs on a weekend or holiday the protest must be filed the next business day.

A Protest must include:

- The name, address and telephone number of the protester;
- The signature of the protester or its representative;
- Identification of the project and the solicitation or agreement number;
- A detailed statement of the legal and factual grounds of the protest including copies of relevant documents; and
- The form of relief requested.

City will review the protest and issue a written response.

PUBLISHED DATE:	<u>6/17/2026</u> <u>6/24/2026</u> Arizona Republic AFFIDAVIT OF PUBLICATION
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INVITATION TO BID

**TUMBLEWEED RANCH PHASES 1 AND 2
PROJECT NO. CA2301.401**

ADDENDUM NO. 1

June 24, 2026

1. Bidder must acknowledge receipt of this addendum on the Proposal Acknowledgement page of the **BID SUBMITTAL**. This addendum, containing 1 **page(s)**, is hereby incorporated into the Construction Agreement by this reference.
2. Proposal Acknowledgement, Page 7, Paragraph 6 - Correction: Work shall be completed within **550** consecutive calendar days, beginning with the day following the starting date specified in the Notice to Proceed.

E-mail all questions to BID.Questions@chandleraz.gov.

DIRECT CONTACT WITH SELECTION COMMITTEE MEMBERS, INCLUDING PROJECT MANAGERS AND/OR ANY OTHER CITY EMPLOYEE, OTHER THAN THE CONTRACT SERVICE REPRESENTATIVE, CONCERNING THIS RFQ, AT ANY TIME IS STRICTLY PROHIBITED.

A handwritten signature in black ink that reads "Daniel Haskins".

Daniel Haskins, P.E.
CIP City Engineer
Public Works & Utilities Dept. – Capital Projects

BID SUBMITTAL LIST

This list may not include all required bid submission items. It is the Contractor's responsibility to read the entire bid and determine all items required by the submission date and time.

DO NOT DOUBLE-SIDE ANY PART OF THE BID SUBMITTAL

PROJECT NAME: **TUMBLEWEED RANCH PHASES 1 AND 2**

CITY PROJECT NO.: **CA2301.401**

PLEASE INCLUDE THE FOLLOWING ITEMS IN YOUR SUBMITTAL ACCORDING TO THE DATE AND TIME LISTED IN THE INVITATION TO BID ADVERTISEMENT:

- A. Bid Bond (Original – with Seal)
- B. Signed Proposal Acknowledgement, and licenses
- C. Bid Schedule
- D. Subcontractor's List Form
- E. Non-Collusion Bidding Certification
- F. Certificate of Insurability and Bonding
- G. Arizona Department of Revenue Privilege Tax License

BID BOND

ARIZONA STATUTORY BID BOND PURSUANT TO
TITLES 28, 34 AND 41,
OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must not be less than 10% of the bid amount)

KNOW ALL MEN BY THESE PRESENTS: That, KLASS Services, Inc., (hereinafter "Principal"), as Principal, and Old Republic Surety Company, (hereinafter "Surety"), a corporation organized and existing under the laws of the State of Wisconsin, with its principal offices in Brookfield, holding a certificate of authority to transact surety business in Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1, as Surety, held and firmly bound unto City of Chandler, (hereinafter "Obligee"), as Obligee, in the amount of Ten Percent (10%) of the amount of the bid of Principal, submitted by Principal to the Obligee for the work described below, for the payment of which sum, the Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for construction of:

Tumbleweed Ranch Phases 1 and 2 CA2301.401

NOW, THEREFORE, if the Obligee shall accept the proposal of the Principal and the Principal shall enter into an agreement with the Obligee in accordance with the terms of the proposal and give the bonds and certificates of insurance as specified in the agreement document with good and sufficient surety for the faithful performance of the agreement and for the prompt payment of labor and materials furnished in the prosecution of the agreement, or in the event of the failure of the Principal to enter into the agreement and give the bonds and certificates of insurance, if the Principal pays to the Obligee the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise it remains in full force and effect provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of that section to the extent as if it were copied at length herein.

Witness our hands this 6th day of July, 20 26

KLASS Services, Inc.

Principal

SEAL

By: 

Adam Sheppard,

Its: Principal

Old Republic Surety Company

SURETY

By: 

Jenna Sparks Attorney-in-Fact



Southwest Bond Services, Inc.

AGENCY OF RECORD

7121 W Bell Rd Ste 230 Glendale AZ 85308

AGENCY ADDRESS



OLD REPUBLIC SURETY COMPANY

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That OLD REPUBLIC SURETY COMPANY, a Wisconsin stock insurance corporation, does make, constitute and appoint:

Jenna Sparks, Melissa Schooler of Peoria, AZ

its true and lawful Attorney(s)-in-Fact, with full power and authority for and on behalf of the company as surety, to execute and deliver and affix the seal of the company thereto (if a seal is required), bonds, undertakings, recognizances or other written obligations in the nature thereof, **(other than bail bonds, bank depository bonds, mortgage deficiency bonds, mortgage guaranty bonds, guarantees of installment paper and note guaranty bonds, self-insurance workers compensation bonds guaranteeing payment of benefits, or black lung bonds)**, as follows:

ALL WRITTEN INSTRUMENTS

and to bind OLD REPUBLIC SURETY COMPANY thereby, and all of the acts of said Attorneys-in-Fact, pursuant to these presents, are ratified and confirmed. This appointment is made under and by authority of the board of directors at a special meeting held on February 18, 1982.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following resolutions adopted by the board of directors of the OLD REPUBLIC SURETY COMPANY on February 18, 1982.

RESOLVED that, the president, any vice-president or assistant vice president, in conjunction with the secretary or any assistant secretary, may appoint attorneys-in-fact or agents with authority as defined or limited in the instrument evidencing the appointment in each case, for and on behalf of the company to execute and deliver and affix the seal of the company to bonds, undertakings, recognizances, and suretyship obligations of all kinds; and said officers may remove any such attorney-in-fact or agent and revoke any Power of Attorney previously granted to such person.

RESOLVED FURTHER, that any bond, undertaking, recognizance, or suretyship obligation shall be valid and binding upon the Company

- (i) when signed by the president, any vice president or assistant vice president, and attested and sealed (if a seal be required) by any secretary or assistant secretary; or
- (ii) when signed by the president, any vice president or assistant vice president, secretary or assistant secretary, and countersigned and sealed (if a seal be required) by a duly authorized attorney-in-fact or agent; or
- (iii) when duly executed and sealed (if a seal be required) by one or more attorneys-in-fact or agents pursuant to and within the limits of the authority evidenced by the Power of Attorney issued by the company to such person or persons.

RESOLVED FURTHER that the signature of any authorized officer and the seal of the company may be affixed by facsimile to any Power of Attorney or certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the company; and such signature and seal when so used shall have the same force and effect as though manually affixed.

IN WITNESS WHEREOF, OLD REPUBLIC SURETY COMPANY has caused these presents to be signed by its proper officer, and its corporate seal to be affixed this 25th day of September, 2023.

Karen J. Haffner
Assistant Secretary



OLD REPUBLIC SURETY COMPANY

Alan Paylic
President

STATE OF WISCONSIN, COUNTY OF WAUKESHA - SS

On this 25th day of September, 2023, personally came before me, Alan Paylic and Karen J. Haffner, to me known to be the individuals and officers of the OLD REPUBLIC SURETY COMPANY who executed the above instrument, and they each acknowledged the execution of the same, and being by me duly sworn, did severally depose and say: that they are the said officers of the corporation aforesaid, and that the seal affixed to the above instrument is the seal of the corporation, and that said corporate seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority of the board of directors of said corporation.



Kathryn R. Pearson
Notary Public

CERTIFICATE

I, the undersigned, assistant secretary of the OLD REPUBLIC SURETY COMPANY, a Wisconsin corporation, CERTIFY that the foregoing and attached Power of Attorney remains in full force and has not been revoked; and furthermore, that the Resolutions of the board of directors set forth in the Power of Attorney, are now in force.

My Commission Expires: September 28, 2026

(Expiration of notary's commission does not invalidate this instrument)

52 5901



Signed and sealed at the City of Brookfield, WI this 6th day of July, 2026.

Karen J. Haffner
Assistant Secretary

ORSC 22262 (3-06)

Southwest Bond Services, Inc

CITY OF CHANDLER
CHANDLER, ARIZONA

Tumbleweed Ranch Phases 1 and 2
CA2301.401

PROPOSAL ACKNOWLEDGEMENT

PROPOSAL to the City Engineer of the City of Chandler,
In compliance with the Advertisement for Bids, the undersigned bidder:

Having examined the agreement documents, site of work, and being familiar with the conditions to be met, hereby submits the following Proposal for furnishing the material, equipment, labor and everything necessary for the completion of the work listed and agrees to execute the agreement documents and furnish the required bonds and certificates of insurance for the completion of said work, at the locations and for the prices set forth on the inside pages of this form.

Understands that construction of this project shall be in accordance with all applicable Uniform Standard Specifications and Standard Details except as otherwise required by the Project Plans and Project Specific Provisions.

Understands that the Proposal shall be submitted with a Proposal guarantee of cash, certified check, cashier's check, or surety bond for an amount of not less than ten percent (10%) of the amount bid.

Agrees that upon receipt of Notice of Award from the City of Chandler, the undersigned bidder will execute the agreement documents.

Work shall be completed within **300** consecutive calendar days, beginning with the day following the starting date specified in the Notice to Proceed. Said Notice will be issued in accordance with the Project Specific Provisions "NOTICE TO PROCEED," or, when, in the opinion of the Engineer, sufficient materials are, or will be available for the continuous prosecution of the work.

Acknowledges that bid prices submitted include all applicable sales and/or use taxes, and no further compensation will be approved for these items.

The Bidder hereby acknowledges receipt of and agrees that the submitter's Proposal is based on the following Addenda:

Addendum	Date Received	Addendum No.	Date Received
<u>1</u>	<u>6/24/26</u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

PROPOSAL ACKNOWLEDGEMENT

THIS BID IS SUBMITTED BY: KLASS Services Inc,
a corporation organized under the laws of the State of Arizona; a
partnership consisting of _____;
or individual trading as _____
and is the holder of an Arizona State Contractor's License: KA174296

ATTACH PHOTOCOPY

Classification KA No. 174296

Failure to fill in the information above, regarding the bidder being a holder of Arizona State Contractor's License is grounds for rejection of the bid.

Joint venture bid proposals will not be accepted for projects bidding in the amount (for base bid) of less than \$5 million dollars.

Contractors are reminded it is a violation of State law to submit a bid if not properly licensed. Bids submitted without designating the Contractor's license classification and number, in the spaces provided above, shall be rejected. Bids submitted by Contractors without the required license shall be rejected.

Contractor acknowledges by signing below that bid prices submitted include all applicable sales and/or use taxes, and no further compensation shall be approved for these items. If there is a conflict between the unit bid price and the unit price extension for a particular pay item, the unit prices shall govern, per MAG 102.5. Also, per MAG 102.7, a proposal shall be considered irregular and may be rejected if there are unauthorized additions, statements, conditional or alternate bids, or irregularities of any kind.

Respectfully submitted,

KLASS Services Inc

Firm

86-1041053

Federal Tax ID Number

1300 S Litchfield Rd. #210F Goodyear, AZ 85338

Address

City, State and Zip Code

623-932-0197

Phone

By (Signature Required)

Adam Sheppard, Principal

Name and Title (Print)

adam@ksi-az.com

Email Address

----- **IMPORTANT NOTICE** -----
YOU MUST:

1. REPORT DISASSOCIATION OF QUALIFYING PARTY **IN WRITING** WITHIN 15 DAYS. [SEE A.R.S. § 32-1154(A)(18)]
2. REPORT A CHANGE OF ADDRESS **IN WRITING** WITHIN 30 DAYS. [SEE A.R.S § 32-1122(8)(1)]
3. REPORT ANY TRANSFER OF OWNERSHIP OF 25% OR MORE IMMEDIATELY [SEE A.R.S. § 32-1151.01]
4. REPORT ANY CHANGE IN LEGAL ENTITY, SUCH AS ANY CHANGE IN OWNERSHIP IN A SOLE PROPRIETORSHIP OR CHANGE OF A PARTNER IN A PARTNERSHIP OR THE CREATION OF A NEW CORPORATE ENTITY [SEE A.R.S § 32-1124(8)(F) § RULE R-4-9-110]

THIS IS YOUR IDENTIFICATION CARD



Licensee: **K L A S S Services Inc**

1300 S Litchfield Rd Suite 210F, Goodyear, AZ 85338

License No.: **ROC 174296**

Class: **KA Dual Engineering**

License Effective Through: **2028-04-30**



ROC 174296

TOM COLE, DIRECTOR

State of Arizona Registrar of Contractors

Visit our license listing on the Registrar of Contractors Contractor Search using the QR Code to the right.



ROC 174296

NAME OF BIDDER: KLASS Services Inc.CITY OF CHANDLER
Tumbleweed Ranch Phase 1 and 2
Project No. CA2301.401**BID SCHEDULE**

NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	EXTENDED PRICE
PHASE 1 AND PHASE 2					
001	CONSTRUCTION SURVEYING AND LAYOUT	1	LS		\$ 25,000.00
002	EROSION CONTROL (SWPPP PREPERATION, INSTALLATION, MAINTENANCE, AND REMOVAL)	1	LS		\$ 12,500.00
003	MOBILIZATION/DEMOBILIZATION	1	LS		\$ 69,000.00
004	CLEARING AND GRUBBING	1	LS		\$ 36,880.00
005	EARTHWORKS	1	LS		\$ 192,330.00
006	ASPHALTIC CONCRETE PAVEMENT (2 IN SURFACE COURSE, A-12.5 EVAC)	229	SY	85.00	\$ 19,465.00
007	PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) TRASH ENCLOSURE	334	SF	35.50	\$ 11,857.00
008	PAVEMENT REPLACEMENT, MAG DET 200-1 & 200-2, T-TOP	40	SY	126.00	\$ 5,040.00
009	VERTICAL CURB & GUTTER, TYPE A, H=6 IN, MAG DET 220-1	8	LF	50.00	\$ 400.00
010	CONCRETE RIBBON CURB, TYPE B, MAG DET 220-1	381	LF	33.50	\$ 12,763.50
011	MOUNTABLE CURB & GUTTER, TYPE E, MAG DET 220-2	22	LF	42.55	\$ 936.10
012	SINGLE CURB, TYPE A, MAG DET 222	204	LF	41.22	\$ 8,408.88
013	VALLEY GUTTER, MAG DET 240	12	SF	65.20	\$ 782.40
	CONCRETE SIDEWALK 4" THICK, MAG DET 230	10,155	SF	8.25	\$ 83,778.75
015	CONCRETE SIDEWALK 6" THICK, MAG DET 230	5,361	SF	9.98	\$ 53,502.78
016	6 IN CONCRETE RISER	9	EA	695.00	\$ 6,255.00
017	CONCRETE APRON, PHASE 1 DET 3 SHEET C3.01	144	SF	17.85	\$ 2,570.40
018	CONCRETE PARALLEL CURB RAMP, MAG 238-3	1	EA	6655	\$ 6,655.00
019	CONCRETE CURB RAMP PER PHASE 1 DETAIL	1	EA	1355	\$ 1,355.00
020	CONCRETE CURB RAMP PER PHASE 2 DETAIL	4	EA	1359	\$ 5,436.00
021	REMOVE ASPHALTIC CONCRETE PAVEMENT	440	SY	9.45	\$ 4,158.00
022	REMOVE PORTLAND CEMENT CONCRETE PAVEMENT	1,340	SF	2.75	\$ 3,685.00
023	REMOVE CONCRETE HEADWALL	3	EA	885	\$ 2,655.00
024	REMOVE CONCRETE SINGLE CURB	329	LF	14.9	\$ 4,902.10
025	REMOVE CONCRETE DITCH & BACKFILL	2,205	SF	3.99	\$ 8,797.95
026	REMOVE PAVERS	471	SF	3.25	\$ 1,530.75
027	REMOVE CONCRETE SIDEWALK	4,137	SF	2.94	\$ 12,162.78
028	REMOVE CONCRETE STRUCTURES AND OBSTRUCTIONS	1	EA	18885	\$ 18,885.00
029	REMOVE FLAG POLE AND FOUNDATIONS	1	EA	1495	\$ 1,495.00
030	REMOVE BOLLARD AND SALVAGE ASSEMBLY	2	EA	425	\$ 850.00
031	REMOVE AND REINSTALL SIGN	2	EA	322	\$ 644.00
032	TRAFFIC CONTROL	1	LS		\$ 20,000.00
033	8 FT HEIGHT CHAIN LINK FENCE	715	LF	26.85	\$ 19,197.75
034	CHAIN LILNK FENCE GATE, 24FT DOUBLE SWING	3	EA	5995	\$ 17,985.00

NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	EXTENDED PRICE
035	4 IN WHITE TRAFFIC PAINT STRIPE	155	LF	9.89	\$ 1,532.95
036	4 IN YELLOW TRAFFIC PAINT STRIPE	1	LS		\$ 2,150.00
037	THERMOPLASTIC/PREFORMED SYMBOL ACCESSIBLE MARKING SET	2	EA	895	\$ 1,790.00
038	PERFORATED SIGN POST AND FOUNDATION	4	EA	485	\$ 1,940.00
039	CONCRETE SCUPPER, CITY DET C-500, W=4 FT	1	EA	4355	\$ 4,355.00
040	CONCRETE SCUPPER, CITY DET C-500, W=5 FT	1	EA	4950	\$ 4,950.00
041	ADJUST EX VALVE TO GRADE PER MAG DETAIL 391-1	3	EA	995	\$ 2,985.00
042	REMOVE, SALVAGE, AND REINSTALL IRRIGATION VALVE, 12 IN (MAG DET 506)	4	EA	1385	\$ 5,540.00
043	12 IN SDR 41, PLASTIC IRRIGATION PIPE	127	LF	89.91	\$ 11,418.57
044	24 IN SDR 41, PLASTIC IRRIGATION PIPE	285	LF	128.05	\$ 36,494.25
045	PIPE PLUG, MAG DET 427	1	EA	995	\$ 995.00
046	CONCRETE PIPE COLLAR FOR 12 IN, MAG DET 505	3	EA	875	\$ 2,625.00
047	CONCRETE PIPE COLLAR FOR 24 IN, MAG DET 505	2	EA	1105	\$ 2,210.00
048	12 IN RGRCP, CLASS IV	72	LF	131.2	\$ 9,446.40
049	CONCRETE BLOCK JUNCTION BOX, MAG DTL 504	2	EA	3355	\$ 6,710.00
050	24 IN IRRIGATION GATE WITH HANDWHEEL LIFT	5	EA	3485	\$ 17,425.00
051	WATER LINE REMOVALS	1	LS		\$ 18,650.00
052	8 IN DUCTILE IRON PIPE WATERLINE WITH FITTINGS	90	LF	165.3	\$ 14,877.00
053	4 IN PVC C-900, CLASS 250 WATERLINE WITH FITTINGS	45	LF	95.25	\$ 4,286.25
054	8 IN PVC C-900, CLASS 250 WATERLINE WITH FITTINGS	538	LF	118.33	\$ 63,661.54
055	DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY, CITY DET C-315, FD102, & C-105	1	EA	44650	\$ 44,650.00
056	HOSE BIB	4	EA	394	\$ 1,576.00
057	YARD HYDRANT	0	EA	0	\$ -
058	8 IN GATE VALVE WITH BOX AND COVER	2	EA	4623	\$ 9,246.00
059	TAPPED CAP WITH BLOW-OFF VALVE, MAG DET 390	3	EA	7321	\$ 21,963.00
060	GATE VALVE, BOX, & COVER PER MAG DET 340 & STAINLESS-STEEL TAPPING SLEEVE	2	EA	6694	\$ 13,388.00
061	1 IN SCH. 40 PVC WATER LINE PIPE	501	LF	35.25	\$ 17,660.25
062	2-1/2 IN SCH. 40 PVC WATER LINE PIPE	259	LF	39.98	\$ 10,354.82
063	BACKFLOW METAL MESH ENCLOSURE	1	EA	1833	\$ 1,833.00
	LANDSCAPE				\$ -
064	AUTOMATIC IRRIGATION SYSTEM - COMPLETE	1	LS		\$ 139,550.00
065	TREE - 24" BOX	3	EA	780	\$ 2,340.00
066	TREE - 36" BOX	113	EA	573.89	\$ 64,849.57
067	SHRUB - 5 GAL.	1,931	EA	31.69	\$ 61,193.39
068	ORGAN PIPE	4	EA	420	\$ 1,680.00
069	SAGUARO	1	EA	1885	\$ 1,885.00
070	TOTOM POLE	8	EA	336.25	\$ 2,690.00
071	DECOMPOSED GRANITE, 1/2" DG	75,910	SF	0.71	\$ 53,896.10

NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	EXTENDED PRICE
072	FRACTURED RIP RAP	2,492	SF	2.57	\$ 6,404.44
073	DESERT PAVEMENT	34,677	SF	1.12	\$ 38,838.24
074	SODDING	148,786	SF	1.07	\$ 159,201.02
075	STRUCTURAL SOIL	202	SF	24.74	\$ 4,997.48
076	STABILIZED ABC VEHICLE ACCESS LANE	14,885	SF	2.25	\$ 33,491.25
077	STABILIZED DECOMPOSED GRANITE	35,039	SF	3.46	\$ 121,234.94
078	RAISED PLANTING BEDS, PER PHASE 2 SHEET A0.28	256	LF	83.39	\$ 21,347.84
	ARCHITECTURAL, STRUCTURAL, ELECTRICAL				\$ -
079	DIVISION 02 - EXISTING CONDITIONS / RELOCATION (RED SHED)	1	LS		\$ 53,550.00
080	DIVISION 03 - CONCRETE	1	LS		\$ 669,300.00
081	DIVISION 04 - MASONRY	1	LS		\$ 25,650.00
082	DIVISION 05 - METALS	1	LS		\$ 252,310.00
083	FENCING PER ARCH DRAWINGS, TO MATCH EXISTING	438	LF	82.25	\$ 36,025.50
084	DIVISION 06 - WOOD, PLASTICS & COMPOSITES	1	LS		\$ 73,220.00
085	DIVISION 07 - THERMAL & MOISTURE PROTECTION	1	LS		\$ 48,990.00
086	DIVISION 08 - OPENINGS	1	LS		\$ 28,450.00
087	DIVISION 09 - FINISHES	1	LS		\$ 5,995.00
088	DIVISION 21 - FIRE SUPPRESSION	1	LS		\$ 16,885.00
089	DIVISION 26 - ELECTRICAL (BUILDINGS & SITE)	1	LS		\$ 216,425.00
090	DIVISION 31 - BLDG. PAD, SOIL & TERMITE TREATMENT	1	LS		\$ 29,880.00
					\$ -
091	ALLOWANCE: MOVE/RELOCATION EXISTING FARM EQUIP.				\$ 20,000.00
092	ALLOWANCE: OWNER				\$ 482,000.00

TOTAL BASE BID:**\$ 3,678,856.94**

Note 1: Bidders must fill in all blank spaces with an entry. Bids submitted with blank spaces will be considered "Non-Responsive".

Note 2: Bids will be opened and read aloud at an open public meeting at the time and place designed in the invitation for bids. Bids will not be modified after the bid opening. A bidder withdrawing a bid after the bid opening will be deemed non-responsible and the City may make a claim against the bidder.

Note 3: The City reserves the right to determine the low bidder based on the Base Bid with or without any Bid Alternate(s).

SUBCONTRACTOR'S LIST FORM
TUMBLEWEED RANCH PHASES 1 AND 2
CA2301.401

If Bidder intends to subcontract any portion of this Agreement, the bidder must submit the name, address, and contractor's license number (if applicable) of each subcontractor, including the work component of such subcontracting. Include this form with the bid submittal documents. Prime Contractor must self-perform according to MAG Specification 108.2. Bidder may make multiple copies of this form as needed.

Company Name:	Raindance Builders ROC KB2 dual 294081	Company Name:	Uranga Landscape ROC C-21 357035
Contact Name:	Kent Sheppard	Contact Name:	Ernie Uranga
Contact Email:	kent@rdbaz.com	Contact Email:	ernie@urangallc.com
Contact Phone:	623.764.0451	Contact Phone:	602.628.8259
Work Component:	Vertical construction / metal work	Work Component:	Landscaping
Percentage of Total Work Performed:	19%	Percentage of Total Work Performed:	11%

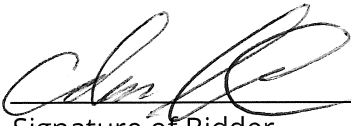
Company Name:	Southwest Barricades	Company Name:	
Contact Name:	Jeff Conant	Contact Name:	
Contact Email:	jeff@swbarricades.com	Contact Email:	
Contact Phone:	602.725.7137	Contact Phone:	
Work Component:	Traffic control	Work Component:	
Percentage of Total Work Performed:	1%	Percentage of Total Work Performed:	

Company Name:		Company Name:	
Contact Name:		Contact Name:	
Contact Email:		Contact Email:	
Contact Phone:		Contact Phone:	
Work Component:		Work Component:	
Percentage of Total Work Performed:		Percentage of Total Work Performed:	
Subcontractor Total Work Performed: \$ 1,174,000		Overall Bid Total: \$ 3,678,856.94	
Overall Prime Contractor Self-performance %:		69%	

CERTIFICATE OF INSURABILITY AND BONDING

I hereby certify that as Bidder to **City of Chandler Tumbleweed Ranch Phases 1 and 2 CA2301.401**, I am fully aware of the City of Chandler's Insurance and Bonding Requirements for Contractors and that by the submission of this Bid Proposal, assure the City of Chandler that I am able to produce the insurance and bonding coverage required should I be selected to be the successful bidder.

Should I be selected to be the successful bidder by the City of Chandler, and then become unable to produce the insurance and bonding coverage specified within ten working days I am fully aware and understand that my Bid Proposal will be rejected by the City of Chandler, and that I will forfeit my posted Bid Bond.



Signature of Bidder

Principal

Title

7.15.2026

Date

NON-COLLUSION BIDDING CERTIFICATION

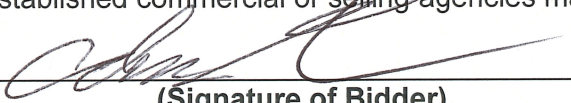
(STATE OF)
ss.
(COUNTY OF)

I, Adam Sheppard of the City of Goodyear,
in the County of Maricopa and the State of Arizona, of full age,
being duly sworn according to the law of my oath depose and say that:

I am Adam Sheppard a, Principal
(Name) (Title, Position, etc.)

of the firm of KLASS Services Inc, the Bidder making
the Bid for City of Chandler, **Tumbleweed Ranch Phases 1 and 2, City Project No. CA2301.401** and that I
executed the said Bid with full authority so to do; that said Bidder has not, directly or indirectly entered into any
agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding
in connection with the above named Project; and that all statements contained in said Bid and in this affidavit
are true and correct, and made with full knowledge that the City of Chandler relies upon the truth of the
statements contained in said Bid and in the statements contained in this affidavit in awarding the Contract for
the said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such
Contract upon an agreement of understanding, for a commission, percentage, brokerage or contingent fee,
except bonafide employees or bonafide established commercial or selling agencies maintained by:

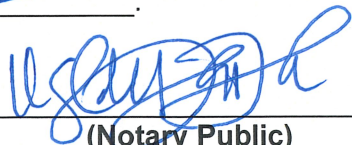

(Signature of Bidder)

Adam Sheppard
(Printed or Typed Name of Bidder)

Sworn to before me this 15th day of July, 2026, in the County
of

maricopa, State of AZ.




(Notary Public)

**ARIZONA DEPARTMENT OF REVENUE
PRIVILEGE TAX LICENSE**

PROJECT NAME: Tumbleweed Ranch Phases 1 and 2

PROJECT NUMBER: CA2301.401

ATTACH, TO THIS FORM, CURRENT PRIVILEGE TAX LICENSE CERTIFICATE.

License Verification

Transaction Privilege Tax License Number: *

07657469

Verification Status

The number **07657469** is a valid Arizona transaction privilege tax license number. 7/10/2026 3:41:05 PM.



I'm not a robot

reCAPTCHA

ARIZONA DEPARTMENT OF REVENUE
ATTN: Customer Care and Outreach
PO BOX 29032
Phoenix, AZ 85038-9032



ARIZONA DEPARTMENT OF REVENUE
TRANSACTION PRIVILEGE TAX LICENSE
NOT TRANSFERABLE

The licensee listed below is licensed to conduct business upon the condition that taxes are paid to Arizona Department of Revenue as required under provisions of A.R.S. Title 42, Chapter 5, Article 1.

2025

ISSUED TO: K L A S S SERVICES
12819 W MISSOURI AVE
LITCHFIELD PARK AZ 85340-4035

ALL communications and reports MUST REFER to this LICENSE NO.

► LICENSE: 07657469
START DATE: 06/19/2002
ISSUED: 12/25/2024
EXPIRES: 12/31/2025

LOCATION: CODE 002
KLASS SERVICES INC
12819 W MISSOURI AVE
LITCHFIELD PARK, AZ 85340
2400069200196
[Barcode]

BUSINESS CODE	REGION	JURISDICTION
015 - CONTRACTING - PRIME	MAR - MARICOPA	COUNTY
015 - CONTRACTING - PRIME	PNL - PINAL	COUNTY
015 - CONTRACTING - PRIME	AJ - APACHE JUNCTION	CITY
015 - CONTRACTING - PRIME	AV - AVONDALE	CITY
015 - CONTRACTING - PRIME	BE - BUCKEYE	CITY
015 - CONTRACTING - PRIME	CA - CAREFREE	CITY
015 - CONTRACTING - PRIME	CG - CASA GRANDE	CITY
015 - CONTRACTING - PRIME	CH - CHANDLER	CITY
015 - CONTRACTING - PRIME	CK - CAVE CREEK	CITY
015 - CONTRACTING - PRIME	CL - COOLIDGE	CITY
015 - CONTRACTING - PRIME	DH - DEWEY-HUMBOLDT	CITY
015 - CONTRACTING - PRIME	EM - EL MIRAGE	CITY
015 - CONTRACTING - PRIME	FH - FOUNTAIN HILLS	CITY
015 - CONTRACTING - PRIME	GB - GILBERT	CITY
015 - CONTRACTING - PRIME	GE - GLENDALE	CITY
015 - CONTRACTING - PRIME	GY - GOODYEAR	CITY
015 - CONTRACTING - PRIME	LP - LITCHFIELD PARK	CITY
015 - CONTRACTING - PRIME	ME - MESA	CITY
015 - CONTRACTING - PRIME	MP - MARICOPA	CITY
015 - CONTRACTING - PRIME	PE - PEORIA	CITY
015 - CONTRACTING - PRIME	PV - PARADISE VALLEY	CITY
015 - CONTRACTING - PRIME	PX - PHOENIX	CITY

This License is issued to the business named above for the address shown. Licenses, by law, cannot be transferred from one person to another, nor can they be transferred from one location to another. Arizona law requires licensees to notify the Department of Revenue if there is a change in business name, trade name, location, mailing address, or ownership. In addition, when the business ceases to operate or the business location changes and a new license is issued, this license must be returned to the Arizona Department of Revenue. According to R15-5-2201, license must be displayed in a conspicuous place.

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LICENSE: 07657469

BUSINESS CODE

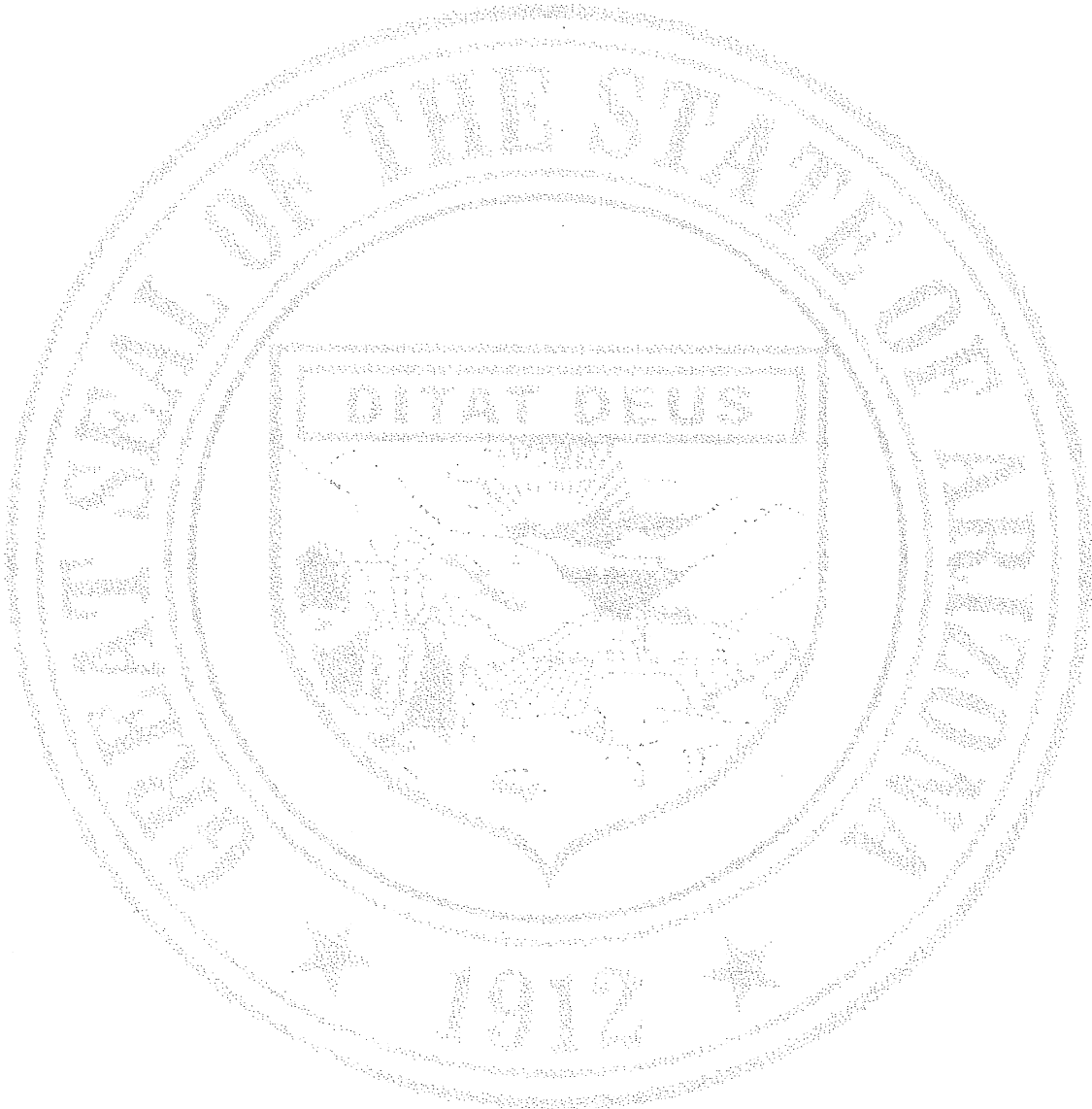
015 - CONTRACTING - PRIME
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REGION

QC - QUEEN CREEK
 SC - SCOTTSDALE
 SE - SEDONA
 SP - SURPRISE
 TE - TEMPE
 TN - TOLLESON
 WB - WICKENBURG
 YT - YOUNGTOWN

JURISDICTION

CITY
 CITY
 CITY
 CITY
 CITY
 CITY
 CITY
 CITY



001560303N0000P7073050400156



**CITY OF CHANDLER, ARIZONA
PUBLIC WORKS & UTILITIES DEPARTMENT
CAPITAL PROJECTS DIVISION**

CONSTRUCTION AGREEMENT

**TUMBLEWEED RANCH PHASES 1 AND 2
CITY PROJECT NO.: CA2301.401**

**MAYOR
KEVIN HARTKE**

**VICE MAYOR
ANGEL ENCINAS - VICE MAYOR**

**CITY COUNCIL
OD Harris Matt Orlando
Christine Ellis Jane Poston Jennifer Hawkins**



**Daniel Haskins, P.E.
CIP City Engineer**

CITY OF CHANDLER, ARIZONA
TUMBLEWEED RANCH PHASES 1 AND 2
CITY PROJECT NO.: CA2301.401

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CONSTRUCTION SERVICES AGREEMENT
PROJECT NO.: CA2301.401

This Agreement (“Agreement”) is made and entered into on the ____ day of _____, 2026, by and between City of Chandler, an Arizona municipal corporation, hereinafter called “City” and KCLASS Services inc. the “Contractor” designated below (City and Contractor may individually be referred to as “Party” and collectively referred to as “Parties”).

City and Contractor agree as follows:

ARTICLE 1 - PARTICIPANTS AND PROJECT

CITY: CIP City Engineer: Daniel Haskins, P.E.
Public Works & Utilities Department
P.O. Box 4008, Mail Stop 407, Chandler, AZ 85244-4008
Phone: 480-782-3335 Email: Daniel.Haskins@chandleraz.gov

CITY: Construction Project Manager: Jason Garcia
Public Works & Utilities Department
P.O. Box 4008, Mail Stop 407, Chandler, AZ 85244-4008
Phone: 480-782-3453 Email: Jason.Garcia@chandleraz.gov

Contractor: Legal Company Name:	KCLASS Services Inc.
Mailing Address:	1300 South Litchfield Road, Suite 210-F Goodyear, AZ 85338
Physical Address:	1300 South Litchfield Road, Suite 210-F Goodyear, AZ 85338
Arizona Roc No.:	KA-174296
Federal Tax Id No.:	86-1041053
State Where Organized:	ARIZONA
Business Organization:	S Corp
Statutory Agent Name:	Kent Sheppard
Statutory Agent Mailing Address:	12819 West Missouri Avenue Litchfield Park, AZ 85340
Statutory Agent Physical Address:	12819 West Missouri Avenue Litchfield Park, AZ 85340
Contractor’s Authorized Project Representative:	
Name:	Adam Sheppard
Title:	Principal
Phone:	623-764-4348
Email:	adam@ksi-az.com

PROJECT DESCRIPTION:

Beginning in the 1890s, cotton, dairy, sheep, citrus, alfalfa, sugar beets, and other agricultural pursuits shaped our community, and Dr. A.J. Chandler founded the city with a vision of innovation in land development, water control, agriculture, and community development. In 1999, a portion of Tumbleweed Park was preserved in order to tell the story of the East Valley's rich agricultural history.

Tumbleweed Ranch is comprised of 19 acres in the southeast corner of Tumbleweed Park, at 2205 S. McQueen Road, Chandler Arizona and features four historic structures, a small stage and amphitheater, demonstration agricultural fields, and antique agricultural equipment displays. The purpose of the ranch is to create a vibrant cultural destination that anchors the southern half of the existing Tumbleweed Park campus and explores Chandler's agricultural roots. Its overall focus will be the history of Chandler's culture of innovation and will celebrate and honor this history and the people who have contributed to it.

The Ranch has a multi-phased improvement plan that supports daily activity for Chandler residents as well as special events. The Tumbleweed Ranch phasing and zones are defined in the Master Plan, completed in March 2024. This project includes construction of Phases 1 and 2, described as follows:

- Phase 1: This scope of work includes demolition and general site improvements such as grading, irrigation improvements, parking lot improvements, retention basins, tree salvage, new tree planting, fencing, a fire access road, utility services, shade structures, and relocation of and site improvements to the Red Shed Theater.
- Phase 2: This scope of work includes improvements to the historic farmhouses, surrounding landscape and hardscape improvements, service yard improvements, retention basins, pedestrian paths, utility services, irrigation improvements, and a new arbor structure.

As the location for this project is in the vicinity of two other ongoing capital projects, the Ryan Road Improvements from the Union Pacific Railroad Crossing to McQueen Road, and improvements to A.S.R. Wells 11 and 12, it is the City's expectation that the Contractor is willing to coordinate construction activities with the City's other contractor partners.

PROJECT LOCATION:

2250 S. McQueen Road, Chandler, Arizona, 85286.

ARTICLE 2 - AGREEMENT DOCUMENTS

2.1 AGREEMENT DOCUMENTS

The Agreement between City and Contractor will consist of the following Agreement Documents:

1. This Construction Services Agreement and all of its Exhibits, including Project Plans and Technical Specifications.
2. General Conditions and General Conditions Appendices, incorporated by reference.
3. Project Specific Special Provisions as set forth in Exhibit A, incorporated by reference.
4. Project Bid Proposal.

2.2 In the event of any inconsistency, conflict, or ambiguity between or among the Agreement Documents, the Agreement Documents will take precedence as described in Section 14.1.4 of the General Conditions.

2.3 DEFINITIONS

The definitions in Section 2 of the General Conditions apply to all the Agreement Documents, including this Agreement.

ARTICLE 3 - CONSTRUCTION SERVICES

3.1 GENERAL

- 3.1.1 Scope of Work. All terms and conditions are set forth in the Agreement. Any terms and conditions and exceptions noted in the Contractor's proposal or other documents do not apply unless agreed to in this Agreement or an approved addendum.
- 3.1.2 Contractor agrees this is a Unit Price Agreement. Contractor agrees at its own cost and expense, to do all Work necessary required to fully, timely and properly complete the construction of the Project in strict accordance with the Agreement Documents in a good and workmanlike manner, free and clear of all claims, liens, and charges whatsoever, in the manner and under the conditions specified, within the Agreement time.
- 3.1.3 Contractor must provide all of the labor and materials and perform the Work in accordance with Section 4 of the General Conditions. Some, but not all, of the major components of the Construction Services and the corresponding subsections of Section 4 of the General Conditions are set forth below.

- 3.1.4 At all times relevant to this Agreement and performance of the Work, the Contactor must fully comply with all Laws, Regulations, or Legal Requirements applicable to City, the Project and the Agreement, including, without limitation, those set forth on attached Exhibit A.
- 3.1.5 Contractor must perform the Work under this Agreement using only those firms, team members and individuals designated by Contractor consistent with Contractor's accepted Bid, or otherwise, approved by City pursuant to the General Conditions. No other entities or individuals may be used without the prior written approval of the Project Manager.
- 3.1.6 Contractor must comply with all terms and conditions of the General Conditions.
- 3.1.7 In the event of a conflict between this Agreement and the General Conditions or an exhibit hereto or appendix thereto, the terms of this Agreement will control.
- 3.1.8 Ownership of Work Product. Notwithstanding anything to the contrary in this Agreement, all Work Product prepared or otherwise created in connection with the performance of this Agreement, including the Work, are to be and remain the property of City. For purposes of this provision, "Work Product" will include all designs, drawings, plans, specifications, ideas, renderings and other information or matter, in whatever form created (e.g., electronic or printed) and in all media now known or hereinafter created. All Work Product will be considered Work Made for Hire as defined in the United States Copyright Act 17 U.S.C. § 101 (Copyright Act). If for any reason, any such Work is found not to be a Work Made for Hire, Contractor hereby transfers and assigns ownership of the copyright in such Work to City. The rights in this Section are exclusive to City in perpetuity.

3.2 **CONTRACTOR'S PRE-AGREEMENT AND PRE-WORK DELIVERABLES**

- 3.2.1 The Contractor must provide the Deliverables in accordance with Section 4.2 of the General Conditions.

3.3 **PRE-CONSTRUCTION CONFERENCE**

Contractor must attend the Pre-Construction Conference in accordance with Section 4.3 of the General Conditions.

3.4 **PERFORMANCE OF THE WORK (INCLUDING FIELD MEASUREMENTS, SUBCONTRACTORS, AND SUPPLIERS)**

Contractor must perform the Work in accordance with Section 4.4 of the General Conditions.

3.5 CONTROL OF THE PROJECT SITE

Contractor must control and maintain the Project Site in accordance with Section 4.5 of the General Conditions.

3.6 PROJECT SAFETY

Contractor must implement and enforce Project safety in accordance with Section 4.6 of the General Conditions.

3.7 MATERIALS QUALITY, SUBSTITUTIONS AND SHOP DRAWINGS

Contractor must provide materials testing and submit substitute materials and Shop Drawings in accordance with Section 4.7 of the General Conditions.

3.8 PROJECT RECORD DOCUMENTS

Contractor must maintain and make available the Project Record Documents in accordance with Section 4.8 of the General Conditions.

3.9 WARRANTY AND CORRECTION OF DEFECTIVE WORK

Contractor must provide warranties and correct defective Work in accordance with Section 4.9 of the General Conditions.

ARTICLE 4 - CITY RESPONSIBILITIES

4.1 City will have the responsibilities, and provide the information specified in, and subject to the conditions set forth in, Section 5 of the General Conditions.

ARTICLE 5 - AGREEMENT TIME

5.1 GENERAL

5.1.1 The total Agreement Duration is 550 Calendar Days (including Substantial Completion by 520 Calendars Days and Final Acceptance by 550 Calendar Days).

5.1.2 The Agreement Time will start with the Notice to Proceed (NTP) and end with Final Acceptance, as set forth in Article 5.4 below.

5.1.3 The Agreement Time will be as set forth in the Project Schedule. Contractor agrees that it will commence performance of the Work and complete the Project through Final Acceptance within the Agreement Time.

5.1.4 Time is of the essence of this Agreement for the Project, and for each phase and designated Milestone thereof.

- 5.1.5 Failure on the part of Contractor to adhere to the approved Project Schedule will be deemed a material breach and sufficient grounds for termination of this Agreement by City.

5.2 PROJECT SCHEDULE

- 5.2.1 The Project Schedule will be updated and maintained throughout Contractor's performance under this Agreement in accordance with Section 6.2 of the General Conditions.

- 5.2.2 Work must be completed to meet the following milestones after the Notice to Proceed:

	Milestone		Time	Liquidated damages for delay	
1.	n/a	within	n/a	n/a	per calendar day

5.3 SUBSTANTIAL COMPLETION

Substantial Completion must be achieved no later than the Substantial Completion Date set forth in the Project Schedule. Substantial Completion will be determined in accordance with Section 6.3 of the General Conditions.

5.4 FINAL ACCEPTANCE

- 5.4.1 Final Acceptance will be obtained within the time period set forth in the Project Schedule.

- 5.4.2 Final Acceptance will be issued pursuant to Section 6.5 of the General Conditions.

5.5 LIQUIDATED DAMAGES

- 5.5.1 Substantial Completion Liquidated Damages. Contractor acknowledges and agrees that if Contractor fails to obtain Substantial Completion of the Work within the Agreement Time, City will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, City and Contractor agree that if Contractor fails to achieve Substantial Completion of the Work within the Agreement Time, City will be entitled to retain or recover from Contractor, as liquidated damages and not as a penalty, the sum per calendar day as indicated in MAG § 108.9.

- 5.5.2 Final Acceptance Liquidated Damages. For the same reasons set forth in Article 5.5.1 above, City and Contractor further agree that if Contractor fails to achieve Final Acceptance of the Work within the Agreement Time, City will be entitled to retain or recover from Contractor, as liquidated damages and not as a penalty, the sum per

calendar day as indicated in MAG § 108.9 commencing from the actual date of Substantial Completion or Final Acceptance as required under the Agreement.

5.5.3 MAG Liquidated Damages. Liquidated damages provisions in MAG § 108.9 will apply.

5.5.4 City may deduct liquidated damages described in this Article 5.5 from any unpaid amounts then or thereafter due Contractor under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due Contractor will be payable to City at the demand of City, together with interest from the date of the demand at the highest lawful rate of interest payable by Contractor.

5.6 **MUTUAL WAIVER OF CONSEQUENTIAL DAMAGES ONLY**

5.6.1 Contractor and City waive claims against each other for consequential damages arising out of or relating to this Agreement. This mutual waiver includes.

1. Damages incurred by City for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
2. Damages incurred by Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

5.6.2 This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination of this Agreement. Nothing contained in this Article 5.6 will be deemed to preclude an award of liquidated damages, when applicable, in accordance with Article 5.5 above.

5.6.3 Nothing herein will be deemed to constitute a waiver of any other remedy available to City in the event of Contractor's default under this Agreement prior to full performance of the Work including, as applicable, specific performance or completion of the Work on behalf of Contractor, the cost and expense of which will be offset against any monies then or thereafter due to Contractor (if any) and otherwise immediately reimbursed to City by Contractor.

ARTICLE 6 - AGREEMENT PRICE

6.1 AGREEMENT PRICE

6.1.1 In exchange for Contractor's full, timely, and acceptable performances and construction of the Work under this Agreement, and subject to all of the terms of this Agreement, City will pay Contractor the "Agreement Price," which is \$3,678,856.94.

6.1.2 The Agreement Price is all-inclusive and specifically includes all fees, cost, insurance and bond premiums, and taxes of any type necessary to fully, properly and timely perform and construct Work.

6.2 CHANGES TO AGREEMENT PRICE

Shall be determined under Section 9 of the General Conditions.

ARTICLE 7 - PAYMENT

Payments will be made to Contractor in accordance with Section 8 of the General Conditions.

ARTICLE 8 - CHANGES TO THE AGREEMENT

Changes to the Agreement may be made in strict accordance with Section 9 of the General Conditions.

ARTICLE 9 - SUSPENSION AND TERMINATION

This Agreement may be suspended or terminated in accordance with Section 10 of the General Conditions.

ARTICLE 10 - INSURANCE AND BONDS

10.1 Contractor must provide insurance in accordance with Sections 11.1 through 11.3 of the General Conditions. Contractor must provide proof of such insurance and all required endorsements in forms acceptable to City prior to commencing any Work under this Agreement.

10.2 Contractor must provide performance and payment bonds to City in Accordance with Section 11.4 of the General Conditions and A.R.S. § 34-222.

10.3 Failure to provide proof of insurance and the required endorsements, or the required bonds, in forms acceptable to City, will be a material breach and grounds for termination for cause of this Agreement.

ARTICLE 11 - INDEMNIFICATION

Contractor must have and assume the indemnity obligations set forth in Section 12 of the General Conditions.

ARTICLE 12 - DISPUTE RESOLUTION

Any claims or disputes relating to this Agreement will be resolved according to the dispute resolution process set forth in Section 13 of, and Appendix 6 to, the General Conditions.

ARTICLE 13 - FORCED LABOR OF ETHNIC UYGHURS PROHIBITED By entering into this Agreement, Contractor certifies and agrees Contractor does not currently use and will not use for the term of this Agreement: (i) the forced labor of ethnic Uyghurs in the People's Republic of China; or (ii) any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; or (iii) any contractors, subcontractors or suppliers that use the forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement through their duly authorized representatives and bind their respective entities as of the effective date.

"CITY"
CITY OF CHANDLER

Mayor

RECOMMENDED BY:

Daniel Haskins July 21, 2026
Daniel Haskins, P.E.
CIP City Engineer

APPROVED AS TO FORM:

City Attorney

ATTEST:

City Clerk Seal

"CONTRACTOR"
KLASS SERVICES INC.

 July 21, 2026
Signature Date

Adam Sheppard
Print Name

Adam Sheppard
Title

adam@ksi-az.com
Signer Email Address

EXHIBIT A
PROJECT SPECIFIC
SPECIAL PROVISIONS

4.2.7 Aerial Construction Photography

General Conditions Section 4 Subsections 4.2.7.1 & 4.2.7.2 are not applicable to this project.

4.2.8 Government Approvals and Permits

General Conditions Section 4 Subsection 4.2.8.1, City permit fees will be paid internally by the City and all other fees will be the responsibility of the Contractor.

Subletting of Agreement

Contractor must perform, with his own organization, work amounting to not less than 50 percent of the total Agreement cost.

Failure to submit Subcontractor's List Form, demonstrating self-performance not less than 50 percent of the total Agreement cost, will cause the bid to be deemed non-responsive.

Bidders should contact the Arizona Registrar of Contractors for information on license requirements.

EXHIBIT B

GENERAL CONDITIONS



GENERAL CONDITIONS

Approved date: July 20, 2022

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Appendix 8 – Construction Sign Detail

Appendix 9 – Cost of the Work (Applicable solely to Construction Manager at Risk and Job Order Contracting)

Appendix 10 Landscape Establishment Period

SECTION 1 - SCOPE OF THESE GENERAL CONDITIONS

These General Conditions encompass provisions that apply, and are incorporated into all construction Agreements entered into by the City of Chandler, unless otherwise specifically excluded in the executed Agreement.

SECTION 2 - GENERAL DEFINITIONS

Allowance: A specific amount for a specific item of Work, if any, that City agrees has not been sufficiently designed, detailed, or selected (including design changes from 90% to 100% as authorized by and at the discretion of the City) at the time the Agreement Price is agreed to for Contractor to provide a definitive price.

Alternate Systems Evaluations or Alternative Analysis: Alternatives for design, means and methods or other scope considerations that are evaluated using value analysis principles and have the potential to reduce construction costs while still delivering a quality and functional Project that meets City requirements.

Change Order: A written instrument issued after execution of the Agreement Documents signed by City and Contractor, stating their agreement upon all of the following: the addition, deletion or revision in the scope of services or deliverables; the amount of the adjustment to the Agreement Price, the extent of the adjustment to the Agreement Time, or modifications of other agreement terms. The Agreement Price and the Agreement Time may be changed only by Change Order.

Consultant: Person or firm that provides professional services.

City (Owner or OWNER): City of Chandler, a municipal corporation, with whom Contractor has entered into the Agreement and for whom the Work or Services are to be provided pursuant to the Agreement(s).

Contingent Bid Items: This is a minor bid item which is likely, but not certain, to occur during the course of work. If the Engineer determines that this work is required, the Contractor will accomplish the work and payment will be made based on the contingent unit bid price included in the proposal. Since the quantity listed in the proposal is primarily for bid comparison, the amount of work required by the Engineer may vary materially from this.

Agreement: The written agreement executed between City and Contractor, including all of the Agreement Documents.

Agreement Documents: The documents which together form the Agreement between City and Contractor, as identified in Article 2 of the Agreement, or are otherwise incorporated into the Agreement, including the Agreement, the exhibits thereto, these General Conditions, any Notice to Proceed, and any Job Order (if applicable), the Plans and Specifications, Project Schedule, written and properly executed Change Orders, MAG Specifications and City's amendments thereto, and any other documents so designated in the Agreement.

Agreement Price: The agreed-upon price to be paid to Contractor for full, timely, and acceptable completion of the Work or Services under the terms of the Agreement.

Agreement Time(s): The number of calendar days or the dates related to the applicable phase, Substantial Completion, or Final Acceptance as stated in Agreement Documents. Agreement Time starts

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with the Notice to Proceed (NTP) and ends with Final Acceptance. The Agreement Time is set forth in the Agreement and is based upon the Project Schedule agreed to by City in writing.

Contractor: The person or business association with whom City has entered into an agreement for construction related Work or Services in relation to the Project at issue.

Contractor Payment Request: The form that is accepted by City and used by Contractor in requesting progress payments or final payment and which must include such supporting documentation as is required by the Agreement Documents or City.

Construction Budget: The City's budget for construction of the Project.

Construction Documents: The Plans, Specifications, and Drawings prepared and issued by the Design Professional and approved by City for construction, meaning the documents are sealed by the Design Professional (as required), acceptable for permitting and incorporated into the Agreement by this reference. All amendments and modifications to the Construction Documents must be approved in writing by City prior to incorporation into the Agreement.

Cost of the Work: The term Cost of the Work will mean costs necessarily incurred by Contractor in the proper performance of the Work. Such costs will be at rates not higher than the standard paid at the place of the Project except with prior consent of City.

Critical Path Method (CPM): A scheduling technique which identifies the logical sequence of the activities occurring in a Construction Project, the anticipated time required to complete each activity in the Project, and the activities that must be completed on schedule to finish the Project within the anticipated time. Typically, activities are arranged in a network that shows both activities and their dependencies. CPM is also used as a management technique which enables contracting parties to predict when activities may occur so that resources can be effectively used and limitations can be identified.

Critical Path: Critical Path is the sequence of project network activities which add up to the longest overall duration. Once established in the Project Schedule, the Critical Path for the Project must not be changed without prior written approval of City.

Day: Calendar day(s) unless otherwise specifically stated in the Agreement Documents.

Design Professional: The qualified, licensed person, firm or corporation who furnishes design and construction administration services required under the Agreement Documents. These services may include, but are not limited to: development of Construction Drawings and Documents, review of Contractor Submittal(s), review of and response to Requests for Information, approval and certification of progress payment applications, construction administration, and construction agreement close out.

Differing Site Conditions: Concealed or latent physical conditions or subsurface conditions at the Site that, (i) materially differ from the conditions indicated in the Agreement Documents, or (ii) are of an unusual nature, differing materially from the conditions ordinarily encountered and generally recognized as inherent in the Work at the general area of the Site. Caliche, rock, hard-digging or sandy/silty soil encountered on a project is not considered a "Differing Site Condition."

Drawings (Plans): Documents, which visually represent the scope, extent and character of the Work to be furnished and performed by Contractor during the construction phase and which have been prepared

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or approved by the Design Professional and City. These documents include Drawings that have reached a sufficient state of completion and released by Design Professional solely for the purposes of review and use in performing constructability or bid-ability reviews by Contractor and in preparing cost estimates (e.g. Master Planning and Programming, Schematic Design, Design Development, and Construction Drawings), but *"not for construction."* Shop Drawings are not Drawings as so defined.

Final Acceptance: The City's acceptance of the facility or project from the Contractor after all Work is completed, tested, and inspected in accordance with the Agreement requirements. Final Acceptance results in a Letter of Acceptance (LOA).

Fixed Price: A fixed price or amount for an Agreement Price, Scope of Work, materials, or other item under an Agreement, Change Order, or other agreement, which City agrees, in writing, to pay instead of the actual cost.

Float: The number of Days by which an activity can be delayed without lengthening the Critical Path and extending the Agreement Time. Unless otherwise expressly agreed in writing, all Float belongs to City.

Laws, Regulations, or Legal Requirements: Any and all applicable laws, rules, regulations, ordinances, codes and orders applicable to the Project of any and all governmental bodies, agencies, authorities and courts having jurisdiction and any applicable provisions of the Development Agreement for the Project (if any), including, without limitation, those provisions relating to the design and construction of the Project.

Line Item: The individual elements of Work identified on a bid or other schedule and associated with a price or a unit price and quantity particular to that individual element of the Work. Also refers to individual items of work within the Schedule of Values.

Liquidated Damages: Designated damages for the City to collect as compensation upon a specific breach (example: late delivery).

Long-Lead Item: Long-lead item refers to the equipment, product, or system that is identified at the earliest stage of a project to have a delivery time long enough to affect directly the Critical Path/the overall lead time of the project.

MAG: The Maricopa Association of Governments.

MAG Specifications: The most current version of the Uniform Standard Specifications for Public Works Construction published by MAG.

MAG Standard Details: The most current version of the Uniform Standard Details as published by MAG.

Minor change: A change in the Work having no impact on cost or time or the City-approved design intent, as determined by City.

Notice to Proceed (NTP): A written notice given by City to Contractor fixing the date on which Contractor will start to perform Contractor's obligations under the Agreement.

Project: The Project specified in the Agreement (including a Job Order).

Project Manager: The Project Manager designated in Article 1 of the Agreement, or any successor thereto

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designated by City. The Project Manager has the authority to act on behalf of City, as delineated and limited by the Agreement Documents and applicable law. And City will communicate with Contractor through the Project Manager. However, the Project Manager has no authority to bind City or City Council in contravention of any City code, State or Federal statute or regulation, or these General Conditions.

Project Schedule: The schedule for the completion of the Project agreed to and required by City.

Project Specific Conditions: Additional conditions which apply to the specific Project and Scope of Work which are set forth in Exhibit D of the Agreement.

Project Team: The Project Team consisting of the Design Professional, Contractor, Project Manager, and such others as City may designate.

Punch List: The list initially prepared by Contractor pursuant to the Agreement Documents, reviewed and supplemented by the Project Manager (and at the sole option of the Project Manager, the Design Professional) and approved by City containing items of incomplete work not impacting Substantial Completion, if allowed for under the Agreement, and to be completed or corrected by Contractor after Substantial Completion and before Final Acceptance in accordance with the Agreement Documents.

Quality Assurance (QA) Testing: Testing performed to verify the accuracy and applicability of the QC testing results and to ascertain that the materials installed meet the specified levels of quality in accordance with the Agreement Documents.

Quality Control (QC) Testing: Testing performed to assure that the materials installed comply with the requirements in the Agreement Documents.

Requests for Information (RFIs): Formal written request from Contractor to City or Design Professional for the Project seeking clarification or additional information needed for Contractor to properly complete the Work or Services under the Agreement. City may require RFI's to be submitted on a specific form or in a specified format.

Schedule of Values (SOV): The specified document prepared by Contractor, and approved and accepted by City, which divides the Agreement Price into pay items, such that the sum of all pay items equals the Agreement Price for the construction phase Work, or for any portion of the Work having a separate specified Agreement Price.

Scope of Work: The scope of work agreed to or required by City and incorporated into the Agreement as Exhibit A.

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

Site: The land or premises on which the Project is located.

Specifications: The part(s) of the Agreement Documents for the construction phase consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto. Where specified, the Project must be constructed using the current Uniform Standard Specifications and Details for Public Works

Construction as furnished by the Maricopa Association of Governments, as amended by City.

Subconsultant: A person, firm or corporation having an Agreement with Consultant/Contractor to furnish services required as its independent professional associate or consultant with respect to the Project.

Subcontractor: An individual or firm having a direct Agreement with Contractor or any other individual or firm having an Agreement with the aforesaid contractors at any tier, who undertakes to perform a part of pre-construction services or construction phase Work at the Site for which Contractor is responsible. Subcontractors must be selected through the Subcontractor selection process described in the Agreement Documents, if any.

Substantial Completion: The date when the City determines that the Work (or separable units of Phases as provided in the Agreement Documents) is essentially and satisfactorily complete in accordance with the Agreement Documents such that the Project is ready for use by the City for its intended purpose, opening to the general public, full occupancy or use by City (including, without limitation, all separate units, or rooms, facilities, access, income-generating areas, and all areas serving the general public, as applicable, must be ready for full operation without material inconvenience or discomfort), including, to the extent applicable to the Work, the following: all materials, equipment, systems, controls, features, facilities, accessories, and similar elements are installed in the proper manner and in operating condition, inspected, and approved; surfaces have been painted; masonry and concrete cleaned with any sealer or other finish applied; utilities and systems connected and functioning; site work complete; permanent heating, ventilation, air conditioning, vertical transportation, and other systems properly operating with proper controls; lighting and electrical systems installed, operable and controlled; paving completed, signage installed, and other work as applicable, has been performed to a similar state of essential and satisfactory completion.

Supplier: A manufacturer, fabricator, distributor, or vendor having a direct Agreement with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the construction phase Work by Contractor or any Subcontractor.

Total Float: Number of Days by which pre-construction services or construction phase Work or any part of the same may be delayed without necessarily extending a pertinent Agreement Time or schedule milestone in the Project Schedule.

Work: The entire completion of construction or the various separately identifiable parts thereof, required to be furnished during the construction phase. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials, resources and equipment into the construction, and performing or furnishing services and documents as required by the Agreement Documents for the construction phase.

Writing: Typing, printing, photography and other modes of representing or reproducing words in a visible form, including email, and expressions.

SECTION 3 - STANDARD SPECIFICATIONS AND DETAILS

- 3.1 City operates under the latest revision of the MAG Specifications and MAG Standard Details as amended by City. City's current amendment to the MAG Specifications, part of the City's Unified Development Manual, may be found and downloaded from City's website at <http://www.chandleraz.gov>.

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- 3.2 Copies of the MAG Specifications and MAG Standard Details are available at the Maricopa Association of Governments office, 302 N. 1st Avenue, Suite 300, Phoenix, Arizona. They may also be downloaded from their website at: <http://www.azmag.gov/Newsroom/Publications>
- 3.3 The MAG Specifications and Standard Details and City's amendments thereto are incorporated into the Agreement by this reference.

SECTION 4 - CONTRACTOR'S RESPONSIBILITIES FOR CONSTRUCTION SERVICES**4.1 GENERAL**

- 4.1.1 Contractor must construct the Work in accordance with the Agreement Documents and as outlined in Exhibit A of the Agreement to the satisfaction of City, exercising the degree of professional care, skill, diligence, quality and judgment that a professional construction manager engaged, experienced and specializing in the construction management of construction and facilities of similar scope, function, size, quality, complexity and detail in urban areas throughout the United States comparable to Chandler, Arizona would exercise at such time, under similar conditions. Contractor must, at all times, perform the Work in conformance with sound and generally accepted engineering principles and construction management and construction contracting practices.
- 4.1.2 If Contractor observes errors, discrepancies or omissions in the Agreement Documents, Contractor must promptly notify the Design Professional and City and request clarification. If Contractor, with the exercise of reasonable care, should have recognized such error, inconsistency, omission, or difference and fails to report it to City, and if Contractor proceeds with the Work affected by such observed errors, discrepancies or omissions, without receiving such clarifications, Contractor does so at its own risk and will be liable to City for damages resulting from proceeding without clarification.
- 4.1.3 Project Team and agents of each of them, testing agencies and governmental agencies with jurisdictional interests will be provided access to the Work at reasonable times for their observation, inspection, and testing. Contractor must provide proper and safe conditions for such access.
- 4.1.4 Contractor must comply with, and require all Subcontractors to comply with, the Arizona Contractors' license laws, including all requirements with respect to being duly registered and licensed.
- 4.1.5 Contractor must ensure that all employees performing any Work for which Contractor is responsible have a legal right to live and work in the United States. In addition, all compensation of any such employee must meet all applicable requirements of the Fair Labor Standards Act (FLSA) and Federal Minimum Wage laws.
- 4.1.6 Contractor must comply with the Immigration Reform and Control Act of 1986 (IRCA). Contractor understands and acknowledges the applicability of the IRCA activities. Contractor agrees to comply with the IRCA while performing their work and to permit City inspection of Contractor personnel records to verify such compliance.
- 4.1.7 Pursuant to MAG Specifications §§ 107.4, Contractor must report immediately any discovery of archeological ruins or artifacts. Excavation must stop immediately so that City can decide on the pertinent steps to follow such discovery.

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- 4.1.8 All property owners that may be affected by the proposed construction activities must be notified of the scope, duration of the construction activities and possible interference with their day-to-day activities by Contractor prior to start of construction. In addition, individual residential or commercial interferences, such as driveway restrictions, water outages, and all other Work adjacent to residence/business, require 48-hour notification in advance of specific adjoining Work. Notification may be through door hangers or other procedures approved by the City.
- 4.1.9 Access must be maintained to adjacent properties at all times during construction. Where property has more than one point of access, no more than one access will be restricted or closed at any one time. Access to adjacent private driveways will be maintained during all non-working hours.
- 4.1.10 Contractor must furnish and erect construction signs in accordance with Project Specifications. The signs must be professionally prepared and subject to approval by City, must be maintained by Contractor for the duration of the project, and must be removed by Contractor during the final project clean up.
- 4.1.11 The number of signs required, the size, shape, installation requirements and information to be included for construction signs is established on the detail sheet, provided, however, signs must be a minimum of 4 foot by 8 foot and must be installed so that the bottom of the sign is at least 4 foot above grade. No direct payment will be made for furnishing and erecting construction signs. The cost thereof must be included in other items for which direct payment is made. Sign locations will be determined by City.
- 4.1.12 All required construction signs must be installed by Contractor within 7 Days of Notice to Proceed.
- 4.1.13 The Work to be accomplished under these Agreement Documents has been designed for City by a Design Professional retained by City for this purpose. It is understood that normal construction Administration for the purpose of interpretation of the Agreement Documents is provided by City. Should any services of the Design Professional be required to assist in the corrections of errors or omissions by Contractor, or services of the Design Professional be required because of changes in structure or equipment where Contractor has requested approval of substitute methods or material, or any other items detailed herein below, those services will be provided by the Design Professional at the standard hourly rates previously negotiated with City and must be paid for by the Contractor.
- 4.1.14 Contractor must reimburse City for costs incurred by the Design Professional for additional services to the Project through no fault of City or the Design Professional including, but not limited to, the following conditions:
- a. Additional Site visits, investigations, inspections, design work or reports by the Design Professional which are required due to damages to existing facilities or completed Work caused by the Contractor in his performance, Contractor's negligence, or Contractor's Work which is rejected as defective or as failing to conform to the Agreement Documents;
 - b. Design Professional construction phase services rendered on the project during the time the project remains incomplete after the Agreement date of final completion will be charged to Contractor at a rate previously negotiated City; and

- c. All retesting required due to the failure of Contractor's Work to meet the requirements of the Agreement Documents will be at Contractor's expense. All standby and travel time by the City's testing lab, the Design Professional or City due to Contractor's inability to be prepared for testing at the agreed upon time will be at the Contractor's expense.

4.1.15 City may withhold from any payment otherwise due to Contractor any amounts necessary to pay the Design Professional for such additional services as provided herein above.

4.1.16 Contractor will not be required to bear additional costs incurred by City due to errors by the Design Professional.

4.2 **CONTRACTOR'S PRE-AGREEMENT AND PRE-WORK DELIVERABLES**

4.2.1 Prior to award of the Agreement, Contractor must execute Agreement and deliver to City. Failure to do so may delay Agreement award. Contractor must also provide to City its Contractor's License classification and number and its Federal Tax I.D. number.

4.2.2 Before beginning any Work under the Agreement, Agreement must be fully executed by City.

4.2.3 After Agreement award, City will issue to Contractor an award letter. At that time Contractor must deliver to City such bonds and certificates of insurance with endorsements in such amounts (and other evidence of insurance requested by City) required under Section 11 of these General Conditions, and as the Agreement requires.

4.2.4 As evidence of Workmen's Compensation Insurance, Contractor must, upon request, provide a letter of certification from the Industrial Commission of Arizona that Contractor is insured by the State Compensation Fund or is an authorized self-insurer or a certificate of insurance issued by an insurance company authorized by the Insurance Department of Arizona to write Workmen's Compensation and Occupational Disease Insurance in the State of Arizona.

4.2.5 Within 10 Days of the date of the executed Agreement letter issued by City, Contractor must submit to City for review and acceptance the following items:

4.2.5.1 Comprehensive construction Project Schedule including a Critical Path Method (CPM) diagram schedule as described in Section 6.2. Project Schedule must be in Microsoft Project standard file format. Within 10 Days of receipt of City's comments, Contractor must make all required corrections, adjustments, and additions to complete the Project Schedule and resubmit to City for review.

4.2.5.2 Preliminary schedule of submittals and Shop Drawings. Within 10 Days of receipt of City's comments, Contractor must submit the corrected and completed schedule of Shop Drawings submissions for approval. Contractor's schedule of Shop Drawings and sample submittals will be acceptable to City if it provides a workable arrangement for reviewing and processing the required submittals.

4.2.5.3 Schedule of Values in a form specified by City reflecting the subcontracts and other categories that will be used to submit Pay Applications for the Work. The total amount of the Schedule of Values must not be greater than the Agreement Price. The Schedule of Values will be reviewed at the Pre-Construction Conference and revised by Contractor within 10 Days after Pre-Construction Conference in response to comments and questions from

City. Once accepted by City in writing, the Schedule of Values for the Project must not be changed without the prior written approval of City.

4.2.6 Video Recording Requirement. Prior to performing any Work, Contractor must document the existing conditions of the Site, all other areas where Work will occur and all adjacent areas that may be impacted by the Work via digital video format. Contractor must video record and index all areas, features, buildings and other public and private improvements that could potentially be impacted by the Work. Video recording must be coordinated with City. When video recording private property, Contractor must also coordinate the video recording with the private property owner, if possible. Contractor must provide City with a copy of said digital video format prior to performing any Work.

4.2.7 Aerial Drone Construction Photography.

4.2.7.1 If Agreement duration is greater than 90 calendar days, Contractor must engage a professional unmanned aerial vehicle (UAV) aerial pilot to photograph the Site prior to construction mobilization, at three-month intervals during construction, and following final inspection. Drone camera specifications must meet the following minimum requirements:

- a. 1-inch CMOS
- b. Pixels: 20M
- c. FOV 84 8.8 mm/24 mm (35 mm format equivalent) f/2.8-f/11 auto focus at 1 m-
- d. For photographing: 16.9 Aspect Ratio: 5472x3078
- e. For video shooting: MP4/MOV/H.264
- f. FHD: 1920x1080 120p @100Mbps
- g. File format: High Definition (HD) JPEG for digital photos and HD MPEG 4 for digital video.
- h. All metadata to be recorded including GPS data and preserved with photographs provided.

Interval	JPEG
3 month intervals	At an altitude (AGL) between 70-90 ft.
3 month intervals	Images to be taken every 50-100 ft. to be determined based on project scope.

4.2.7.2 Drone photos to be taken in sequential geographical order and then organized and provided in the same manner unless otherwise specified.

4.2.7.3 Photos to be provided digitally via an online file share service and/or by a USB drive to contractor.

4.2.7.4 Drone pilots to obey ALL local (city, county, state) UAV regulations as well as FAA UAV guidelines including, but not limited to, conducting all flights during daylight hours, not exceeding maximum altitude ceilings (depending on area), not flying over people, yielding to other aircraft.

4.2.7.5 Drone pilots must fly drone within visual line of sight (VSOL) and have visual spotter when needed. Drone pilots only to operate in favorable weather conditions when minimum visibility is 3 miles or greater.

4.2.7.6 Drone pilots to conduct a preflight checklist and visually inspect the entire flight path prior to flying to ensure a safe flight.

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- 4.2.7.7 **Airspace Authorizations.** Operations in Class G airspace are allowed without air traffic control (ATC) permission. Operations in Class B, C, D and E airspace need ATC authorization. Drone pilots to schedule each flight in advance and based on airspace if required will notify nearby airports/control towers, etc.
- 4.2.8 **Government Approvals and Permits.**
- 4.2.8.1 Contractor must obtain all necessary permits for the Work and pay all applicable fees, unless otherwise noted on the Plans and in the Specifications. City permit fees will be paid internally by City. For bidding purposes, an allowance for all permit fees is included in the bid schedule under the item "allowance for permit fees." The Contractor will be paid for the actual cost of the permit fees upon submitting a receipt showing the fee Contractor has paid. Excluded from the above allowance are items such as all costs incurred by the Contractor in securing the permit except for the actual permit fee established by the agency, cost for all shutdowns or outages, cost for pole bracing, cost of permits for construction water, cost of construction water, cost for any additional insurance requirements, cost for any licenses, and other similar type costs. Contractor is specifically notified of the need to obtain the necessary environmental permits or file the necessary environmental and regulatory permit notices.
- 4.2.8.2 Copies of all permits and the associated notices must be provided to City prior to starting the permitted activity.
- 4.3 **PRE-CONSTRUCTION CONFERENCE**
- 4.3.1 Prior to the commencement of any Work, City will schedule a Pre-Construction Conference.
- 4.3.2 The purpose of this Conference is to establish a working relationship between Contractor, the utility firms, and various City agencies. The agenda will include critical elements of the Work schedule, submittal schedule, cost breakdown of major lump sum items, Payment Requests and processing, coordination with the involved utility firms, and emergency telephone numbers for all representatives involved in the course of construction.
- 4.3.3 Minimum attendance by Contractor at any mandatory meeting with City must be (1) Contractor's Representative, who is authorized to execute and sign documents on behalf of the firm, (2) Contractor's on-site Superintendent, and (3) Contractor's Safety Office, or other employee responsible for safety.
- 4.4 **PERFORMANCE OF THE WORK (INCLUDING FIELD MEASUREMENTS, SUBCONTRACTORS, AND SUPPLIERS)**
- 4.4.1 Unless otherwise provided in the Agreement Documents to be the responsibility of City or a separate Contractor, Contractor must provide through itself or Subcontractors the necessary supervision, labor, inspection, testing, start-up, material, equipment, machinery, temporary utilities and other temporary facilities to permit Contractor to complete the Work consistent with the Agreement Documents.
- 4.4.2 Contractor must perform all construction activities efficiently and with the requisite expertise, skill and competence to satisfy the requirements of the Agreement Documents. Contractor must at all times exercise complete and exclusive control over the means, methods, safety, sequences and techniques of construction.
- 4.4.3 Contractor's Superintendent must be present at the Site at all times that material Work

under this Agreement is taking place. Contractor's Superintendent or designee must be present at the Site at all times any other Work under this Agreement is taking place. Superintendent must not be replaced without written notice to City. Whenever the Superintendent is not present at a particular part of the Work where the City or Design Professional may desire to inform the Contractor relative to interpretation of the Drawings and Specifications or to disapproval or rejection of materials or Work performed, the City or Design Professional may provide such information in writing to the foreman or other worker in charge of the particular part of the Work in reference to which the information is given. Information so given will be as binding as if given to the Superintendent.

4.4.4 All elements of the Work must be under the direct supervision of a foreman or his designated representative on the Site who must have the authority to take actions required to properly carry out that particular element of the Work.

4.4.5 Working Hours. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise indicated, all Work at the Site must be performed during regular working hours, and Contractor will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without City's written consent given after prior written notice to City. If it will become absolutely necessary to perform Work at night or on Saturdays, Sundays or legal holidays, the City must be informed at least 24 hours in advance of the beginning of performance of such Work. Only such Work will be done at night as can be done satisfactorily as determined by the City. Good lighting and all other necessary facilities for carrying out and inspecting the Work must be provided and maintained at all points where such Work is being done. Further, unless such non-normal work hours are performed at City's request or required by the Agreement Documents, Contractor must pay to City all additional costs incurred by City by reason of such non-normal working hours. Expenses incurred by City for overtime compensation must be reimbursed by Contractor as follows: (i) City staff at the rate set forth in current City Fee Schedule as published on City website, (ii) Design Professional and staff at the standard hourly rates previously negotiated with City, and (iii) all others at actual cost plus ten percent administrative overhead. Such costs may be deducted by City from any payments due to Contractor. Provided, however, if overtime work or work during other than normal hours is at the request of City and not due to Contractor delay, City will pay the cost of City overtime expenses.

4.4.6 Where the Agreement Documents require that a particular product be installed or applied by an applicator approved by the manufacturer, it is Contractor's responsibility to ensure the Subcontractor employed for such work is approved by the manufacturer. All materials and equipment must be stored, applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier or distributor, except as otherwise provided in the Agreement Documents; but no provisions of any such instructions will be effective to impose on City or Design Professional responsibility for the means, methods, techniques, sequences or procedures of construction or for safety precautions incident thereto.

4.4.7 Before starting the Work, Contractor must carefully study and compare the various Plans, Drawings, other Agreement Documents, and Specifications relative to that portion of the Work, as well as the information furnished by City, must take field measurements of any existing conditions related to that portion of the Work and must observe any conditions at the Site affecting it. The exactness of grades, elevations, dimensions, or locations given on any Drawings, or the Work installed by other contractors, is not guaranteed by City.

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- 4.4.8 Before ordering materials or doing Work, Contractor and each Subcontractor must verify measurements at the Site and will be responsible for the correctness of such measurements. No extra charge or compensation will be allowed because of differences between actual dimensions and the dimensions indicated on the Agreement Documents, including the Drawings.
- 4.4.9 Ground Level Construction Photography.
- 4.4.9.1 The Contractor must furnish progress photographs of the project. The photographer selected by the Contractor must be approved by the City and must be either a commercial photographer or an individual experienced and equipped for such photography.
- 4.4.9.2 The Contractor must deliver to City all photographs taken during that period with each application for payment. If the current photographs do not accompany the application, the application will not be reviewed and will be returned to the Contractor as incomplete.
- 4.4.9.3 Photographs must be identified by use of typewritten labels affixed to the back of the photograph. The label must provide a description of the view, the direction from which the photograph was taken, the name of the project, City's project number, the name of Contractor and the date of the photography. The stationing must also be included for all pipeline installations.
- 4.4.9.4 Photographs must be taken during the construction period and must be of aesthetic composition and depict the progress of the Work from the beginning of construction through and including the finished product. City may vary the specified frequency so that significant progress or changes can be recorded on the photographs.
- 4.4.10 Underground Facilities.
- 4.4.10.1 The existence and number of facilities as shown on the Plans are estimated from information furnished by the particular utility. Contractor is responsible for field verification and location of all utilities prior to the start of construction. No field work will be allowed to start until Contractor has contacted Arizona 811 and all affected utilities have been located. In addition, Contractor must expose and physically locate all potentially conflicting utilities prior to construction. The actual locations of the utilities must be compared to locations shown on the Plans and any required changes in alignment and grade must be made at the time of construction in consultation with Project Manager. It is generally recognized and Contractor should anticipate that information from Arizona 811 or information from utility companies during project design, frequently fails to disclose all underground facilities. The fact that more utility lines or other underground facilities are located in the Project Site than shown on the Project Plans does not constitute an "unforeseen Condition" and such undisclosed underground facilities do not differ materially from the conditions which Contractor should expect. The provisions of Sections 105.4, 105.6, 107.11 and 109.8.1 of the MAG Uniform Standard Specifications for Public Works Construction apply and are incorporated herein by this reference.
- 4.4.10.2 Contractor is responsible for all coordination with utility companies. The provisions of Sections 105.4, 105.6, 107.11 and 109.8.1 of the MAG Uniform Standard Specifications for Public Works Construction strictly apply and no additional compensation will be paid to Contractor for delays due to utility work on the project.
- 4.4.11 Relocation of Existing Water Meters. When a service line has been extended and a line

setter installed in a meter box, City forces will re-install meter. No compression fittings will be utilized.

4.4.12 Water Turn-On or Turn-Off.

4.4.12.1 Contractor must coordinate all water line turn-ons and turn-offs through the City. Application must be made to the Municipal Utility Division and Contractor must pay the established charges. The City will close existing valves, but will not guarantee a bone-dry Shutdown.

4.4.12.2 Contractor must notify all customers affected by the turn-off not less than 48 hours in advance. Notification must be in writing, must give the reason for the turn-off and must give the estimated time and duration that water service will be interrupted. Contractor is also notified that water turn-off will not be permitted on the Day before and after Thanksgiving Day and Christmas Day.

4.4.12.3 No direct payment will be made to Contractor for turn-ons or turn-offs. Costs associated therewith will be included in other items for which direct payment is made.

4.4.13 Tests and Inspections.

4.4.13.1 Contractor must give City timely (at a minimum, twenty-four hours) notice of readiness of the Work for all required inspections, tests or approvals. Contractor must give timely notice to City in advance of backfilling or otherwise covering any part of the Work so that city representative may, if desired, observe such part of the Work before it is concealed. Whenever Contractor varies the normal period during which Work or any portion of it is carried on each Day, Contractor must give timely notice to City so that city representative may, if desired, be present to observe the Work in progress. If Contractor fails to give such timely notice, any Work done in the absence of city representative will be subject to rejection. If Contractor gives such notice to City, but then is not ready for such inspections, tests, approvals or observations at the time so noticed, Contractor must reimburse City for all costs incurred by the attendance of city representatives.

4.4.13.2 If any law, ordinance, rule, regulation, code, or orders of any public body having jurisdiction requires any Work (or part thereof) to be inspected, tested or approved, Contractor (unless another party is specified in the Agreement Documents) must assume full responsibility therefor, pay all costs in connection therewith and furnish City the required certificates of inspection, testing, or approval. Contractor must also be responsible for and must pay all costs in connection with any inspection or testing required by the Specifications in connection with City's acceptance of a manufacturer, fabricator, supplier or distributor of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. The cost of all other inspections, tests and approvals required by the Agreement Documents will be paid by City (unless otherwise specified).

4.4.13.3 All inspections, tests or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction must be performed by organizations acceptable to City and by the Design Professional if so specified.

4.4.13.4 Neither observations by City, the Design Professional nor inspections, tests or approvals by others will relieve Contractor from their obligations to perform the Work in accordance with the Agreement Documents.

General Conditions

- 4.4.14 Uncovering Work. If any Work that is to be observed, inspected, tested or approved is covered without written concurrence of City, it must, if requested by City be uncovered for observation. Unless Contractor has given City timely notice of Contractor's intention to cover such Work and City has not acted with reasonable promptness in response to such notice, Contractor must furnish all necessary labor, material and bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order will be issued.
- 4.4.15 In all cases of interconnection of its Work with existing or other Work, Contractor must verify at the Site all dimensions relating to such existing or other Work. Any errors due to Contractor's failure to so verify all such grades, elevations, locations or dimensions must be promptly rectified by Contractor without any increase in the Agreement Price. Any design errors or omissions noted by Contractor during this review must be reported promptly to City.
- 4.4.16 Contractor must establish and maintain all construction grades, lines, levels, and benchmarks, and will be responsible for accuracy and protection of same. This Work must be performed or supervised by a licensed civil engineer or surveyor in the State of Arizona.
- 4.4.17 Contractor must photograph all buried piping of greater than four (4) inches in diameter prior to backfill.
- 4.4.18 Contractor is responsible for the proper performance of the work of Subcontractors and any acts and omissions in connection with such performance. Nothing in the Agreement Documents is intended or deemed to create any legal or contractual relationship between City and any Subcontractor or Sub-Subcontractor, including but not limited to any third-party beneficiary rights.
- 4.4.19 Contractor must coordinate the activities of all Subcontractors. Contractor must coordinate performance of the Work with City's Public Works & Utilities Department and other departments or agencies within City. The Design Professional and other contractors or parties involved in the Project. If City performs other work on the Project or at the Site with separate contractors under City's control, Contractor agrees to cooperate and coordinate its activities with those of such separate contractors so that the Project can be completed in an orderly and coordinated manner without unreasonable disruption.
- 4.4.20 Contractor will not substitute or change any Subcontractor or Supplier without the prior written approval of City. Any substitute or replacement Subcontractor or Supplier must be required to meet the same qualifications and selection criteria and process as the original Subcontractor or Supplier. If a Subcontract/Supplier selection plan has been approved by City, Contractor will follow that plan unless otherwise approved by City in writing.
- 4.4.21 Contractor must not change or replace any members of its Project team, including Contractor's Representative, Project Manager, or Superintendent, without an explanation for the change being given to City, and receiving prior written approval of the change from City, which approval will not be unreasonably withheld.
- 4.4.22 Subcontractors whose scope of work has a value greater than 15% of the total Agreement Price are required to furnish performance and payment bonds to Contractor, unless

otherwise approved in writing by City.

- 4.4.23 Contractor must comply with MAG Specification § 108.2 (E) unless otherwise specified in Agreement Documents.

4.5 **CONTROL OF THE PROJECT SITE**

- 4.5.1 Throughout all phases of construction, including suspension of Work, Contractor must keep the Site reasonably free from debris, trash and construction wastes to permit Contractor to perform its construction services efficiently, safely and without interfering with the use of adjacent land areas. Prior to Final Acceptance of the Work, or a portion of the Work, Contractor must remove all debris, trash, construction wastes, materials, equipment, machinery and tools arising from the Work or applicable portions thereof to permit City to occupy the Project or a portion of the Project for its intended use.
- 4.5.2 Contractor must take whatever steps, procedures or means necessary to prevent dust nuisance due to construction operations. The dust control measures must be maintained at all times to the satisfaction of City and in accordance with the requirements of the Maricopa County Bureau of Air Pollution Control Rules and Regulations.
- 4.5.3 Contractor must maintain Americans with Disabilities Act (ADA) and American National Standards Institute (ANSI) accessibility requirements during construction activities, including without limitation compliance with the 2010 regulations governing implementation of the ADA to the extent applicable. ADA and ANSI accessibility requirements must include, but not be limited to, parking, building access, areas of refuge, and emergency exit paths of travel. Contractor is responsible for the coordination of all Work to minimize disruption to residents and the public.
- 4.5.4 Only materials and equipment used directly in the Work will be brought to and stored on the Site by Contractor. When equipment is no longer required for Work, it must be removed promptly from the Site. Protection of construction materials and equipment stored at the Site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.
- 4.5.5 Contractor agrees all persons working on the Site must act at all times in the best interest of the Project and will comply with all applicable rules and regulations reasonably set forth by City related to the Site. Notwithstanding the foregoing or anything in this Agreement to the contrary, City may remove from the Site any individual who City deems in their reasonable discretion to be creating a disturbance or causing any problem on the Site.
- 4.5.6 Contractor will be responsible to City for the acts and omissions of Contractor's employees, Subcontractors and their agents and employees, and any other person performing any of the Work under an Agreement with Contractor, or claiming by, through or under Contractor, for all damages, losses, costs and expenses resulting from such acts or omissions.
- 4.5.7 City may conduct criminal, drive history, and all other requested background checks of Contractor and Subcontractor personnel performing Work or who have access to City's information, data, or facilities in accordance with City's current background check policies, or the provisions of the Project Specific Conditions. Any officer, employee or agent that fails to background check must be replaced immediately.
- 4.5.8 City will have a final authority, based upon security reasons: (i) to determine when

security clearance of Contractor's and Subcontractor's personnel is required; (ii) to determine the nature of the security clearance, up to and including fingerprinting personnel; and (iii) to determine whether or not any individual or entity may provide Services or perform Work under the Agreement.

- 4.5.9 If City objects to any personnel for any reasonable cause, then Contractor must, upon notice from City, remove such individual from the Project.

4.6 **PROJECT SAFETY**

- 4.6.1 The Project and all Work performed in relation thereto is governed by applicable provisions of the federal laws, including but not limited to, the latest amendments of the following:

- a. Williams-Steiger Occupational Safety & Health Act of 1970, Public Law, 91-596.
- b. Part 1910 and Part 1926 – Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations.
- c. Part 1518 – Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations.

- 4.6.2 Contractor is responsible for safety of the job Site for employees of Contractor as well as for members of the general public and others who may drive or walk through or be at the Site.

- 4.6.3 Contractor recognizes the importance of performing the Work in a safe manner so as to prevent damage, injury or loss to: (i) all individuals at the Site, whether working or visiting; (ii) the Work, including materials and equipment incorporated into the Work and stored On-Site or Off-Site; and (iii) all other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and (iv) the owners or tenants of adjacent property and their patrons, employees and invitees.

- 4.6.4 Contractor assumes responsibility for implementing and monitoring all safety precautions and programs related to the performance of the Work.

- 4.6.5 Contractor must provide a "competent person" as required by O.S.H.A regulations. The "competent person" must be identified at the Pre-Construction Conference with City advised in writing of any changes.

- 4.6.6 The "competent person" must make routine daily inspections of the Site and must hold weekly safety meetings with Contractor's personnel, Subcontractors and others as applicable.

- 4.6.7 Contractor and Subcontractors must comply with all legal and regulatory requirements relating to safety, as well as any City specific safety requirements set forth in the Agreement Documents, provided that such City-specific requirements do not violate any applicable legal and regulatory requirements.

- 4.6.8 Contractor will immediately report in writing any safety-related injury, loss, damage or accident arising from the Work to Project Manager and, to the extent mandated by Legal Requirements, to all government or quasi-government authorities having jurisdiction over safety-related matters involving the Project or the Work.

- 4.6.9 Contractor's responsibility for safety under this Section is not intended in any way to relieve Subcontractors and Sub-Subcontractors of their own contractual and legal obligations and responsibility for (i) complying with all Legal Requirements, including those related to health and safety matters, and (ii) taking all necessary measures to implement and monitor all safety precautions and programs to guard against injury, losses, damages or accidents resulting from their performance of the Work.
- 4.6.10 As between City and Contractor, Contractor is responsible to City for any and all the safety issues relating to the Work on the Project. Contractor must administer and manage the safety program. This will include, but not necessarily be limited to review of the safety programs of each Subcontractor. Contractor must monitor the establishment and execution of compliance with all applicable regulatory and advisory agency construction safety standards. Contractor's responsibility for review, monitoring, and coordination of the Subcontractor's safety programs will not extend to direct control over execution of the Subcontractors' safety programs. Notwithstanding Contractor's safety obligations to City, it is agreed and understood that each individual Subcontractor will remain controlling employer responsible for the safety programs and precautions applicable to its own work and the activities of other's work in areas designated to be controlled by such Subcontractor for purposes of workers compensation insurance coverage.
- 4.6.11 Nothing in this agreement will relieve Contractor of his responsibility to maintain traffic, structures, etc., as noted on the Plans, Specifications, and Project Specific Conditions. Contractor is responsible to provide all necessary shoring, bracing and trench support as is necessary to maintain traffic structures, etc., as stipulated in the Plans, Specifications, and Special Provisions. If the stability of adjoining building, walls, roadways, etc., is endangered by Contractor's excavation, shoring, bracing, or under pinning must be provided as necessary to ensure project safety. Cost for shoring, bracing, underpinning, and trench support will be included in the appropriate items listed in the Agreement Price, and no additional payment will be made for this work.
- 4.7 **MATERIALS QUALITY, SUBSTITUTIONS, AND SHOP DRAWINGS**
- 4.7.1 **Quality Control and Quality Assurance Testing.**
- 4.7.1.1 All construction materials to be used or incorporated in the Project are subject to inspection, Quality Control & Quality Assurance Testing, and approval or rejection by City. Any material rejected by City must be removed immediately and replaced in an acceptable manner to City at no additional cost to City. When QC/QA tests indicate noncompliance with the Agreement Documents, retesting must be performed by the same testing laboratory that performed the tests that indicated noncompliance.
- 4.7.1.2 The Contractor must establish, provide, and maintain an effective Quality Control Testing Program (QCTP). The Contractor must develop his own program or procure the services of a consultant. In either case, the party performing the tests must be currently certified by the National Bureau of Standards in the National Voluntary Laboratory Accreditation Program (NVLAP) for construction services or the AASHTO Accreditation Plan (AAP) for Soils, Asphalt and Concrete. The Contractor must provide all support necessary to perform QC and QA testing and sampling (i.e. shoring for testing trench backfill, backhoes, motor graders, loaders, etc. to facilitate testing and sampling). The City will perform the QA testing.
- 4.7.1.3 The Contractor must submit a written QCTP to the City as a required submittal. The Contractor must not begin Work until the Quality Control Program has been reviewed and

- accepted by the City. Resumes of all personnel that will be associated directly or indirectly with the QCTP must be included.
- 4.7.1.4 The QCTP must include, but not be limited to, on-site/field and laboratory testing of all material delivered to the Site and any existing materials or conditions pertinent to the project.
- 4.7.1.5 All testing must be under the direction of a Professional Engineer registered in the State of Arizona, knowledgeable in Materials Testing. All "Test Report" forms must be stamped by said Engineer.
- 4.7.1.6 The written QCTP will set forth the responsibilities of the engineer, project manager, supervisory personnel and each technician assigned to this project. Substitutions or replacement of personnel must require prior written approval by the City. All personnel must be proficient within their assigned duties and possess certification(s) commensurate with their position and responsibilities. The minimum certification(s) for each technician must be NICET Level II, Arizona Technical Testing Institute, American Concrete Institute, or other nationally recognized program applicable to the project and approved by the City of Chandler. The written QCTP must include a description of the required field and construction materials laboratory tests, including required frequencies that meet the minimums established herein.
- 4.7.1.7 The Contractor must establish a system to record and report all material test results. The daily test reports must include, but not be limited to:
- a. Test designation;
 - b. Date of test;
 - c. Name of tester;
 - d. Location of test/sample (station and offset);
 - e. Product suppliers and product codes (as applicable);
 - f. Depth/elevation of test/sample;
 - g. Test result;
 - h. Control requirement(s);
 - i. Cause of rejection (if applicable);
 - j. Results of retests (if applicable); and
 - k. Remedial action (if applicable).
- 4.7.1.8 The Contractor must submit test results to the designated City representative.
- 4.7.1.9 The Contractor must also submit a weekly report to the City summarizing the testing and construction activities completed by emailing the report to the email addresses noted above. All weekly reports must be submitted simultaneously to the Contractor and the City of Chandler. The report must include individual summary sheets for each utility line, structure, and portion of the pavement section. Cores must be numbered sequentially throughout the Project. Re-cores must reference the original core by number and must contain the averaged values for thickness and density. Total pavement thickness must be reported. Vertical location of tests for underground utilities must indicate the depth of the

excavation at the location of the test (i.e., cut to flow line [if applicable], depth to bottom or top of pipe, etc.). Density tests must be numbered sequentially. If the minimum number of tests has not been performed per the written QCTP, this must be stated in the weekly summary report with an explanation of the circumstances.

4.7.1.10 The City will maintain a copy of the Project test results and weekly reports in the Project file. In cases where quality control activities do not comply with the Agreement provisions, the City may:

- a. Order the Contractor to replace ineffective or unqualified quality control personnel.
- b. Order the Contractor to stop operations until appropriate corrective action is taken.

4.7.1.11 Although minimum testing requirements are specified herein, the Contractor bears full responsibility for the quality of the materials and their installation and may elect to perform additional testing beyond the requirements set forth herein to ensure compliance.

4.7.1.12 The Quality Control requirements contained in this Section are in addition to and separate from Quality Assurance Testing, which will be performed by the City of Chandler or its representative. If the Quality Assurance test results are not in agreement with the Quality Control test results, the Contractor will have the option to retain a third party consultant for referee tests. The third party consultant must meet the same requirements as the consultant performing the Quality Control Testing. The results of the third party will be binding. All cost incurred by the referee testing will be the Contractor's expense. If the Contractor elects not to retain a third party for referee testing, the City of Chandler test results will prevail.

4.7.1.13 Except as otherwise noted within this Section, Work or materials required by this Section are non-pay items. Per MAG Section 101, a non-pay item is an item of Work for which no separate payment will be made, the cost of which is to be included as an incidental cost for associated item(s) included on the Bid Schedule or Schedule of Values.

4.7.2 Trade Names and Substitutions.

4.7.2.1 Substitutions prior to bid will only be considered if in compliance with Arizona Revised Statute § 34-104.

4.7.2.2 Contractor, if requested by City, must submit Samples or any additional information that may be necessary to evaluate the acceptability of the substitution.

4.7.2.3 City will make the final decision and will notify Contractor in writing as to whether the substitution has been accepted or rejected.

4.7.2.4 If City does not respond within 15 working days, Contractor must continue to perform the Work in accordance with the Agreement Documents and the substitution will be considered rejected.

4.7.3 Shop Drawings.

4.7.3.1 Contractor must prepare and submit Shop Drawings which show details of all Work to insure proper installation of the Work using those materials and equipment specified under the approved Plans and Specifications.

General Conditions

- 4.7.3.2 Contractor must submit a schedule of Shop Drawing submissions, which avoids bulk submissions to the extent reasonably possible, with the Project Schedule for City approval. The schedule of Shop Drawing submissions must include all of the items for which Shop Drawings are required by the Agreement Documents, including the Specifications. Unless otherwise noted, Shop Drawings will not be required for items specified or detailed in the Uniform Standard Specifications and Details or the Technical Specifications.
- 4.7.3.3 Shop Drawings must be numbered consecutively for each Specification section and must accurately and distinctly present the following:
- a. All working and erection dimensions.
 - b. Arrangements and sectional views.
 - c. Necessary details, including complete information for making connections between work under this Agreement and work under other Agreements.
 - d. Kinds of materials and finishes.
 - e. Parts list and description thereof.
- 4.7.3.4 Each Drawing or page must include:
- a. Project Name, City of Chandler Project Number and descriptions.
 - b. Submittal date and space for revision dates.
 - c. Identification of equipment, product or material.
 - d. Name of Contractor and Subcontractor.
 - e. Name of Supplier and Manufacturer.
 - f. Relation to adjacent structure of material.
 - g. Physical dimensions clearly identified.
 - h. ASTM and Federal Specifications references.
 - i. Identification of and justification for deviations from the Agreement Documents.
 - j. Contractor's stamp, initialed or signed, dated and certifying the review of submittal, certification of field measurements and compliance with Agreement.
 - k. Location at which the equipment or materials are to be installed.
- 4.7.3.5 Location will mean both physical location and location relative to other connected or attached material. City will return unchecked any submittal, which does not contain complete data on the Work and full information on related matters.
- 4.7.3.6 Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.
- 4.7.3.7 Contractor must schedule, prepare and submit all Shop Drawings in accordance with a timetable that will allow its suppliers and manufacturers sufficient time to fabricate, manufacture, inspect, test and deliver their respective products to the project Site in a timely manner so as to not delay the complete performance of the Work.

General Conditions

- 4.7.3.8 If the Shop Drawings show departures from the Agreement requirements, Contractor must make specific mention thereof in the Letter of Transmittal; otherwise review of such submittals by City will not constitute review of the departure. Review of the Drawings will constitute review of the specific subject matter for which the Drawings were submitted and not of any other structure, material, equipment, or apparatus shown on the Drawings.
- 4.7.3.9 The review of Shop Drawings will be general and will not relieve Contractor of responsibility for the accuracy of such Drawings, nor for the proper fitting and construction of the Work, nor for the furnishing of materials or Work required by the Agreement. No construction called for by Shop Drawings will be initiated until such Drawings have been reviewed and approved by City.
- 4.7.3.10 The procedure in seeking review of the Shop Drawings will be as follows:
- a. Contractor must submit complete sets of Shop Drawings and other descriptive data as specified in this Section.
 - b. After Contractor's submittal or resubmittal of Shop Drawings, if Contractor has submitted Shop Drawings in accordance with the City-approved submittal schedule, or upon resubmission, City will be provided with three (3) calendar weeks for review. Should City require additional review time above and beyond the three (3) calendar weeks, Contractor may ask for a time extension or monetary compensation, if they can present valid, factual evidence that actual damages were incurred by Contractor. City will determine the amount of the time extension or the monetary compensation to be awarded Contractor, if any, in accordance with City's Policy Statement for Calculating Delays and Damages, Appendix 1.
- 4.7.3.11 Contractor will be responsible for all extra costs incurred by City caused by Contractor's failure to comply with the procedure outline above.
- 4.7.4 Long Lead Time Items. Contractor must submit Shop Drawings, as required by the Engineer, on all long lead items to be furnished and installed as part of the project within 10 Days after the date of the executed Agreement letter issued by City. In addition, Contractor must order all long lead items to be furnished and installed as part of this Project within 3 Days after receiving approved Shop Drawings. For all long lead times for which Shop Drawings are not required, Contractor must order said long lead items within 15 Days after the date of the executed Agreement letter issued by City. Within 2 Days after ordering long lead items, Contractor must supply copies of all purchase orders, along with an accurate delivery schedule from the supplier.
- 4.7.5 Construction Water. If Contractor uses water from City's water system for construction water, Contractor must obtain a fire hydrant meter from City of Chandler Utility Services (480-782-2280) and all construction water must be obtained through the hydrant meter. Contractor must pay all fees related to the hydrant meter and all water bills for construction water. All cost for meters and construction water will be included in the Agreement Price.
- 4.8 **PROJECT RECORD DOCUMENTS**
- 4.8.1 During the construction period, Contractor must maintain at the jobsite a full-size set of prints of the Construction Document Drawings and Shop Drawings for Project Record Document purposes.

- 4.8.2 Contractor must mark these Drawings to indicate the actual installation where the installation varies from the original Construction Documents. Contractor must give particular attention to information on elements that will be concealed, which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
- a. Dimensional changes to the Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Actual equipment locations.
 - f. Changes made by Change Order or Addendum.
 - g. Details not on original Agreement Drawings.
- 4.8.3 Contractor must mark completely and accurately Project Record Drawing sets of Construction Documents.
- 4.8.4 Contractor must mark Project Record Drawings sets with red erasable colored pencil.
- 4.8.5 Contractor must note Request for Information (RFI) Numbers and Change Order numbers, etc., as required to identify the source of the change to the Construction Documents.
- 4.8.6 Contractor must submit Project Record Drawing sets and Shop Drawings to City or its representative for review and comment.
- 4.8.7 Upon receipt of the reviewed Project Record Drawings from City, Contractor must correct any deficiencies and omissions to the Drawings and submit the final original of the Project Record Drawings to City prior to Final Payment.
- 4.8.8 Project Manager will review the Project Record Drawings monthly prior to the date established for the Payment Request and will be the sole judge of acceptance of these Drawings.

4.9 **WARRANTY AND CORRECTION OF DEFECTIVE WORK**

- 4.9.1 Contractor warrants to City that the construction, including all materials and equipment furnished as part of the Work, will be new unless otherwise specified in the Agreement Documents, of good quality, and free of defects in materials and workmanship. Contractor's warranty obligation excludes defects caused by abuse, alterations, or unreasonable failure to maintain the construction by persons other than Contractor, subcontractors, or others under Contractor's control. Nothing in this warranty will limit any manufacturer's warranty which provides City with greater warranty rights than set forth herein or in the Agreement. Contractor will provide City with all manufacturers' warranties and operation and maintenance manuals upon substantial completion of the Work. Contractor's warranty must be for one (1) year, in accordance with MAG Specification § 108.8, and will commence for all portions of the Work upon Final Acceptance of the entire Work as determined by City under the Agreement. All statutory or other warranties, express or implied, related to latent defects will remain in force and are not limited by this provision.
- 4.9.2 City May Stop the Work. If the Work is defective, or Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, City may order Contractor to stop the

Work without cost to City, or any portion thereof, until the cause for such order has been eliminated; however, this right of City to stop the Work will not give rise to any duty on the part of City to exercise this right for the benefit of Contractor or any other party.

4.9.3 Correction or Removal of Defective Work.

4.9.3.1 If required by City, Contractor must promptly, without cost to City and as specified by City, either correct any defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by City, remove it from the Site and replace it with non-defective Work. Contractor must correct any Work which may be displaced in correcting, removing or replacing defective Work. No compensation will be allowed Contractor for such removal, replacement or remedial Work. Contractor must reimburse City for costs incurred by City due to such correction or removal including but not limited to additional expenses for inspection, testing or observation and for repeated reviews by the City or Design Professional.

4.9.3.2 Upon failure on the part of the Contractor to comply within a reasonably prompt time with any written order of City to correct or remove defective Work, City has authority to cause nonconforming materials or rejected Work to be remedied, removed, or replaced at the Contractor's expense and to deduct the costs from any moneys due or to become due the Contractor.

4.9.4 City May Correct Defective Work. If Contractor fails within a reasonable time after written notice of City to proceed to correct defective Work or to remove and replace rejected Work as required by City or if Contractor fails to perform the Work in accordance with the Agreement Documents (including any requirements of the progress schedule), City may, after 7 Days' written notice to Contractor, correct and remedy any such deficiency. To the extent necessary to complete corrective and remedial action, City may exclude Contractor from all or part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site and incorporate in the Work all materials and equipment stored at the Site or for which City has paid Contractor, but which are stored elsewhere. Contractor must allow City, city representatives, agents and employees such access to the Site as may be necessary to enable City to exercise City's rights under this Section. All direct and indirect costs of City in exercising such rights will be charged against Contractor in an amount verified by City representative, and a Change Order will be issued incorporating the necessary revisions in the Agreement Documents and a reduction in the Agreement Price. Such direct and indirect costs will include, in particular but without limitation, compensation for additional professional services required and all costs of repair and replacement of Work or others destroyed or damaged by correction, removal or replacement of Contractor's defective Work. Contractor will not be allowed an extension of the Agreement Time because of any delay in Contractor's performance of the Work attributable to the exercise by City or City's rights hereunder.

4.9.5 Correction or Removal of Unauthorized Work.

4.9.5.1 Any Work done beyond the lines and grades shown on the Drawings or established by the Design Professional or any changes in, additions to, or deductions from the Work done without written authority will be considered as unauthorized and will not be paid for. Work so done may be ordered remedied, removed, or replaced at the Contractor's expense.

4.9.5.2 Upon failure on the part of the Contractor to comply promptly with any order of the City,

City will have authority to cause unauthorized Work to be remedied, removed, or replaced at the Contractor's expense and to deduct the costs from any moneys due or to become due the Contractor.

4.9.6 Correction Period - One Year Guarantee.

4.9.6.1 If, within one year after the date of Final Acceptance, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Agreement Documents, or by any specific provision of the Agreement Documents, any Work is found to be defective, Contractor must promptly, without cost to City and in accordance with City's written instructions, either correct such defective Work, or, if it has been rejected by City, remove it from the Site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, City may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, must be paid by Contractor. Such action by the City will not relieve the Contractor of the guarantees required by this Section or elsewhere in the Agreement Documents.

4.9.6.2 If, in the opinion of the City, defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the City or to prevent interruption of operation of the City, the City will attempt to give the notice required by this Section. If the Contractor cannot be contacted or does not comply with the City's request for correction within a reasonable time as determined by the City, the City may, notwithstanding the provisions of this Section, proceed to make such correction or provide such attention; and the costs of such correction or attention will be charged against the Contractor. Such action by the City will not relieve the Contractor of the guarantees required by this Section or elsewhere in the Agreement Documents.

4.9.6.3 This Section does not in any way limit the guarantee on any items for which a longer guarantee is specified or on any items for which a manufacturer or supplier gives a guarantee for a longer period. The Contractor agrees to act as co-guarantor with such manufacturer or supplier and must furnish the City all appropriate guarantee or warranty certificates upon completion of the Project. No guarantee period, whether provided for in this Section or elsewhere, will in any way limit the liability of Contractor or their sureties or insurers under the indemnity or insurance provisions of these General Conditions and the Project Specific Special Conditions.

4.9.7 Acceptance of Defective Work.

4.9.7.1 If, instead of requiring correction or removal and replacement of defective Work, City may accept Work when in the best interest of the City to do so with appropriate monetary credit from Contractor. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Agreement Documents, including appropriate reduction in the Agreement Price; or, if the acceptance occurs after final payment, an appropriate amount must be paid by Contractor to City.

4.9.7.2 Alternatively, City may require Contractor to furnish at Contractor's expense, a special performance guarantee or other surety prior to acceptance of defective work.

4.9.8 The Warranty period begins on the Final Acceptance date noted in the Certificate of Completion, irrespective of early completion by some Subcontractors of their work.

General Conditions

- 4.9.9 Contractor's warranty obligation must be in accordance with MAG Specifications.
- 4.9.10 Nothing in the warranties contained in the Agreement Documents are intended to limit any manufacturer's warranty which provides City with greater warranty rights than set forth in this Section or the Agreement Documents. Contractor must provide City with all manufacturers' warranties prior to Substantial Completion, if applicable, or Final Acceptance.
- 4.9.11 Contractor agrees that it will be responsible to manage and administer the correction of any Work that is not in conformance with the Agreement Documents during the warranty periods set forth in this Section, or during any longer periods to the extent required by the Agreement Documents. A progress payment, or partial or entire use or occupancy of the Project by City, will not constitute acceptance of Work not in accordance with the Agreement Documents.
- 4.9.12 When notified of a warranty issue, Contractor must respond in writing within 48-hours and must perform warranty Work as soon as material for said repairs are available (as judged solely by City), and in any event Contractor must, take immediate steps to commence and complete correction of nonconforming Work no later than the time period set forth in City's written notification in accordance with the Agreement Documents. This includes the correction, removal or replacement of the nonconforming Work and any damage caused to other parts of the Work affected by the nonconforming Work. If defects develop which are determined by City to be an emergency, City will notify Contractor, via the most expeditious means regarding the nature and condition of the defects. In turn, Contractor must immediately dispatch necessary forces to correct the defect or the emergency condition in accordance with Agreement Documents.
- 4.9.13 The time periods referenced in this Section apply only to Contractor's obligation to correct nonconforming Work and is not intended to constitute a period of limitations for any other rights or remedies that City may have regarding Contractor's other obligations under the Agreement Documents.
- 4.9.14 Without limiting the foregoing or anything in these General Conditions or the Agreement to the contrary, Contractor must obtain and provide to City all warranties for any portion of the Project offered by the manufacturer, installer or provider thereof. City and the user of the facility will have the right to the full value and benefit of all such warranties. Contractor must ensure all such warranties are fully transferrable to facilitate the full value of this Section.
- 4.9.15 Contractor's warranty excludes damages or defects caused by abuse, alterations to the Work not executed by or through Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.
- 4.9.16 In the event of any noncompliance with this entire Section 4, City may require Contractor to stop or suspend the Work in whole or in part.

SECTION 5 - CITY RESPONSIBILITIES**5.1 CITY PROJECT MANAGER AND INSPECTORS**

- 5.1.1 Project Manager is responsible for providing City-supplied information and approvals in a timely manner to assist Contractor to fulfill its obligations under the Agreement Documents.

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- 5.1.2 Project Manager will also provide Contractor with prompt notice when it observes any failure on the part of Contractor to fulfill its contractual obligations, including any default or defect in the Project or non-conformance with the Drawings and Specifications.
- 5.1.3 City may utilize Field Inspectors to assist Project Manager during construction in observing performance of Contractor. City's use of Inspectors is for the purpose of assisting Project Manager.
- 5.1.4 The Inspectors are authorized to inspect all Work and materials furnished. Such inspections may extend to all or part of the Work and to preparation, fabrication or manufacture of the materials to be used. The Inspectors have the authority to issue instructions contrary to the Construction Documents if approved and coordinated with the directions of Project Manager.
- 5.1.5 The Inspectors have the authority to reject work or materials until any questions at issue can be decided by Project Manager.
- 5.1.6 The use of Inspectors by City will not make City responsible for or give City control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs or responsibility for Contractor's failure to perform the Work in accordance with Agreement Documents. The Inspectors are not authorized to direct any of Contractor's activities, employees or Subcontractors.
- 5.2 **DESIGN PROFESSIONAL SERVICES**
City may contract separately with one or more Design Professionals to provide construction administration of the Project. The Design Professional's Agreement, as well as other firms hired by City may be furnished to Contractor. Contractor does not have the right to limit or restrict or reject any Agreement modifications that are mutually acceptable to City and Design Professional.
- 5.3 **CITY'S SEPARATE CONTRACTORS**
City is responsible for all work performed on the Project or at the Site by separate contractors retained by City. City will contractually require its separate contractors to reasonably cooperate with, and reasonably coordinate their activities so as not to interfere with Contractor in order to enable Contractor to timely complete the Work consistent with the Agreement Documents. Contractor must immediately notify the Project manager, and address the matter in the next monthly status report, if any activities of such separate contractors are expected to interfere, or are interfering, with Contractor and such interference will or could result in any delay in Contractor's performance of the Work.
- 5.4 **PERMIT REVIEW AND INSPECTIONS**
- 5.4.1 If requested by Contractor, Project Manager will provide assistance and guidance in obtaining necessary reviews, permits and inspections.
- 5.4.2 The regulating agencies of City, such as Development and Sustainability, Fire and Planning Departments, enforce legal requirements. The enforcement activities of City are independent and separate from this Agreement.
- 5.5 **PLANS AND SPECIFICATIONS TO THE CONTRACTOR**
Contractor will be provided up to five copies of the Agreement Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished,

upon request, at the cost of reproduction.

SECTION 6 - AGREEMENT TIME

6.1 AGREEMENT TIME

- 6.1.1 The Agreement Time will start with the Notice to Proceed ("NTP") and end with Final Acceptance.
- 6.1.2 Beginning on the date of the NTP, Contractor must begin to fulfill Contractor's obligations under the Agreement. Contractor's obligations include providing City and other agencies with any submittals required by the Project Specific Special Provisions, including but not limited to, an approved Project Schedule, Traffic Control Plans, and a Stormwater Pollution Prevention Plan. Contractor must submit all such required submittals before any physical construction work commences on the Site. NTP does not authorize construction work until all agreement insurance, bonds, and schedules are submitted to and accepted by the City.
- 6.1.3 The Agreement Time will be as set forth in the Project Schedule. Contractor agrees that it will commence performance of the Work and complete the Project through both Substantial Completion and Final Acceptance within the Agreement Time.
- 6.1.4 Time is of the essence of this Agreement, for the Project, for the Work, and for each phase and designated Milestone thereof.
- 6.1.5 Failure of Contractor to perform any covenant or condition contained in the Agreement Documents within the time periods specified herein, will constitute a material breach of this Agreement entitling City to terminate the Agreement unless Contractor applies for and receives an extension of time, in accordance with the procedures set forth in the Agreement Documents.
- 6.1.6 Failure of City to insist upon the performance of any covenant or condition within the time periods specified herein, will not constitute a waiver of Contractor's duty to perform every other covenant or condition within the designated periods, unless a specific waiver is granted in writing for each such covenant or condition.
- 6.1.7 City's agreement to waive a specific time provision or to extend the time for performance will not constitute a waiver of any other time provisions contained in the Agreement Documents. Failure of Contractor to complete performance promptly within the additional time authorized in the waiver or extension of time agreement constitutes a material breach of this Agreement entitling City to all the remedies set forth herein or provided by law.

6.2 PROJECT SCHEDULE

- 6.2.1 The Project Schedule must be in Microsoft Project standard file format, must be updated and maintained throughout the Agreement Time, and must contain the following:
 - 6.2.1.1 Detailed representation of all activities for the project, both on-site construction and major procurement. All significant activities together with the resource loading requirements for each and all items appearing on the schedule of values or bid schedule for progress payments must be shown on the Project Schedule or in attached transmittal letter as described in Section 6.2.8.

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- 6.2.1.2 Dependencies between activities must be indicated so that it may establish as to the effect the progress of any one activity would have on other activities and on the Schedule.
- 6.2.1.3 Activities for submission, review, and approval of all required submittals.
- 6.2.1.4 An amount of time will be established prior to the final completion date for “punch list and cleanup”. No other activities will be scheduled during this period. Punch list and cleanup must be shown on the Project Schedule and must be entirely completed prior to the expiration of the Agreement Time.
- 6.2.2 Within 10 Days of receipt of City’s comments, Contractor must make all required corrections, adjustments, and additions to complete the Project Schedule and resubmit to City for review. City’s review of and response to the Project Schedule is for the purpose of: (1) City planning and staffing for the Project as may be required from time to time; (2) ensuring Contractor’s general conformance with the scheduling requirements of the Agreement Documents and completion of the Project within the Agreement Time; and (3) monitoring and evaluating the construction status for purposes of approving monthly progress payments. Acceptance of a submitted schedule by City should in no way be construed as an affirmation or admission that the schedule is reasonable or workable by Contractor. The responsibility for completing the Work on the Project within the Agreement Time remains the obligation of Contractor. City’s review does not relieve Contractor from compliance with the requirements of the Agreement Documents or be construed as relieving Contractor of its complete and exclusive control over the means, methods, sequences and techniques for executing the work.
- 6.2.3 The Project Schedule must show milestones, including milestones for City-furnished information, and must include activities for City-furnished material and construction by other contractors when those activities are interrelated with Contractor activities.
- 6.2.4 The Project Schedule must be revised as required by conditions and progress of the Work, but such revisions do not relieve Contractor of its obligations to complete the Work within the Agreement Time, as adjusted in accordance with the Agreement Documents. No modification to the Agreement Documents or the Agreement Time will be effective unless approved in advance by City.
- 6.2.5 For all items of materials and equipment that are critical or may require long lead times to acquire, the Project Schedule must show dates for submission, review and approval of submittals, ordering, and delivery.
- 6.2.6 An updated Project Schedule must be submitted monthly to City as part of the Payment Request. The monthly submittal must include one full size plot of the entire schedule and one electronic copy containing the schedule in Microsoft Project standard file format. In addition, Contractor must, upon request by City, provide a copy of all submitted schedule data in electronic format which must be clearly labeled with the Project description, scheduling program name and version number, and schedule print/data date.
- 6.2.7 Contractor must provide City with a monthly status report with each Project Schedule detailing the progress of the Work, including: (i) if the Work is proceeding according to schedule, (ii) any discrepancies, conflicts, or ambiguities found to exist in the Agreement Documents that require resolution, and (iii) other information detailing items that require resolution so as not to jeopardize the ability to complete the Work in the Agreement Time.

- 6.2.8 With each Project Schedule submittal, Contractor must include a transmittal letter including the following:
- a. Description of problem tasks, referenced to field instructions or requests for information (RFI's), as appropriate.
 - b. Current and anticipated delays including:
 - (i) Cause of the delay.
 - (ii) Corrective action and schedule adjustments to correct the delay.
 - (iii) Known or potential impacts and their delay on other activities, milestones, and their impact on the Substantial Completion and Final Acceptance dates.
 - (iv) Changes in construction sequence.
 - c. Pending items and status thereof including but not limited to:
 - (i) Time Extension requests;
 - (ii) Substantial Completion date status;
 - (iii) Final Acceptance date status.
 - d. If ahead of schedule, the number of calendar Days ahead.
 - e. If behind schedule, the number of calendar Days behind.
 - f. Other Project or scheduling concerns.
- 6.2.9 Critical Path Method (CPM).
- 6.2.9.1 Unless otherwise specified in the Agreement, the Project Schedule must include a Critical Path Method (CPM) diagram schedule showing the sequence of activities, the interdependence of each activity and identifies the Critical Path.
- 6.2.9.2 The CPM diagram schedule must be in calendar Days and indicate duration, earliest and latest start and finish dates for all activities, and total Float Times for all activities except critical activities. The CPM diagram must be presented in a time scaled graphical format for the Project as a whole.
- 6.2.9.3 The CPM diagram schedule must indicate all relationships between activities.
- 6.2.9.4 The activities making the Project Schedule must contain sufficient detail to assure that adequate planning has been done for proper execution of the Work and such that it provides an appropriate basis for monitoring and evaluation the progress of the Work. Individual activities must not exceed 30 Days in length, in most cases.
- 6.2.9.5 The CPM diagram schedule must be based upon activities, which coincide with the Schedule of Values.
- 6.2.9.6 The CPM diagram schedule must show all submittals associated with each work activity and the review time for each submittal.
- 6.2.10 Float Time.
- 6.2.10.1 The total Float Time within the overall schedule is for the exclusive use of City, but City may approve Contractor's use of Float as needed to meet Agreement Milestones and

the Project completion date.

- 6.2.10.2 Contractor will not be allowed to sequence, hide, or reallocate Float Time through such strategies, as extending activity duration estimates to consume available Float, using preferential logic, or using extensive crew/resource sequencing, etc. No time extensions will be granted nor delay damages paid until a delay occurs which extends the Work beyond the Agreement Time.
- 6.2.11 City-Caused Delays. City-caused delays on the Project, if any, may be offset by City-caused time savings (i.e., Critical Path submittals returned in less time than allowed by the Agreement, approval of substitution requests and credit changes which result in savings of time to Contractor, etc.) In such an event, Contractor will not be entitled to receive a time extension or delay damages until all City-caused time savings are exceeded and the Agreement Time is also exceeded.
- 6.2.12 Rain-Related Delays. Contractor is required, in preparing the Project Schedule to take into account all relevant weather conditions, including normal rainfall and distribution. No additional compensation will be given for any rain-related delays or impacts on the Work or the Project Schedule. No time extension will be granted in the Project Schedule unless the rainfall during the construction of Work is unusually severe, was not reasonably anticipated, and the total rainfall was significantly in excess of the normal rainfall for the Project Site location. Normal rainfall for the Project will be determined from the 10-year average rainfall for the Site as measured by the National Oceanic and Atmospheric Administration or comparable source of reliable information for rainfall in Chandler, Arizona. In addition, the excessive rainfall must have actually impacted Work activities on the Critical Path and caused delay beyond any remaining Float at the time of the rain-caused delay. The burden of documenting normal rainfall, the excessive rainfall and the impact on Critical Path activities is on Contractor. All other provisions in the Agreement Documents relating to claims, including without limitation notice requirements, apply to any claim by Contractor for a rain delay.
- 6.2.13 City's "Policy Statement for Calculating Delays and Damages," Appendix 1 to these General Conditions, will apply to all claims of delay and delay damages.
- 6.2.14 Force Majeure. If Contractor is delayed or prevented from the performance of any Work required under this Agreement by reason of acts of God or other causes beyond the control and without fault of Contractor (financial inability excepted), performance of that Work will be excused, but only for the period of the delay. The time for performance of the Work will be extended for a period equivalent to the period of delay. In addition, the parties agree if Contractor's delayed or suspended performance directly arises out of or directly results from the COVID-19 pandemic, Contractor's delayed or suspended performance may be excused as set forth in this clause. Provided, however; Contractor must give the City written notice within 30 days of the occurrence of the event giving rise to COVID-19 pandemic related delayed or suspended performance. For COVID-19 pandemic related delay or suspended performance, the parties must agree in writing to the length of the excused delay or suspended performance. Further, Contractor must obtain the City's written approval to use any allowance established as part of the project for delays and costs related to the COVID-19 pandemic.

6.3 **SUBSTANTIAL COMPLETION**

- 6.3.1 When Contractor considers that the Work, phase or a portion thereof, which City agrees in

writing to accept separately, is substantially complete, City will prepare and submit to Contractor a comprehensive Punch List of items to be completed or corrected prior to Final Acceptance and Final Payment. Failure to include an item on such Punch List does not alter the responsibility of Contractor to complete all Work in accordance with the Agreement Documents.

6.3.2 Upon receipt of Contractor's Punch List, Project Manager will make an inspection to determine whether the Work or designated portion thereof is substantially complete. Project Manager may, at Project Manager's sole option, be assisted in such inspection by the Design Professional for the Project. If the inspection by the Project Manager discloses any item, whether or not included on Contractor's Punch List, which is not sufficiently completed in accordance with the Agreement Documents so that City can occupy or utilize the Work, phase or designated portion thereof for its intended use, Contractor must, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by Project Manager. In such case, Contractor must then submit a request for another inspection by Project Manager to determine Substantial Completion.

6.3.3 Certificate of Substantial Completion.

6.3.3.1 The Project Manager will not issue a Certificate of Substantial Completion unless and until the Work (or separable units or Phases as provided in the Agreement Documents) is essentially and satisfactorily complete in accordance with the Agreement Documents, such that the Project is ready for use by City for its intended purpose, opening to the general public, full occupancy or use by City (including, without limitation, all separate units, or rooms, facilities, access, income-generating areas, and all areas serving the general public, as applicable, must be ready for full-operation without material inconvenience or discomfort), including, to the extent applicable to the Work, the following: all materials, equipment, systems, controls, features, facilities, accessories and similar elements are installed in the proper manner and in operating condition, inspected and approved; surfaces have been painted; masonry and concrete cleaned with any sealer or other finish applied; utilities and systems connected and functioning; site work complete; permanent heating, ventilation, air condition, vertical transportation and other systems properly operating with proper controls; lighting and electrical systems installed, operable and controlled; paving completed, signage installed, and other Work as applicable, has been performed to a similar state of essential and satisfactory completion. A minor amount of Work, as determined by and at the discretion of the Project Manager, such as installation of minor accessories or items, a minor amount of painting, minor replacement of defective work, minor adjustment of controls or sound systems, or completion or correction of minor exterior work that cannot be completed as a result of weather conditions, will not delay determination of Substantial Completion. If prior written approval is obtained from City for purposes of Substantial Completion, specified areas of the entire Work or Project may be individually certified as Substantially Complete. In no event will Substantial Completion be deemed to have occurred unless and until: (i) a temporary certificate of occupancy has been issued by the appropriate Governmental Authorities (as applicable) and (ii) all terms and Work required under this Agreement have been fulfilled by Contractor and same will have also been approved and accepted by City, subject only to the Punch List items.

6.3.3.2 If requested by City, Contractor must complete and turn-over to City the Project on a phased basis. Each phase will have a separate inspection by the Project Manager, a Punch List generated, and then an inspection by City with final approval and acceptance only after the

Project Manager's Punch List.

6.4 **PARTIAL UTILIZATION**

6.4.1 City at City's option may use and occupy any substantially completed parts of the Work which has specifically been identified in the Agreement Documents, or which City, the Design Professional and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by City for its intended purpose, without significant interference with Contractor's performance of the remainder of the Work, provided, however, if the portion of the Work to be used or occupied has not been found to be substantially complete, City must do so in accordance with Section 6.3 prior to such occupancy.

6.4.2 In lieu of the issuance of a Certificate of Substantial Completion as to part of the Work, City may take over operation of a facility constituting part of the Work whether or not it is substantially complete if such facility is functionally and separately usable; provided that prior to any such takeover, City and Contractor agree in writing as to the division of responsibilities between City and Contractor for security, operation, safety, maintenance, correction period, heat, utilities and insurance with respect to such facility.

6.4.3 Substantial Completion of or City's beneficial occupancy of a part of the Project will not alter the fact that the one-year warranty for the whole Project starts at the date of Final Completion of the whole Project.

6.5 **FINAL ACCEPTANCE**

6.5.1 Unless otherwise expressly agreed to in writing by City, Final Acceptance must be obtained by no later than 30 Days (60 Days for federally funded agreements) after the date of Substantial Completion. Failure to timely obtain Final Acceptance will be a material breach of the Agreement.

6.5.2 Upon receipt of written notice that the Work is ready for final inspection and acceptance, City and Contractor will jointly inspect to verify that the remaining items of Work have been completed. There will be no partial acceptance. Final Acceptance will not occur until all items of Work, including Punch List Items, have been completed to City's satisfaction as reflected in the written Final Acceptance.

6.5.3 Final Payment will not be due, owing, or paid by City until Final Acceptance is issued.

6.5.4 Landscape Establishment Period. Unless otherwise expressly agreed to in writing by City, the Landscape Establishment Period will begin on the date of Final Acceptance of the Project and will run 90 Calendar Days thereafter. Landscape Establishment Period requirements are detailed in General Conditions Appendices, attached herein.

6.6 **CONTINUATION OF WORK**

6.6.1 Permitting Contractor to continue and finish the Work or any part of it after the time fixed for its completion (whether milestone, phase, Substantial Completion or Final Acceptance) or after the date to which the time fixed for any completion may have been extended, does not operate as a waiver by City of any rights under the Agreement Documents, law or equity.

6.6.2 Furthermore, the timely completion of the Work being of the utmost importance under this Agreement, notwithstanding the existence of one or more disputes between the parties

concerning the scope of the Work, the Project Schedule, Agreement Time, payments or any other matter, and further notwithstanding a party's invocation of the Dispute Resolution provisions specified in Appendix 6 of these General Conditions, unless City suspends the Agreement or Contractor's performance pursuant to Section 10 of these General Conditions, Contractor will continue to prosecute the Work, including any Change Order work or Extra Work Orders, in a diligent and timely manner and not stop, slow down or impede by action or inaction the progress of the Work, including commencing performance of and thereafter completing any additional work called out in any Change Order or Extra Work Order issued by Project Manager with the approval of City, so long as City makes payment to Contractor in accordance with Section 8 of these General Conditions.

SECTION 7 - AGREEMENT PRICE

7.1 UNIT PRICE AGREEMENTS

- 7.1.1 The Agreement Price for all Unit Price Agreements will be the amount set forth in the Agreement or Change Order multiplied by the verified quantity provided.
- 7.1.2 Measurements of quantities to determine the total Agreement Price must be in accordance with MAG Specification §§ 109.1 and 109.2.
- 7.1.3 The Unit Price may only be changed as set forth in Section 9 below.

7.2 CHANGE ORDERS

- 7.2.1 Unit Price Change Orders. The Change Order Price for all Unit Price Change Orders will be the amount set forth in the Change Order multiplied by the verified quantity provided.
- 7.2.2 Measurements of quantities to determine the total Change Order Price must be in accordance with MAG Specifications §§ 109.1 and 109.2.
- 7.2.3 The Unit Price may only be changed as set forth in Section 9 below.
- 7.2.4 MAG Specification § 109.4.1 is modified as follows: Before § 109.4.1, the following is added: Any deduction or increase in the Agreement Price must be supported by a signed, written Change Order fully executed by City, and supported by such backup as the Project Manager may require.

7.3 SALES TAX

Contractor is required to pay all applicable sales tax in accordance with the law of the state of Arizona and this cost must be included in all Agreement Prices. When equipment, materials or supplies generally taxable to Contractor are eligible for a tax exemption due to the nature of the Project, Contractor must assist City in applying for and obtaining such tax credits and exemptions which will be paid or credited to City.

SECTION 8 - PAYMENT

8.1 PAYMENT FOR CONSTRUCTION SERVICES

- 8.1.1 Payment for the Work will be made in accordance with MAG Standard Specification § 109 as amended below.
- 8.1.2 Contractor must submit to City for review a completed Contractor Payment Request signed

by Contractor, covering the Work completed as of the date of the Request and accompanied by such supporting documentation as is required by the Agreement Documents and also as City may reasonably require. A Contractor Payment Request will not be considered complete unless it is accompanied by an updated Project Schedule and a certification that the on-site, red lined, as built Drawings are up to date. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably, securely stored at the Site or at another location (such as a bonded warehouse) agreed to in writing, the Contractor Payment Request must also be accompanied by such data, satisfactory to City, as will establish City's title to the material and equipment and protect City's interest therein, including applicable insurance. Each subsequent Contractor Payment Request must include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of Contractor's obligations reflected in prior Contractor Payment Requests.

- 8.1.3 Except for Work performed under a JOC Agreement, the Contracting Agency will retain 10 percent of all estimates as a guarantee for complete performance of the Agreement in accordance with Arizona Revised Statutes Section 34-221 or 34-607. The Contractor may elect to deposit securities in lieu of retention in accordance with Arizona Revised Statutes Section 34-221, Paragraph C.5. or 34-607, Paragraph B.5. See Appendix 11 for City's standard form Construction Escrow Agreement, which must be fully executed prior to depositing funds into escrow account.
- 8.1.4 The payment process functions as follows: Prior to the payment cycle date, Contractor must send a draft Contractor Payment Request to Project Manager. The Project Team will review the Request and agree upon any necessary adjustments. Contractor must certify the final Request by signing and returning to Project Manager.
- 8.1.5 When construction of the Project is fifty percent (50%) completed, Contractor may request payment of one-half of the retention pursuant to A.R.S. § 34-609(B)(3), subject to all of City's rights to withhold or offset payments, and other rights of City, under the Agreement.
- 8.1.6 City reserves the right under A.R.S. § 34-609(B)(3) to reinstate the ten percent (10%) retention if City determines that satisfactory progress is not being made.
- 8.1.7 Contractor's Warranty of Title.
- 8.1.7.1 Contractor warrants and guarantees that title to all Work, materials and equipment covered by any Contractor Payment Request, whether incorporated in the Project or not, will pass to City at the time of payment, free and clear of all liens, claims, security interests, and encumbrances, provided that this will not preclude the Contractor from installing metering devices or other equipment of utility companies or municipalities, the title of which is commonly retained by the utility company or municipality.
- 8.1.7.2 No materials, supplies, or equipment for the Work under this Agreement will be purchased subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest therein, or any part thereof, is retained by the seller or supplier.
- 8.1.7.3 Nothing contained in this Section will defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection, or any right under any law permitting such persons to look to funds due the Contractor in the hands of the City. The provisions of this Section must be inserted in all subcontracts and material agreements, and notices of its provision must be given to all persons furnishing materials

for the Work when no formal agreement is entered into for such materials.

8.2 PAYMENT UPON SUBSTANTIAL COMPLETION

8.2.1 No payment will be made upon Substantial Completion, except for a regularly-scheduled monthly progress payment, as allowed by Section 8.2.2.

8.2.2 No further payments will be made to Contractor until Final Acceptance.

8.3 FINAL PAYMENT

8.3.1 Subject to all of City's rights to withhold or offset payment, and other rights under the Agreement, Final Payment including remaining retainage will be paid only after:

- a. Work has been fully completed (including completion of all incorrect or incomplete work items) and the written Final Acceptance has been issued by City;
- b. Necessary operating manuals, any excess materials and supplies necessary for matching materials and supplies incorporated into the Work, acceptable sewer video results (if applicable), and complete "as-built" Drawings (including the Building Information Model, if required by the Agreement Documents) have been delivered to City, as specified in this Section 8.3;
- c. Full and unconditional lien waivers and releases by Contractor and any person performing labor or supplying material, machinery, fixtures, or tools for the Work have been delivered to Contractor;
- d. All conditions and requirements imposed by City or any financing entity for the corresponding disbursement have been met; and
- e. Contractor delivers to City a Contractor Payment Request requesting Final Payment.

8.3.2 Contractor must also submit a signed copy of Contractor's Affidavit Regarding Settlement of Claims, Appendix 3 to these General Conditions, and Certificate of Completion, Appendix 7 to these General Conditions, prior to Final Payment.

8.3.3 In addition, if required under the Project Specific Special Provisions, Contractor must compile a complete equipment list and maintenance manual to be submitted to City as a precondition to Final Payment. The list must include the following items for all equipment supplied under the Plumbing, Electrical, Air Conditioning, Elevator, and other Special Equipment Specifications:

- a. Name, Model and Manufacturer.
- b. Complete parts lists and Drawings.
- c. Local source of supply for replacement parts along with suppliers' telephone numbers.
- d. Local service organizations serving the equipment and their telephone numbers.
- e. All tags, inspection slips, instruction packages, etc., removed from equipment must be properly identified as to pieces of equipment from

which they were taken.

- 8.3.4 Contractor must also deliver to City, prior to Final Payment, one (1) digital (in the format specified by City), and if requested by City, one (1) hard copy, of any applicable Maintenance manuals. Each manual must include all manufacturer's operation and maintenance instructions and "as-built" Drawings with the list herein specified. It must also include all other diagrams and instructions necessary to properly operate and maintain the equipment, the name, address and telephone number of Contractor and all Subcontractors involved.

8.4 **CITY'S RIGHT TO WITHHOLD PAYMENT**

City may withhold payment to such extent as may be necessary in City's opinion to protect City from loss for which Contractor is responsible, including, without limitation, if any of the following conditions exist:

- a. Defective Work not remedied;
- b. Third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to City is provided by Contractor;
- c. Failure of Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Agreement Price;
- e. Damage to City or another Contractor;
- f. Reasonable evidence that the Work will not be completed within the Agreement Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- g. Failure to carry out the Work in accordance with the Agreement Documents;
or
- h. Contractor is in default of any of its other obligations under the Agreement Documents.

8.5 **JOINT/DIRECT CHECKS**

To promote the timely completion and progress of the Work or when appropriate and necessary, payments to Contractor may be made jointly to Contractor and its employees, agents, Subcontractors and suppliers, or any of them. For federally funded agreements, see federal provisions for additional requirements for the joint check process.

8.6 **PAYMENT NOT A WAIVER**

No payment (nor use or occupancy of the Project by City) will be deemed acceptance or approval of the Work or as a waiver of any claims, rights, or remedies of City.

8.7 **LIENS AND BOND CLAIMS**

Contractor must make all payments, in the time required, of all labor and materials furnished to Contractor in the course of the Work and must promptly furnish evidence of such payments as City may require. Contractor must pay when due all claims arising out of performance of the Work covered by this Agreement for which a lien may be filed either against the real estate or leasehold interest of City, or against payments due from City to Contractor, or for which a claim may be made against any payment or performance bond

or both. To the fullest extent permitted by law, Contractor agrees that no liens or other claims in the nature of a lien against the real estate, leasehold, or other interest of City, against payment due from City to Contractor, or against any payment or performance bond, must be filed or made in connection with the Work by any party who has supplied professional services, labor, materials, machinery, fixtures, tools, or equipment used in or in connection with the performance of this Agreement, and Contractor agrees to remove or to cause to be removed any such liens or claims in the nature of a lien or bond claim within 10 Days upon receiving notice or obtaining actual knowledge of the existence of such liens or claim. In addition, Contractor agrees to defend, indemnify, and hold harmless City from and against any and all such liens and claims. This paragraph does not apply to claims and liens of Contractor due to non-payment for work performed.

8.8 FINANCIAL RECORDKEEPING AND CITY'S AUDIT RIGHT

8.8.1 Records for all Agreements between City and Contractor must, upon reasonable notice, be open to inspection and subject to audit, scanning, and reproduction during normal business working hours. Such audits may be performed by any City's representative or any outside representative engaged by City for the purpose of examining such records. City or its designee may conduct such audits or inspections throughout the term of this Agreement and for a period of five years after Final Payment or longer if required by law. City's representatives may (without limitation) conduct verifications such as counting employees at the Site, witnessing the distribution of payroll, verifying information and amounts through interviews and written confirmations with Contractor employees, field and agency labor, Subcontractors, and vendors.

8.8.2 Contractor's "records" must include any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, recordings, agreements, purchase orders, leases, contracts, commitments, arrangements, notes daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in City's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Agreement Document. Such records must include (hard copy, as well as computer readable data if it can be made available), written policies and procedures; time sheets; payroll registers; payroll records; cancelled payroll checks; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, negotiation notes, etc.); original bid estimates; estimating work sheets; correspondence; Change Order files (including documentation covering negotiated settlements); back-charge logs and supporting documentation; invoices and related payment documentation; general ledger, information detailing cash and trade discounts earned, insurance rebates and dividends; and any other Contractor records which may have a bearing on matters of interest to City or the Project in connection with Contractor's dealings with City or the Project (all foregoing hereinafter referred to as "records") to the extent necessary to adequately permit evaluation and verification of any or all of the following:

- a. Compliance with Agreement requirements for deliverables;
- b. Compliance with approved Plans and Specifications;
- c. Compliance with § 14.9 below;
- d. Compliance with Agreement provisions regarding the pricing of Change Orders;

- e. Accuracy of Contractor representations regarding the pricing of invoices; or
- f. Accuracy of Contractor representations related to claims submitted by Contractor or any of their employees.

- 8.8.3 Contractor must require all payees (examples of payees include Subcontractors, Suppliers, Insurance Carriers, etc.) to comply with the provisions of this Section by including the requirements hereof in a written agreement between Contractor and payee. Contractor will ensure that all payees (including those entering into lump sum agreements) have the same right to audit provisions contained in this Agreement included in their agreements with Contractor.
- 8.8.4 City's authorized representative(s) (including, without limitation, Project Manager) must have reasonable access to Contractor's facilities, must be allowed to interview all current or former employees to discuss matters pertinent to the performance of this Agreement and must be provided adequate and appropriate work space, in order to conduct audits in compliance with this Section.
- 8.8.5 If an audit inspection or examination in accordance with this Section, discloses overpricing or overcharges to City (of any nature) by Contractor or Contractor's Subcontractors in excess of \$100,000 in addition to making adjustments for the overcharges, the reasonable actual cost of City's audit must be reimbursed to City by Contractor. Any adjustments or payments which must be made as a result of any such audit or inspection of Contractor's invoices or records must be made within a reasonable amount of time (not to exceed 90 Days) from presentation of City's findings to Contractor.
- 8.8.6 In addition to the normal paperwork documentation Contractor typically furnishes to City, Contractor agrees to furnish, upon written request from City, any of the documentation necessary for City to exercise its audit rights under this Section 8.8 in computer readable file formats (Word, Excel, or .pdf), as City may designate.
- 8.8.7 City, its authorized representative, and the appropriate agency, reserve the right to audit Contractor's records in compliance with local, state or federal policies, statutes or at City's discretion, within three (3) years of Final Acceptance of the Work.

SECTION 9 - CHANGES TO THE AGREEMENT

9.1 FIELD ORDERS

City may authorize minor changes in the Work not involving an adjustment in the Agreement Price or the Agreement Times, which are consistent with the overall intent of the Agreement Documents. These may be accomplished by a written Field Order on the standard form approved and executed by City. Such Field Orders must be binding and Contractor must perform the change promptly. If Contractor believes that a Field Order justifies an increase in the Agreement Price or Agreement Time, Contractor may make a claim therefor as provided in Section 7.2.

9.2 EXTRA WORK/CHANGES IN THE WORK

- 9.2.1 City reserves the right to make such changes in the Plans and Specifications for the Work, as it may deem appropriate and any such change as set forth in a written Change Order must be deemed a part of this Agreement as if originally incorporated herein.
- 9.2.2 In the event City and Contractor cannot agree on the terms of a Change Order, or

when circumstances otherwise require, the Project Manager has the authority to direct the Contractor to perform extra work, if the work in question is an item not provided for in the Agreement as awarded. The Project Manager will have the authority to determine, based upon factual evidence presented by the Contractor, whether the work in question is an item not provided for in the Agreement as awarded. If the Project Manager directs the Contractor to perform extra work, the Project Manager's instructions will include a price that the Contractor cannot exceed in charging the City for the extra work. Upon receipt of the Project Manager's directions to perform extra work, the Contractor must promptly proceed with the extra work and document the actual cost thereof. Contractor's right to payment for extra work will be determined under Subsection 9.2.4 below. The Contractor is responsible to manage the extra work to ensure that the price limits set by the Project Manager are not exceeded. Contractor must perform the extra work and submit documentation for the actual cost of the extra work to the City. A Change Order will be issued to cover this work.

9.2.3 Contractor will not be entitled to payment for extra work unless a written Change Order, in form and content prescribed by City, has been executed by City. On all requests for Change Orders, Contractor must specify the increased or decreased costs and whether it believes any extensions of time will be necessary to complete its Work as modified by the Change Order. If extra work is performed under Subsection 9.2.2 above, a corresponding Change Order will be prepared, approved and processed by City before payment can be made to Contractor.

9.2.4 In general, pricing for Change Orders will include the same mark-up percentages that were in effect when the Agreement was awarded. The cost or credit to the City resulting from a change in the Work is subject to Appendix 1 (Policy Statement for Calculating Delays and Damages) and will be determined, based on the type of pricing for the Agreement involved, as follows:

- a. By mutual acceptance of a lump sum properly itemized in a form acceptable to City;
- b. By unit prices stated in the Agreement Documents;
- c. When the City determines that a Unit Price Book Job Order associated with a Job Order Agreement requires a Change Order, by using the same Total Cost Data and CCI that are in effect when the Change Order is anticipated to be issued; or
- d. By actual cost and a percentage fee covering overhead and profit, as follows:
 - (i) Contractor will perform the extra work and be compensated for actual cost of labor, materials and equipment.
 - (ii) Contractor will have the right to add the fee percentage applicable to the Work under the Agreement, or if no such fee has been agreed to by the parties, not more than five percent (5%) to the Subcontractor's prices for authorized extra work performed solely by Subcontractors. Such percentage will include all of Contractor's charges for overhead, profit, administration and supervision.
 - (iii) Contractor or Subcontractor will have the right to add the fee percentage applicable to Work under the Agreement for self-performed extra work, or if no such fee has been agreed to by the

parties, Contractor's or Subcontractor's maximum total allowable additions for overhead, profit, administration and supervision will not exceed ten percent (10%) of actual verifiable labor, materials and equipment for such self- performed extra work.

- 9.2.5 Any agreement which modifies the terms of the Agreement (including Change Orders) will be approved in writing by the Project Manager. Once properly executed by both parties, these modifications to the Agreement will have the same effect as if they had been included in the original Agreement.

9.3 **ACCURACY OF CHANGE ORDER PRICING INFORMATION**

- 9.3.1 Subject to Sections 9.3.2 through 9.3.4, signature by the contracting parties constitutes full accord and satisfaction between City and Contractor for all costs, damages, and expenses of whatever kind of nature, including delay, impact or acceleration damages, which may be occasioned by a Change Order or other modification of the Agreement agreed to in writing.

- 9.3.2 Accurate Change Order Pricing Information: Contractor agrees that it is responsible for submitting accurate cost and pricing data to City to support its Fixed Price, Unit Price, or Cost Plus Change Order Proposals or other Agreement Price adjustments under the Agreement. Contractor further agrees to submit Change Order proposals with cost and pricing data which is accurate, complete, current, and in accordance with the terms of the Agreement with respect to pricing of change orders. Contractor agrees that any "buy-out savings" on Change Orders will accrue 100% to Owner. "Buy-out savings" are defined as any savings negotiated by the Contractor with a Subcontractor or a Material Supplier after receiving approval of a Change Order amount that was designated to be paid to a specific Subcontractor or Supplier for the Approved Change Order work.

- 9.3.3 Right to Verify Change Order Pricing Information: Contractor agrees that City, through its designated representative, will have the right to examine, copy, and scan the records of the Contractor, Subcontractor or Sub-Subcontractor's records (during the Agreement period and up to three years after final payment is made on the Agreement) to verify the accuracy and appropriateness of the pricing data used to price all Change Order proposals or claims. Contractor agrees that if City determines the cost and pricing data submitted (whether approved or not) was inaccurate, incomplete, not current, or not in compliance with the terms of the Agreement regarding pricing of Change Orders, an appropriate Agreement Price adjustment will be made. Such post-approval Contact Price adjustments will apply to all levels of contractors and Subcontractors and to all types of Change Order proposals, specifically including Fixed Price, Unit Price, and Cost Plus Change Orders.

- 9.3.4 Requirements for Detailed Change Order Pricing Information: Contractor agrees to provide a detailed breakdown of allowable labor and labor burden cost (i.e., base wage rate of applicable classifications of workers, payroll taxes, and insurance and benefits costs). This information will be used to evaluate the potential cost of labor and labor burden related to Change Order work. It is intended that this information represent an accurate estimate of the Contractor's actual labor and labor burden cost components. Information is not intended to establish fixed billing or Change Order pricing labor rates. However, at the time Change Orders are priced, the submitted cost data for labor rates may be used to price Change Order work. The accuracy of any such agreed upon labor rate cost components used to price Change Orders will be subject to later audit. Approved Change Order

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amounts may be adjusted later to correct the impact of inaccurate labor cost components if the agreed upon labor cost components are determined to be inaccurate.

9.4 **EMERGENCIES**

In any emergency affecting the safety of persons or property, Contractor will act, at its discretion, to prevent threatened damage, injury or loss. Any change in the Agreement Price or Agreement Time resulting from emergency work will be determined as provided in this Section.

9.5 **DIFFERING SITE CONDITIONS**

- 9.5.1 If Differing Site Conditions are encountered at the Project Site, then notice by the observing party must be given to the other party promptly before conditions are disturbed (to the extent practicable) and in no event later than 14 Days after first observance of the conditions. City will promptly investigate such conditions and, if City determines that Differing Site Conditions exist and they materially cause an increase in the cost of, or time required for, performance of any part of the Work, Contractor will be entitled to equitable adjustment in the Agreement Price or Construction Schedule (and other time requirements), or both. If it is determined by City that the conditions at the Project Site are not Differing Site Conditions and no change is justified, then City will so notify Contractor in writing, stating the reasons. Claims in opposition to such determination must be made within 14 Days after City has given notice of its decision. If City and Contractor cannot agree on an adjustment in the Agreement Price or Construction Schedule (and other time requirements), the adjustment may be submitted to dispute resolution as provided these General Conditions.

9.6 **CHANGES IN LAWS, REGULATIONS, OR LEGAL REQUIREMENTS OR TAXES**

In the event of a material change in applicable Laws, Regulations, or Legal Requirements, or taxes subsequent to the date of the Agreement by the parties, Contractor may be entitled to a Change Order, in City's discretion, to the extent Contractor can document to the satisfaction of City that such change significantly increases Contractor's actual cost of performance of the Work.

SECTION 10 -SUSPENSION AND TERMINATION

10.1 **SUSPENSION**

City may suspend the Agreement and Contractor's performance in accordance with MAG Specifications § 105.1 and 108.7.

10.2 **TERMINATION BY THE CITY FOR CAUSE**

- 10.2.1 MAG Specifications § 108.11 applies to the Agreement.

- 10.2.2 City may also terminate the Agreement if City determines, in its sole discretion that Contractor has:
- a. After prior written notice, refused or failed to supply enough properly skilled workers or proper materials;
 - b. After prior written notice, failed to make payment to Subcontractors for materials or labor in accordance with the respective agreements between Contractor and the Subcontractors;
 - c. After prior written notice, disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;

- d. After prior written notice, repeatedly failed to comply with written directives from City;
- e. Is adjudged as bankrupt or insolvent;
- f. Made a general assignment for the benefit of creditors;
- g. Appointed a trustee or receiver for itself or any of its property;
- h. Filed a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws; or
- i. Otherwise breached a provision of the Agreement Documents or any other Agreement between City and Contractor.

10.2.3 When any of the above reasons exist, City may terminate the Agreement, without prejudice to any other rights or remedies of City, after giving Contractor and Contractors' surety, if any, 7 Days written notice of City's intent to terminate the Agreement and Contractor's failure to cure any such reasons. Upon such termination, City may: (1) take possession of the Site and of all materials thereon owned by Contractor; or (2) finish the Work by whatever reasonable method City may deem expedient. When City terminates the Agreement for one of the reasons state above, Contractor will not be entitled to receive further payment until the Work is finished. If the unpaid balance of the Agreement Price existing at the time of such termination exceeds the costs and expenses of finishing the Work and any other damages incurred by City, such excess will be paid to Contractor. If such costs, expenses and damages exceed such unpaid balance, Contractor must pay the difference to City. This obligation for payment will survive termination of the Agreement.

10.3 **TERMINATION BY CITY FOR CONVENIENCE**

City may also terminate the Agreement at any time for its convenience upon 7 Days written notice to Contractor specifying the termination date. In the event of termination which is not the fault, in whole or in part, of Contractor, City will pay to Contractor only such compensation, including reimbursable expenses, due for Work properly performed on the Project prior to the termination date. Upon any termination of the Agreement, no further payments will be due from City to Contractor.

10.4 **A.R.S. § 38-511**

The Agreement is subject to, and may be terminated by City in accordance with, the provisions of A.R.S. § 38-511.

SECTION 11 -INSURANCE AND BONDS

11.1 **INSURANCE REQUIREMENTS**

11.1.1 After Agreement award, the Contractor must furnish the City a certificate of insurance on a standard insurance industry ACORD form. The ACORD form must be issued by an insurance company authorized to transact business in the State of Arizona possessing a current A.M. Best, Inc. rating of A-7, or better and legally authorized to do business in the State of Arizona with policies and forms satisfactory to City. Provided, however, the A.M. Best rating requirement may not be deemed to apply to required Worker's Compensation coverage.

11.1.2 The Contractor and any of its Subcontractors must procure and maintain, until all of their obligations have been discharged, including any warranty periods under this Agreement are satisfied, the insurances set forth below.

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- 11.1.3 The insurance requirements set forth below are minimum requirements for this Agreement and in no way limit the indemnity covenants contained in this Agreement.
- 11.1.4 The City in no way warrants that the minimum insurance limits contained in this Agreement are sufficient to protect Contractor from liabilities that might arise out of the performance of the Agreement services under this Agreement by Contractor, its agents, representatives, employees, or Subcontractors and the Contractor is free to purchase any additional insurance as may be determined necessary.
- 11.1.5 Failure to demand evidence of full compliance with the insurance requirements in this Agreement or failure to identify any insurance deficiency will not relieve the Contractor from, nor will it be considered a waiver of its obligation to maintain the required insurance at all times during the performance of this Agreement.
- 11.1.6 Use of Subcontractors: If any Work is subcontracted in any way, the Contractor must execute a written agreement with Subcontractor containing the same Indemnification Clause and Insurance Requirements as the City requires of the Contractor in this Agreement. The Contractor is responsible for executing the Agreement with the Subcontractor and obtaining Certificates of Insurance and verifying the insurance requirements.
- 11.2 **MINIMUM SCOPE AND LIMITS OF INSURANCE**
- 11.2.1 The Contractor must provide coverage with limits of liability not less than those stated below.
- 11.2.1.1 Commercial General Liability-Occurrence Form. Contractor must maintain "occurrence" form Commercial General Liability insurance with a limit of not less than \$2,000,000 for each occurrence, \$4,000,000 aggregate. Said insurance must also include coverage for products and completed operations, independent contractors, personal injury and advertising injury. If any Excess insurance is utilized to fulfill the requirements of this paragraph, the Excess insurance must be "follow form" equal or broader in coverage scope than underlying insurance.
- 11.2.1.2 Automobile Liability-Any Automobile or Owned, Hired and Non-Owned Vehicles. Contractor must maintain Business/Automobile Liability insurance with a limit of \$1,000,000 each accident on Contractor owned, hired, and non-owned vehicles assigned to or used in the performance under this Agreement. If any Excess or Umbrella insurance is utilized to fulfill the requirements of this paragraph, the Excess or Umbrella insurance must be "follow form" equal or broader in coverage scope than underlying insurance.
- 11.2.1.3 Workers Compensation and Employers Liability Insurance. Contractor must maintain Workers Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor employees engaged in the performance of Work under this Agreement and must also maintain Employers' Liability insurance of not less than \$1,000,000 for each accident and \$1,000,000 disease for each employee.
- 11.2.1.4 Builders' Risk/Installation Floater Insurance. The Contractor bears all responsibility for loss to all equipment or Work under construction. Unless waived in writing by the City the Contractor will purchase and maintain in force Builders' Risk/Installation Floater insurance on the entire Work until completed and accepted by the City. This insurance will be Special Causes of Loss policy form, (minimally including perils of fire, flood, lightning, explosion,

windstorm and hail, smoke, aircraft and vehicles, riot and civil commotion, theft, vandalism, malicious mischief, and collapse), completed value, replacement cost policy form equal to the Agreement Price and all subsequent modifications. The Contractor's Builders' Risk/Installation Floater insurance must be primary and not contributory.

- a. Builders' Risk/Installation Floater insurance must cover the entire Work including reasonable compensation for architects and engineers' services and expenses and other "soft costs" made necessary by an insured loss. Builders' Risk/Installation Floater insurance must provide coverage from the time any covered property comes under the Contractor's control and or responsibility, and continue without interruption during course of construction, renovation and or installation, including any time during which any Project property or equipment is in transit, off Site, or while on Site for future use or installation. Insured property must include, but not be limited to, scaffolding, false work, and temporary buildings at the Site. This insurance must also cover the cost of removing debris, including demolition as may be legally required by operation of any law, ordinance, regulation or code.
- b. The Contractor must also purchase and maintain Boiler and Machinery insurance with the same requirements as Builders' Risk/Installation Floater insurance cited above if the Work to be performed involves any exposures or insurable property normally covered under a Boiler and Machinery insurance policy or made necessary as required by law or testing requirements in the performance of this Agreement. The Contractor will be responsible for any and all deductibles under these policies and the Contractor waives all rights of recovery and subrogation against the City under the Contractor- Builders' Risk/Installation Floater insurance described herein.
- c. Builders' Risk/Installation Floater Insurance must be maintained until whichever of the following first occurs: (i) final payment has been made; or, (ii) until no person or entity, other than the City, has an insurable interest in the property required to be covered.
- d. The Builders' Risk/Installation Floater insurance must be endorsed so that the insurance will not be canceled or lapse because of any partial use or occupancy by the City.
- e. The Builders Risk/Installation Floater insurance must include as named insureds, the City, the Contractor, and all tiers of Subcontractors and others with an insurable interest in the Work who will be named as additional insureds unless they are able to provide the same level of coverage with the City and Contractor named as additional insureds. Certificates must contain a provision that the insurance will not be canceled or materially altered without at least 30 Days advance notice to the City. The City must also be named as a Loss Payee under the Builders' Risk/Installation Floater coverage.
- f. The Builders Risk/Installation Floater insurance must be written using the Special Causes of Loss policy form, replacement cost basis.
- g. All rights of subrogation under the Builders Risk/Installation Floater insurance are, by this Agreement, waived against the City, its officers, officials, agents and employees.

- h. The Contractor is responsible for payment of all deductibles under the Builders' Risk/Installation Floater insurance policy.

11.2.1.5 Pollution Liability Insurance (Including Errors and Omissions). For Job Orders, Pollution Liability Insurance is only required if applicable and determined on a project specific basis. Contractor must maintain Pollution Liability Insurance with a limit of not less than \$5,000,000 per loss, \$5,000,000 aggregate for losses caused by pollution conditions including coverage for bodily injury, property damage, defense costs, clean-up costs, and completed operations that arise from the operations of Contractor as described in this Agreement.

- a. The policy must provide for complete professional service coverage, including coverage for pollution liability that is a result of a breach of professional duties.
- b. The policy must provide for protection again claims for third-party bodily injury, property damage, or environmental damage caused for pollution conditions resulting from general contracting activities for which Contractor is legally liable.
- c. The policy must provide for cleanup costs when mandated by governmental entities, when required by law, or as a result of third-party claims.
- d. Completed Operations Coverage must be kept in place for up to the statute of repose.
- e. The policy must be endorsed to include the following additional insured language: "City, its elected officials, trustees, employees, agents, and volunteers must be named as additional insureds with respect to liability arising out of the activities performed by, or on behalf of Contractor".
- f. If Work under this Agreement requires the transportation of any hazardous material or regulated substances, Contractor must carry Auto Liability with a CA 9948 endorsement or equivalent.
- g. If Work under this Agreement requires the disposal of any hazardous materials from the job site, Contractor must obtain a certificate of insurance for Pollution Legal Liability from the disposal site operator with a limit of not less than \$5,000,000 per loss, \$5,000,000 aggregate.

11.3 **ADDITIONAL POLICY PROVISIONS REQUIRED**

11.3.1 Self-Insured Retentions or Deductibles. Any self-insured retentions and deductibles must be declared and approved by the City. If not approved, the City may require that the insurer reduce or eliminate any deductible or self-insured retentions with respect to the City, its officers, officials, agents, employees, and volunteers.

11.3.2 The Contractor's insurance must contain broad form contractual liability coverage.

11.3.3 The Contractor's insurance coverage must be primary insurance with respect to the City, its officers, officials, agents, and employees. Any insurance or self-insurance maintained by the City, its officers, officials, agents, and employees will be in excess of the coverage provided by the Contractor and must not contribute to it.

11.3.4 The Contractor's insurance must apply separately to each insured against whom claim is

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made or suit is brought, except with respect to the limits of the insurer's liability.

11.3.5 Coverage provided by the Contractor must not be limited to the liability assumed under the indemnification provisions of this Agreement.

11.3.6 The policies must contain a severability of interest clause and waiver of subrogation against the City, its officers, officials, agents, and employees, for losses arising from Work performed by the Contractor for the City.

11.3.7 The Contractor, its successors and or assigns, are required to maintain Commercial General Liability insurance as specified in this Agreement for a minimum period of 3 years following completion and acceptance of the Work. The Contractor must submit a Certificate of Insurance evidencing Commercial General Liability insurance during this 3 year period containing all the Agreement insurance requirements, including naming the required Additional Insureds set forth herein.

11.3.8 If a Certificate of Insurance is submitted as verification of coverage, the City will reasonably rely upon the Certificate of Insurance as evidence of coverage but this acceptance and reliance will not waive or alter in any way the insurance requirements or obligations of this Agreement.

11.3.9 Insurance Cancellation During Agreement Term.

11.3.9.1 If any of the required policies expire during the life of this Agreement, the Contractor must forward renewal or replacement Certificates to the City within 10 Days after the renewal date containing all the required insurance provisions.

11.3.9.2 Each insurance policy required by the insurance provisions of this Agreement must provide the required coverage and must not be suspended, voided or canceled except after 30 Days prior written notice has been given to the City, except when cancellation is for non-payment of premium, then 10 Days prior notice may be given. Such notice must be sent directly to Chandler Law-Risk Management Department, Post Office Box 4008, Mailstop 628, Chandler, Arizona 85225. If any insurance company refuses to provide the require notice, the Contractor or its insurance broker must notify the City of any cancellation, suspension, non-renewal of any insurance within 7 Days of receipt of insurers' notification to that effect.

11.3.10 City as Additional Insured. The above-referenced policies are to contain, or be endorsed to contain, the following provisions:

11.3.10.1 The Commercial General Liability and Automobile Liability policies are to contain, or be endorsed to contain, the following provisions: The City, its officers, officials, agents, and employees are additional insureds with respect to liability arising out of activities performed by, or on behalf of, the Contractor including the City's general supervision of the Contractor; Products and Completed Operations of the Contractor; and automobiles owned, leased, hired, or borrowed by the Contractor.

11.3.10.2 The City, its officers, officials, agents, and employees must be additional insureds to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Agreement.

11.4 **BONDS AND OTHER PERFORMANCE SECURITY**

11.4.1 After Agreement award, Contractor must provide a Performance Bond and a Payment

Bond, each in an amount equal to the full amount of the Agreement Price.

- 11.4.2 Each such bond must be executed by a surety company or companies holding a Certificate of Authority to transact surety business in the State of Arizona, issued by the Director of the Arizona Department of Insurance and must be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. A copy of the Certificate of Authority must accompany the bonds. The Certificate must have been issued or updated within two (2) years prior to the execution of this Agreement. The bonds must be written or countersigned by an authorized representative of the surety who is either a resident of the state of Arizona or whose principal office is maintained in this state, as by law required.
- 11.4.3 The bonds must be made payable and be acceptable to City. The bond forms for the performance and payment bonds must be in the forms required under A.R.S. § 34-221, *et. Seq.*, as in Appendices 4 and 5 of these General Conditions.
- 11.4.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Agreement Documents, Contractor must promptly furnish a copy of the bonds or must permit a copy to be made.
- 11.4.5 All bonds submitted for this Project must be provided by a company which has been rated AM Best rating of A- or better for the prior four quarters by the latest edition of the 'Results Best's Key Rating Guide (Property/Casualty)' published by the A.M. Best Company.
- 11.4.6 Personal or individual bonds are not acceptable.
- 11.4.7 If the surety on any Bond furnished by Contractor is declared a bankrupt or becomes insolvent, or Contractor's right to do business is terminated in any state where any part of the Project is located, or it ceases to meet the requirements of this Section 11.4, Contractor must within 5 Days thereafter substitute another Bond and surety, both of which must be acceptable to City.

SECTION 12 - INDEMNIFICATION

- 12.1 To the extent permitted by law, the Contractor and its owners, officers, directors, agents, employees, and subconsultants (collectively "Indemnitor") must indemnify, save, and hold harmless the City and its officers, officials, agents, and employees (collectively "Indemnatee") from any and all claims, actions, liabilities, damages, losses, or expenses (including court costs, attorneys' fees, and costs of claim processing, investigation, and litigation) (collectively "Claims") caused or alleged to be caused, in whole or in part, by the negligent, reckless, wrongful, or willful acts, errors, or omissions of Indemnitor in connection with this Agreement. This indemnity includes any Claim or amount arising out of or recovered under workers' compensation laws or on account of Indemnitor's failure to conform to any federal, state, or local law, statute, ordinance, rule, regulation, or court decree. Indemnitor must indemnify Indemnatee from and against any and all Claims, except those arising solely from Indemnatee's own negligent, reckless, wrongful, or willful acts, errors, or omissions. Indemnitor is responsible for primary loss investigation, defense, and judgment costs where this indemnification applies. In consideration of the award of this Agreement, Indemnitor agrees to waive all rights of subrogation against Indemnatee for losses arising from or related to this Agreement. Indemnitor's obligations under this provision survive the termination or expiration of this Agreement.

SECTION 13 -DISPUTE RESOLUTION

- 13.1 All disputes arising out of or relating to the Agreement, the Work or the Project, other than termination under Section 10, will be resolved pursuant to the Dispute Resolution process set forth in Appendix 6 of these General Conditions, and not pursuant to MAG Specifications § 110.
- 13.2 Contractor agrees that during any dispute between the parties, Contractor will continue to perform its obligations under the Agreement until such dispute is resolved.
- 13.3 Notwithstanding any other provision in this Agreement, City has the right to immediately file in court and pursue an action for a temporary restraining order and injunctive relief against Contractor if City determines that such action is necessary to protect its interests under the Agreement, to obtain specific performance of any provision of the Agreement, to advance the completion of the Project, or to protect health, welfare and safety.

SECTION 14 - MISCELLANEOUS PROVISIONS**14.1 AGREEMENT DOCUMENTS**

- 14.1.1 The Agreement Documents are intended to permit the parties to complete the Work and all obligations required by the Agreement Documents within the Agreement Times for the Agreement Price. The Agreement Documents are intended to be complementary and interpreted in harmony so as to avoid conflict, with words and phrases interpreted in a manner consistent with construction and design industry standards.
- 14.1.2 It is the intent of the Agreement Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Agreement Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Agreement Documents or from prevailing custom or trade usage as being required to produce the intended result must be provided by Contractor whether or not specifically called for at no additional cost to City.
- 14.1.3 The Agreement Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Agreement Documents), Contractor's Bid or Proposal (including documentation accompanying the Bid and any post-Bid documentation submitted prior to Agreement award) when attached as an exhibit to the Agreement, the accepted Project Schedule, the Notice to Proceed, the Performance Bond, the Payment Bond, Project Design, Engineering and Specifications, these General Conditions, the Project Specific Special Provisions, Technical Specifications, Agreement Drawings, as the same may be more specifically identified in the Agreement, Change Orders, Work Change Directives, Field Orders and the written interpretations and clarifications of the Design Professional or City representative and Modifications issued after execution of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Agreement Documents.
- 14.1.4 In the event of any inconsistency, conflict, or ambiguity between or among the Agreement Documents, the Agreement Documents will take precedence as follows from highest to lowest: Change Orders, Addenda, Agreement, Project Specific Special Provisions, General Conditions, Technical Specifications, Drawings/Plans, Chandler Amendments to MAG

Standard Specifications and Chandler Standard Details, and MAG Uniform Standard Specifications and Details for Public Works Construction. If applicable to this Agreement, Federal Provisions prevail.

- 14.1.5 On the Drawings, given dimensions will take precedence over scaled measurements and large scale drawings over small-scale drawings.
- 14.1.6 Clarifications and interpretations of the Agreement Documents will be issued by the Design Professional through the City.
- 14.1.7 The headings used in this Agreement or any other Agreement Documents, are for ease of reference only and must not in any way be construed to limit or alter the meaning of any provision.
- 14.1.8 The Agreement Documents form the entire agreement between City and Contractor. No oral representations or other agreements have been made by the parties except as specifically stated in the Agreement Documents.
- 14.1.9 The Agreement Documents may not be changed, altered, or amended in any way except in writing signed by a duly authorized representative of each party in the form of a Change Order.
- 14.1.10 Re-Use of Documents. Neither Contractor nor any Subcontractor, manufacturer, fabricator, supplier or distributor will have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of the Design Professional; and they must not re-use any of them on extensions of the Project or any other project without written consent of City and the Design Professional and specific written verification or adaptation by the Design Professional.

14.2 **REFERENCE STANDARDS**

- 14.2.1 Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, will mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Agreement Documents.
- 14.2.2 The provisions of any such standard, specification, manual or code, or any instruction of a Supplier will not change the duties or responsibilities of City, Contractor, Design Professional or Project Manager, or any of their Subcontractors, consultants, agents, or employees from those set forth in the Agreement Documents, nor will any such provision or instruction assign to City, Contractor, Design Professional, or any of their agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Agreement Documents.

14.3 **COMPLIANCE WITH ARIZONA LAW AND FEDERAL LAW**

- 14.3.1 Compliance with A.R.S. § 41-4401. Pursuant to the provisions of A.R.S. § 41-4401, the Contractor hereby warrants to the City that the Contractor and each of its subcontractors ("Subcontractors") must comply with all Federal Immigration laws and regulations that relate to the immigration status of their employees and the requirement to use E-Verify set

forth in A.R.S. §23-214(A).

14.3.2 A breach of the Contractor Immigration Warranty constitutes a material breach of this Agreement and subject to penalties up to and including termination of this Agreement.

14.3.3 The City retains the legal right to inspect the papers of any Contractor or Subcontractor employee who works on this Agreement to ensure that the Contractor or Subcontractor is complying with the Contractor Immigration Warranty. The Contractor agrees to assist the City in the conduct of any such inspections.

14.3.4 The City may, at its sole discretion, conduct random verifications of the employment records of the Contractor and any Subcontractors to ensure compliance with Contractors Immigration Warranty. The Contractor agrees to assist the City in performing any such random verifications.

14.3.5 The provisions of this Article must be included in any agreement the Contractor enters into with any and all of its subcontractors who provide services under this Agreement or any subcontract. "Services" are defined as furnishing labor, time or effort in the State of Arizona by a contractor or subcontractor. Services include construction or maintenance of any structure, building or transportation facility or improvement to real property.

14.4 **HAZARDOUS ENVIRONMENTAL CONDITIONS**

14.4.1 Contractor will not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Agreement Document to be within the scope of the Work. Contractor will be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

14.4.2 If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition. Contractor must immediately:

- a. Secure or otherwise isolate such condition;
- b. Stop all Work in connection with such condition and in any area affected thereby; and
- c. Notify City and promptly thereafter confirm such notice in writing.

14.4.3 City will promptly retain a qualified expert to evaluate such condition or take corrective action, if any.

14.4.4 Contractor will be responsible for any and all civil or criminal penalties, fines, damages, or other charges imposed by any regulatory agency or court for sewage discharges that are in violation of applicable statutes and laws and that are a result, direct or indirect, of work performed under this Agreement. Contractor will also be responsible for reimbursement to City for administration, reporting, and tracking expenses required as a result of any spill event. In the event the regulatory agency or court imposes a probationary period, Contractor must post bond for the probationary period to ensure that all such costs are reimbursed to City. This responsibility will apply whether penalties are imposed directly on Contractor or any of its Subcontractors, or the City of Chandler. Contractor must defend and indemnify City against such penalties. Regulatory agencies may include, but are not

limited to, the Arizona Department of Environmental Quality (ADEQ) and the United States Environmental Protection Agency (USEPA).

14.5 **COOPERATION AND FURTHER DOCUMENTATION**

Contractor agrees to provide City such other duly executed documents as may be reasonably requested by City to implement the intent of the Agreement Documents.

14.6 **ASSIGNMENT**

Neither Contractor nor City will, without the written consent of the other assign, transfer or sublet any portion of this Agreement or part of the Work or the obligations required by the Agreement Documents, any such assignment will be void, will transfer no rights to the purported assignee, and would be a material breach of the Agreement.

14.7 **SUCCESSORS**

Contractor and City intend that the provisions of the Agreement Documents are binding upon the parties, their employees, agents, heirs, successors and assigns.

14.8 **LAWFUL PRESENCE**

Pursuant to A.R.S. §§ 1-501 and 1-502, City is prohibited from awarding an agreement to any natural person who cannot establish that such person is lawfully present in the United States. To establish lawful presence, a person must produce qualifying identification and sign a City-provided affidavit affirming the identification provided is genuine. This requirement will be imposed at the time of agreement award. This requirement does not apply to business organizations such as corporations, partnerships, or limited liability companies.

14.9 **NO BOYCOTT OF ISRAEL CERTIFICATION**

By Contractor's signature on this Agreement, Contractor certifies under A.R.S. § 35-393.01 that Contractor is not currently engaged in and for the duration of this Agreement will not engage in a boycott of Israel.

14.10 **NO THIRD PARTY BENEFICIARY**

Nothing under the Agreement Documents will be construed to give any rights or benefits in the Agreement Documents to anyone other than City and Contractor, and all duties and responsibilities undertaken pursuant to the Agreement Documents will be for the sole and exclusive benefit of City and Contractor and not for the benefit of any other party, unless otherwise expressly set forth in the Agreement Documents.

14.11 **GOVERNING LAW AND VENUE**

The Agreement and all Agreement Documents will be deemed to be made under, and will be construed in accordance with and governed by the laws of the State of Arizona without regard to the conflicts or choice of law provisions thereof. Any court action to enforce any provision of the Agreement or to obtain any remedy with respect hereto must be brought in the Superior Court, Maricopa County, Arizona, and for this purpose, each party hereby expressly and irrevocably consents to the jurisdiction and venue of such Court.

14.12 **SEVERABILITY**

If any provision of the Agreement Documents or the application thereof to any person or circumstance will be invalid, illegal or unenforceable to any extent, the remainder of the affected provision, the remainder of the Agreement Documents, and the application thereof will not be affected and will be enforceable to the fullest extent permitted by law.

14.13 LEGAL REQUIREMENTS

At all times relevant to its entry into this Agreement and performance of the Services and the Work, Contractor must fully comply with all Laws, Regulations, or Legal Requirements applicable to City, the Project, and the Agreement, including, without limitation, those set forth on Exhibit C of the Agreement.

14.14 PARTIAL INVALIDITY

If any provision of the Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

14.15 ATTORNEYS' FEES

Should either party to the Agreement bring an action to enforce any provision of the Agreement, the prevailing party will be entitled to recover reasonable attorneys' fees and costs in connection therewith.

14.16 CONFLICT OF INTEREST

14.16.1 Contractor agrees to disclose any financial or economic interest with the Project property, or any property affected by the Project, existing prior to the execution of the Agreement. Further, Contractor agrees to disclose any financial or economic interest with the Project property, or any property affected by the Project, if Contractor gains such interest during the course of this Agreement. If Contractor gains financial or economic interest in the Project during the course of this Agreement, this may be grounds for terminating this Agreement. Any decision to terminate the Agreement must be at the sole discretion of City.

14.16.2 Contractor will not engage the services on this Agreement of any present City employee who was involved as a decision maker in the selection or approval processes, or who negotiated or approved billings or Agreement Modifications for this Agreement.

14.16.3 Contractor agrees that it will not perform services on this Project for a contractor, subcontractor, or any supplier, not covered under this Agreement.

14.17 INDEPENDENT CONTRACTOR

Contractor is and must be an independent contractor. Any provisions in the Agreement Documents that may appear to give City the right to direct Contractor as to the details of accomplishing the Work or to exercise a measure of control over the Work means that Contractor must follow the wishes of City as the results of the Work only. These results must comply with all applicable laws and ordinances.

14.18 NOTICE OF INJURY

Should City or Contractor suffer injury or damage to their person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim must be made in writing to the other party within 7 Days of the first observance of such injury or damage.

14.19 CONFIDENTIALITY

Contractor, for the benefit of City, hereby agrees it will not release or cause or permit to be released to the public any press notices, publicity (oral or written) or advertising promotion relating to, any statement regarding, or any other public announcement or disclosure or cause or permit to be publicly announced or disclosed, in any manner whatsoever, the specific terms and conditions of this Agreement or any comment relating

to the Project or the Site. Notwithstanding the foregoing, Contractor will be entitled to disclose the terms of the Agreement to the extent required by law or in the course of enforcing or defending a claim or action hereunder. Contractor must give City reasonably prompt notice of any disclosure or statement made pursuant to this provision.

14.20 **DATA CONFIDENTIALITY**

- 14.20.1 As used in the Agreement, "data" means all information, whether written or verbal, including plans, specifications, renderings, photographs, studies, investigations, audits, analyses, samples, reports, calculations, internal memos, meeting minutes, data field notes, work product, proposals, correspondence and any other similar documents or information prepared by, obtained by, or transmitted to the City in the performance of this Agreement.
- 14.20.2 Contractor agrees that all data, regardless of form, including originals, images, and reproductions, prepared by, obtained by, or transmitted to City in connection with the Contractor's performance of this Agreement is confidential and proprietary information belonging to City.
- 14.20.3 Except as specifically provided in this Agreement, Contractor or its Subcontractors must not divulge data to any third party without prior written consent of City. Contractor or its Subcontractors must not use data for any purposes except to perform Work required under this Agreement. These prohibitions will not apply to the following data provided Contractor has first given the required notice to City:
- a. Data which was known to Contractor or its Subcontractors prior to its performance under this Agreement unless such data was acquired in connection with Work performed for City;
 - b. Data which was acquired by Contractor or its Subcontractors in its performance under this Agreement and which was disclosed to Contractor or its Subcontractors by a third party, who to the best of Contractor's or its Subcontractor's knowledge and belief, had the legal right to make such disclosure and Contractor or its Subcontractors are not otherwise required to hold such data in confidence; or
 - c. Data which is required to be disclosed by virtue of law, regulation, or court order, to which the Contractor or its Subcontractors are subject.
- 14.20.4 In the event the Contractor or its Subcontractors are required or requested to disclose data to a third party, or any other information to which the Contractor or its Subcontractors became privy as a result of any other agreement with City, the Contractor must first notify City as set forth in this Section of the request or demand for the data. The Contractor or its Subcontractors must give City sufficient facts so that City can be given an opportunity to first give its consent or take such action that City may deem appropriate to protect such data or other information from disclosure.
- 14.20.5 Unless prohibited by law, within 10 Days after completion of services for a third party on real or personal property owned or leased by City, the Contractor must promptly deliver, as set forth in this Section, a copy of all data to City. All data will continue to be subject to the confidentiality agreements of this Agreement.
- 14.20.6 Contractor or its Subcontractors assume all liability for maintaining the confidentiality of the data in its possession and agree to compensate City if any of the provisions of this

Section are violated by Contractor, its employees, agents, or Subcontractors. Solely for the purposes of seeking injunctive relief, it is agreed that a breach of this Section will be deemed to cause irreparable harm that justified injunctive relief in court. Contractor agrees that the requirements of this Section will be incorporated into all subcontracts entered into by Contractor. A violation of this Section may result in immediate termination of this Agreement without notice.

14.21 **SURVIVAL**

All warranties, representations and indemnifications by Contractor must survive the completion or termination of this Agreement.

14.22 **COVENANTS AGAINST CONTINGENT FEES**

Contractor warrants that no person has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, and that no member of City Council, or any employee of City has any interest, financially, or otherwise, in the firm. For breach or violation of this warrant, City will have the right to annul the Agreement without liability or at its discretion to deduct from the Agreement Price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

14.23 **NO WAIVER**

The failure of either party to enforce any of the provisions of the Agreement Documents or to require performance of the other party of any of the provisions hereof must not be construed to be a waiver of such provisions, nor will it affect the validity of the Agreement Documents or any part thereof, or the right of either party to thereafter enforce each and every provision.

14.24 **NONEXCLUSIVE REMEDIES**

The remedies set forth in this Agreement are cumulative and not exclusive, and failure to exercise any remedy (including, without limitation, any right to terminate) will not preclude any party from exercising any other right in seeking any other remedy available to it at law or in equity.

14.25 **PROJECT COMMUNICATIONS**

14.25.1 All communications concerning the performance of the Work or the Project will be provided to the designated Project Manager and Contractor's Representative set forth in Article 1 of the Agreement. City may change the designated Project Manager and, subject to Section 4.4.20 of these General Conditions, Contractor may change Contractor Representative, by written notice to the other.

14.25.2 Project communications may be exchanged by e-mail, but email communications cannot change the terms of the Agreement or the Scope of Work, or effectuate any change that requires a written Change Order.

14.25.3 When any provisions of the Agreement Documents requires Contractor or the Design Professional to give written notice to City, it will be deemed to have been validly given if delivered in person or if delivered at or sent by registered or certified mail, postage prepaid, to the Parties indicated in Agreement Article 1, incorporated by reference.

14.25.4 When any provisions of the Agreement Documents requires City, Project Manager, or the Design Professional to give written notice to Contractor, it will be deemed to have been

validly given if delivered in person to the person designated in the Agreement Documents as Contractor's Resident Superintendent, or if delivered at or sent by registered or certified mail, postage prepaid, to Contractor at the last address in the Agreement Documents or such substitute address which Contractor designates in writing, or to the business address known to the giver of notice.

14.26 **DRUG FREE WORKPLACE PROGRAM**

14.26.1 City has adopted a policy establishing a drug free workplace for itself and as a requirement for Contractors doing business with City, to ensure the safety and health of employees working on City projects.

14.26.2 Contractor must require a drug free workplace for all employees working under the Agreement. Specifically, all employees of Contractor who are working under an agreement with City must be notified, in writing, by Contractor that they are prohibited from the manufacture, distribution, dispensation, possession or unlawful use of a controlled substance in the workplace.

14.27 Failure to require a drug free workplace in accordance with the City's policy may result in termination of the Agreement and possible debarment from bidding on future City projects.

SECTION 15 - PROVISIONS APPLICABLE SOLELY TO GMP AND COST-BASED AGREEMENTS, CHANGE ORDERS, AND JOB ORDERS

15.1 **ADDITIONAL DEFINITIONS**

The definitions set forth in Section 2 apply to GMP and Cost-Based Agreements, Change Orders, and Job Orders, together with the additional definitions set forth below.

Baseline Cost Model –

A breakdown and estimate of the scope of the Project developed by CM@Risk pursuant to Section 17.5 of these General Conditions.

CM@Risk or Construction Manager at Risk –

The person or firm selected by City to provide pre-construction and/or construction services as detailed in a Construction Manager at Risk Agreement with City. In these General Conditions, the term "Contractor" includes CM@Risk under both Pre-Construction and Construction Services Agreements.

CM@Risk Fee or Contractor's Fee –

An agreed to percentage in an accepted GMP that represents the Contractor's fee for performance of the Work.

Agreement Documents –

Where compensation under the Agreement is based upon a GMP accepted by City, the term "Agreement Documents" also includes the accepted GMP Proposal.

Agreement Price –

Where compensation under the Agreement based upon a GMP accepted by City, the term "Agreement Price" refers to the GMP.

Cost-Based Agreement, Change Order, or Job Order –

A Agreement, Change Order, or Job Order where the Agreement Price is based upon the actual cost of performing the Work, subject to the terms of the Agreement Documents, including this

General Conditions

Section 15. These would include those generally referred to as "Cost of the Work plus a Fee with a GMP," "Time and Materials," or "Cost Plus a Fee."

Cost of the Work –

The direct costs necessarily incurred by Contractor in the proper, timely, and complete performance on the Work. The Cost of the Work will include only those costs set forth in Section 15.2 of these General Conditions.

Deliverables –

The work products prepared by Contractor in performing the scope of work described in the Agreement. Some of the major deliverables to be prepared and provided by Contractor during pre-construction may include but are not limited to: the Baseline Cost Model and Schedule that validate City's plan and budget, Construction Management Plan, Detailed Project Schedule, Schedule of Values, alternative system evaluations, procurement strategies and plans, Detailed Cost Estimates, construction market surveys, cash flow projections, GMP Proposals, Subcontractor procurement plan, Subcontractor agreements, Subcontractor bid packages, Supplier agreements, Constructability Review, Cost Control Log, Traffic control and phasing plans and others as indicated in this Agreement or required by the Project Team.

Pre-Construction Services Agreement –

The Agreement entered into between City and the CM@Risk for Pre-Construction Services to be provided by the CM@Risk, including, without limitation, the generation of a GMP Proposal. If the GMP Proposal is accepted by City and a Construction Agreement is entered into between City and CM@Risk, the duties, obligations and warranties of the CM@Risk under the Pre-Construction Services Agreement survive and are incorporated into the resulting Construction Agreement.

Pre-Construction Services –

The services to be provided under the Pre-Construction Services Agreement, including Section 17 of these General Conditions.

Detailed Project Schedule –

The Detailed Project Schedule developed by the CM@Risk for the review and approval of the Project Manager in accordance with Section 17.3 of these General Conditions, if applicable.

General Conditions Costs –

Those costs set forth in Section 4 of Appendix 9 to these General Conditions.

GMP Plans and Specifications –

The plan and specifications upon which the Guaranteed Maximum price Proposal is based.

GMP Proposal –

The proposal of Contractor submitted pursuant to Section 17.7 of these General Conditions for the entire Work and/or portion (phases) of the Work.

Guaranteed Maximum Price or GMP –

The Guaranteed Maximum Price set forth in the Agreement, Change Order, or Job Order if applicable.

15.2 AGREEMENT PRICE

- 15.2.1 The Agreement Price for all Agreements, Change Orders, and Job Orders based upon payment of the Cost of the Work plus a Fee with a GMP, time and materials, or cost-plus a

General Conditions

fee will be the Cost of the Work incurred plus the Fee agreed to in writing by City, limited to the amount of the GMP, if agreed to. Unless otherwise expressly provided in the Agreement, Change Order, or Job Order, all Cost Based pricing will be subject to and limited to GMP.

15.2.2 The Agreement Price may only be changed as set forth in Section 9 above.

15.2.3 Only costs specifically designated as reimbursable costs are eligible for payment by City or may be charged against the Agreement Price. All other costs will not be paid by City and will not be chargeable against the Agreement Price.

15.2.4 Cost-Based Agreements. For Agreements, Change Orders, or Job Orders, reimbursable costs must be determined pursuant to Appendix 9 to these General Conditions, Cost of the Work, and not by MAG Specifications §109.5.

15.3 **ALLOWANCES**

15.3.1 Contractor must include in the Agreement Price all Allowances stated in the Agreement Documents and agreed to in writing by City. Items covered by these Allowances must be supplied for such amounts and by such persons as City may direct, provided Contractor will not be required to employ persons against whom Contractor makes a reasonable objection. Materials, labor, and equipment under an Allowance will be selected by City in accordance with a schedule to be mutually agreed upon by City, Design Professional and Contractor or otherwise in reasonably sufficient time to avoid delay in the Work.

15.3.2 Unless otherwise provided in the Agreement Documents:

15.3.2.1 These Allowances must cover the cost to Contractor, less any applicable trade discount, of the materials, labor, and equipment required by the Allowances, delivered at the Site, and all applicable taxes;

15.3.2.2 Contractor's costs for unloading and handling on the Site, labor, installation costs, overhead, profit and other expenses relating to materials, labor, and equipment required by the Allowance must be included in the Agreement Sum and not in the Allowance; and

15.3.2.3 Whenever the cost is more or less than the Allowance, the Agreement Sum must be adjusted accordingly by Change Order, the amount of which will recognize the difference between actual costs for an Allowance item and the amount of the Allowance item and changes, if any, in handling costs on the Site, labor, installation costs, overhead, profit and other expenses.

15.4 **CONTINGENCY**

An agreed to amount in the GMP that may only be used in accordance with the terms set forth in these General Conditions and with prior written approval by the City.

15.4.1 Construction Contingency. This GMP includes a dollar amount listed as a Construction Contingency which will be readily available for increased costs for subcontractors, material, and equipment subject to prior approval of City, which approval will not be withheld unreasonably. The Construction Contingency may also be used, at the discretion of City, to reimburse CM@Risk for unexpected costs due to (a) scope gaps between trade subcontractors; (b) agreement default by trade subcontractors; (c) unforeseen field conditions, but only as defined in Section 9.5 above; (d) work completed to meet the intent of the design, but which was not indicated on the plans; (e) costs overruns not covered by allowances; (f) costs of corrective work not provided for elsewhere; and (g) implementation

of any Recovery Plan. Cost for which CM@Risk desires to be paid from the Construction Contingency must be documented by CM@Risk on a time and materials basis and are subject to verification by City. If agreed to by City, a "Use of Contingency" form will be executed by both parties authorizing the actual cost of the work to be paid and included in the Work Item Direct Costs. The Construction Contingency is not allocated to any particular item of the Project but may be used for any portion of the work as determined above. Any amount not used in the Construction Contingency will belong to City and will reduce the GMP.

- 15.4.2 Owner's Contingency. This GMP also includes a dollar amount listed as an Owner's Contingency which may be used only by the City (owner department) for upgrades and changes in scope or other changes not already included within the intent of the Project Program. City will provide CM@Risk with a Work Change Directive authorizing CM@Risk to perform the additional work and to transfer funds from the Owner's Contingency to the Work Item Direct Costs category to be paid with such direct costs. These additional costs will be in an amount mutually agreed upon by CM@Risk and City or will be documented by CM@Risk on a time and materials basis and are subject to verification by City. Any amount not used in the Owner's Contingency will belong to the City and will reduce the GMP.

15.5 **REDUCTION IN RETENTION**

If the Agreement Price is based upon a GMP, in order to receive payment of one-half of the retention as set forth in Section 8.1.5 above, Contractor must also submit to the Project Manager a complete accounting of the Actual Reimbursable Cost of the Work to date, including all such documentation (including, without limitation, invoices, subcontract, subcontractor change orders, purchase orders, records of payment, etc.) as City may require, to establish whether the payments made to Contractor equal, exceed, or are less than the actual reimbursable Cost of the Work to date. Any excess payments by City, as determined by the Project Manager, will be deducted from the one-half retention payment to be made to Contractor, and any additional excess amounts paid to Contractor will be refunded by Contractor to City. The Project Manager's determinations as to Actual Reimbursable Cost of the Work will be the basis of payment until final Project Closeout and Final Payment under the Agreement.

15.6 **FINAL PAYMENT**

If the Agreement Price is based upon a GMP, as a further condition precedent to Final Payment by City, Contractor must submit to the Project Manager a complete final accounting of the Actual Reimbursable Cost of the Work, including all such documentation (including, without limitation, invoices, subcontracts, subcontractor change orders, purchase orders, records of payment, etc.) as City may require, to establish whether the payments made to Contractor equal, exceed, or are less than the Actual Reimbursable Cost of the Work to date. Any excess payments by City, as determined by the Project Manager, will be deducted from the one-half retention payment to be made to Contractor, and any additional excess amounts paid to Contractor will be refunded by Contractor to City. Disputes relating to the Final Cost of the Work will be subject to City's audit rights under Sections 8.8 above and 15.7 below, and the dispute resolution process under Section 13 above.

15.7 **OPEN BOOK**

On any GMP-based or Cost-Based Agreement, Job Order, or Change Order, City may attend any and all meetings or discussions pertaining to the Project, including bid openings, and must have access to all books, invoices, accounts, memoranda, correspondence, and

written communications or records of any kind pertaining to the Project, including without limitation, those stored in electronic format.

15.8 **DIFFERING SITE CONDITIONS AND/OR CHANGE IN LAWS**

A Change Order for increased costs under Section 9.5 or 9.6 above will only be considered or granted by City to the extent such actual, documented costs are justified.

SECTION 16 - PROVISIONS APPLICABLE SOLELY TO JOB ORDER AGREEMENTS (JOC)

16.1 **ADDITIONAL DEFINITIONS**

The definitions set forth in Sections 2 and below will apply to all Job Order Agreements and Job Orders. In addition, the definitions set forth in Section 15.1 above will apply to all Cost-Based Job Orders.

Agreement –

Includes the Job Order Master Agreement and Job Order Project Agreements issued and agreed to by City and JOC Contractor.

JOC Contractor's Coefficient –

A numerical factor that represents JOC Contractor total costs (indirect and direct costs, sales tax, profit, etc.) and other adjustments for market conditions.

Job Order Request for Proposal (RFP) –

The Request for Proposals issued by City for each Job Order Project Agreement relating to a specific Project.

Job Order Cost Proposal –

The Proposal submitted by JOC Contractor in response to a Job Order Request for Proposal (RFP) issued by City to develop a Job Order Project Agreement for a specific Project.

Guaranteed Maximum Price (GMP) Job Order –

Job Order under which JOC Contractor is compensated for actual costs incurred.

Job Order Project Agreement (Job Order) –

The agreement for a specific project, as it may be modified by all Change Orders, executed by the Parties, which incorporates the terms and conditions of the Job Order Master Agreement.

16.2 **ORDERING AND PROCESSING PROCEDURES FOR JOB ORDERS**

16.2.1 The process for developing and issuing a Job Order for a particular Project consists of three (3) procedures: (1) issuance of a RFP by City; (2) JOC Contractor's response to the RFP in the form of JOC Contractor's Job Order Cost Proposal; and (3) Issuance of a Job Order by City, as set for below.

16.2.2 **RFP's For Job Orders**

16.2.2.1 City will provide to JOC Contractor RFP with a Scope of Work (SOW) describing the Work to be performed, which may include special instructions and conditions, material submittal requirements, and, if applicable, a complete set of sketches, construction drawings and specifications for the Job Order.

16.2.2.2 Some Job Order RFP's will be issued by City without detailed sketches, drawing and

specifications and will rely on JOC Contractor to produce them for City review and approval and is considered to be Pre-Construction and incidental design services included in JOC Contractor's overhead for GMP Job Orders. In addition JOC Contractor will not be reimbursed for any Pre-Job Order costs, including proposal preparation, attendance during negotiations, or site visits.

16.2.3 JOC Contractor's Job Order Cost Proposal

16.2.3.1 JOC Contractor must respond within ten (10) calendar days of the RFP date or site visit, whichever is later or as otherwise indicated on a case-by-case basis, by submitting JOC Contractor's Job Order Cost Proposal to the City representative.

16.2.3.2 Unless otherwise required under the terms of the RFP, JOC Contractor's Job Order Cost Proposal must include the following.

- a. JOC Contractor's Job Order Cost Proposal in PDF and electronic format;
- b. A Project Schedule and schedule of values that reflects the costs of each work element on the schedule. The schedule must show all milestones (e.g., permits, submittals, ordering materials, demolition, work phases, closeout and completion date); and
- c. Necessary documentation will be required to indicate that adequate scoping, layout, setup and planning to accomplish the Work has been done. Examples of documentation that might reasonably be expected include sketches, drawings, calculations, catalog cuts and specifications produced to a level of detail and skill that could be expected of experienced, competent Project Managers with five or more periods experience in their respective trade.

16.2.3.3 JOC Contractor must select Subcontractors based on qualifications alone or on a combination of qualifications and price and must not select Subcontractors based on price alone. A qualifications and price selection may be a one-step selection based on a combination of qualifications and price or two-step selection. In a two-step selection, the first step must be based on qualifications alone and the second step may be based on a combination of qualifications and price or on price alone.

16.2.3.4 Upon request, JOC Contractor must provide City with copies of Subcontractor quotes and the basis for selection of each Subcontractor.

16.2.3.5 If City objects to a selected Subcontractor, City will make the objection and the reasons for the objection known to the JOC Contractor. JOC Contractor must then present an acceptable Subcontractor for the applicable discipline. City will not unreasonably object to or withhold approval of a Subcontractor.

16.2.3.6 For self-performed work, the City retains the right to have the JOC Contractor establish JOC Contractor's costs by bidding their costs against at least three (3) other interested trade Contractors. No self-performed work will be allowed to be performed on a lump sum basis.

16.2.4 Issuance of Job Order

16.2.4.1 City Representative will compare the JOC Contractor's Job Order Cost Proposal with the City's estimate, schedules and other requirements, and then, if the City Representative determines it is in the best interest of City, arrange a meeting with JOC Contractor, at which

time the JOC Contractor's Job Order Cost Proposal will be discussed and negotiated.

16.2.4.2 If the City Representative determines that it is in the best interest of the City, City will then issue a Job Order to JOC Contractor for execution.

16.2.4.3 Specific Job Orders may vary, but unless agreed to by City in writing otherwise, the content of Job Orders under the Agreement will generally be as follow, all of which will be signed and/or initialed by JOC Contractor's designated representative:

- a. The description of the Scope of the Work and Project Schedule (attached as Exhibit A to the Job Order);
- b. The address or location of the Work;
- c. The Agreement Price for Work (Construction) included in the Project (attached as Exhibit B to the Job Order);
- d. The name of the JOC Contractor representative for the Project;
- e. The Drawings and Specifications for the Project;
- f. If any shop drawings, project date and/or samples are required for the Job Order, the date for delivery of each required item (included in the Project Schedule, Exhibit A to the Job order); and
- g. Project Specific Provisions, if any, in Exhibit A to the Job Order, including, without limitation, whether any of the following are required: Pre-Construction Conference, weekly progress meetings, field office, storage enclosure, materials and equipment handling facility, submittals, shop drawings, product data, equipment list, samples, project manual, schedule of values, Construction progress schedule, narrative reports, progress report, progress charts, progress photographs, materials status report, Construction diagram, Construction status report, operation and maintenance data, operating maintenance instructions and parts list, and as-build drawings.

16.2.5 Job Order Intent. Each Job Order will be interpreted to include all items reasonably necessary to complete the Project under that Job Order as described in the scope of the Work in that Job Order. All Work must be performed in a professional manner and all materials used must be new and of the highest quality and of the type best adapted to their purpose, unless otherwise specified. The Notice to Proceed date, and the award date established therein, will be deemed an integral part of the Job Order the same as if set forth therein.

16.3 **INCIDENTAL DESIGN SERVICES**

16.3.1 This effort includes all "extensions of design" for systems that are typically specified in a performance oriented manner by consultants and designers. Examples include: fire sprinkler systems, fire alarm and sprinkler systems, DDC controls, control systems, prefabricated metal building and similar situations. These designs are normally provided under submittals as a shop drawing with engineering backup and as appropriate, seals of registered engineers specializing in the particular system.

16.3.2 Incidental design includes all documents, sketches, schematic diagrams, floor plan layouts, equipment schedules and other documents produced by the JOC Contractor to

define the work required for projects that the City does not develop formal or abbreviated designs requiring a seal by a registered engineer. Incidental design does not include preparation of designs requiring an architect or engineer seal.

16.3.3 JOC Contractor represents, covenants, and agrees, and contractually assumes the obligation to furnish, all of the required Design Services through properly licensed and experienced Design Professionals in complete accordance with all of the duties imposed on a Design Professional under the Agreement Documents, Laws, Regulations, or Legal Requirements, and the common law.

16.3.4 All Design Documents (and all other Project-related documents, models, computer drawings and other electronic expression, photographs and other expressions CADD, and BIM files and images included) that JOC Contractor and/or JOC Contractor's Design Professional(s) prepare in connection with a Job Order and the copyrights therein (collectively, the "Instruments of Service") will be the property of City. JOC Contractor covenants and agrees to execute any additional document reasonably requested by City to confirm such assignment without any additional compensation.

16.4 **CONSTRUCTION SERVICES**

16.4.1 The following subsections of this Section 16.4 set forth requirements beyond those set forth in Section 4 above which apply to Construction Services performed under a Job Order.

16.4.2 JOC Contractor must perform the Work using only those firms, team members and individuals designated by JOC Contractor consistent with each Job Order or otherwise approved by City pursuant to the General Conditions. No other entities or individuals may be used without the prior written approval of the Project Manager.

16.4.3 Construction Phasing

16.4.3.1 City use of the facilities is anticipated while the Work is being performed. The Work must be planned and accomplished so that there will be a minimum of interference and inconvenience to occupants in the building and agencies in the vicinity and to other craftsmen who may have to do work in the affected facilities. Any blockage of building exits or driveways must be coordinated in advance.

16.4.3.2 If applicable, furniture, portable office equipment and wall appurtenances not rigidly fastened to the walls must be moved by JOC Contractor, protected from damage and replaced to the original position upon completion of the work. If the work required by the Job Order will not allow furniture and portable office equipment to be replaced to its original position, new locations will be designated by City. Incidental costs associated with moving one-piece furnishings up to approximately 150 pounds to perform such tasks as painting, carpet or tile replacement, etc., are considered a general cost of building renovation and must be included in the JOC Contractor's Coefficient. Costs for large scale or wholesale removal and replacement of large quantities of desks or modular workstations, copiers, multiple full file cabinets, etc. to another location or storage outside the work space, or disassembly and reassembly of modular furniture is not considered part of the JOC Contractor's Coefficient and will be priced separately.

16.4.3.3 The work must, so far as practicable, be done in definite sections or divisions and confined to limited areas which must be completed before work in other sections or divisions are begun.

General Conditions

- 16.4.4 Work Site Conflicts. In the event of a conflict between JOC Contractor and others in an occupied facility or where other Contractors are performing work on the same facility under other Agreements, City will decide to dispute and that decision will be final.
- 16.4.5 Ownership of Work Product. Work Product prepared or otherwise created in connection with the performance of this Agreement, including the Work, are to be and remain the property of City. For purposes of this provision, "Work Product" will include all designs, drawings, plans, specifications, ideas, renderings and other information or matter, in whatever form created (e.g., electronic or printed) and in all media now known or hereinafter created. All Work Product will be considered Work Made for Hire as defined in the United States Copyright Act 17 U.S.C. §101 (Copyright Act). If for any reason any such Work is found not to be a work for hire, JOC Contractor hereby transfers and assigns ownership of the copyright in such Work to City. The rights in this Section are exclusive to City in perpetuity.
- 16.5 **OPTIONAL LIQUIDATED DAMAGES**
- 16.5.1 Specific Job Orders. City will have the right to assess liquidated damages in relation to any specific JOC Project Agreement as set forth below.
- 16.5.2 Substantial Completion Liquidated Damages. JOC Contractor acknowledges and agrees that if JOC Contractor fails to obtain Substantial Completion of the Work within the Agreement Time, City will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, City and JOC Contractor agree that if JOC Contractor fails to achieve Substantial Completion of the Work within the Agreement Time, City will be entitled to retain or recover from JOC Contractor, as liquidated damages and not as a penalty, the sum per calendar day as indicated in MAG § 108.9.
- 16.5.3 Final Acceptance Liquidated Damages. For the same reasons set forth in Section 16.5.2 above, City and JOC Contractor further agree that if JOC Contractor fails to achieve Final Acceptance of the Work within the Agreement Time, City will be entitled to retain or recover from JOC Contractor, as liquidated damages and not as a penalty, the sum per calendar day as indicated in MAG § 108.9 commencing from the actual date of Substantial Completion or Final Acceptance as required under any specific JOC Project Agreement.
- 16.5.4 MAG Liquidated Damages. Liquidated damages provisions in MAG § 108.9 may apply to any specific JOC Project Agreement.
- 16.5.5 City may deduct liquidated damages assessed pursuant to this Section 16.5 from any unpaid amounts then or thereafter due JOC Contractor under the Agreement or any specific JOC Project Agreement between JOC Contractor and City. Any liquidated damages not so deducted from any unpaid amounts due JOC Contractor must be payable to City at the demand of City, together with interest from the date of the demand at the highest lawful rate of interest payable to JOC Contractor.
- 16.6 **PERFORMANCE MEASUREMENT**
- 16.6.1 Performance Assessment. After the Final Acceptance of Work under each Job Order, City will complete a written evaluation of the performance of JOC Contractor on the Job Order.
- 16.6.2 Consideration in Assignment of Work. JOC Contractor's record of cost, schedule and

quality performance and comparative assessments will be significant considerations in City's determination whether to award future Job Orders. JOC Contractor agrees that any determination by City not to award future Job Orders or Option periods based on performance will be at the sole discretion of City.

SECTION 17 - PROVISIONS APPLICABLE SOLELY TO PRE-CONSTRUCTION SERVICES FOR CONSTRUCTION MANAGER AT RISK

17.1 ADDITIONAL DEFINITIONS

The definitions set forth in Section 2 and 15.1 above will apply to all Pre-Construction Services Agreements.

17.2 GENERAL

17.2.1 CM@Risk must perform the Services required by, and in accordance with the Agreement Documents and as outlined in Exhibit A of the Agreement to the satisfaction of the Project Manager, exercising the degree of care, skill, diligence and judgment a professional construction manager experienced in the performance of such services for construction and/or facilities of similar scope, function, size, quality, complexity and detail to the Project in urban areas throughout the United States, would exercise at such time, under similar conditions. CM@Risk must, at all times, perform the required services consistent with sound and generally accepted engineering principles and construction management and construction contracting practices.

17.2.2 As a participating member of the Project Team, CM@Risk must provide to City and Design Professional a written evaluation of City's Project Program and budget, each in terms of the other, with recommendations as to the appropriateness of each. CM@Risk must prepare a Baseline Cost Model that validates City's budget. The Baseline Cost Model must include all assumptions and basis of estimates in enough detail so that the Project Team can compare future detail estimates to the Baseline Cost model for variances. City and Design Professional will provide all the reasonably required data that is available in order to reach agreement between the team members that the Baseline Cost Model is an accurate projection of the costs of the Project.

17.2.3 CM@Risk must attend Project Team meetings, which may include, but are not limited to, bi-weekly Project management meetings, Project workshops, special Project meetings, construction document rolling reviews, public meetings and partnering sessions. CM@Risk attendance at design or other meetings in which CM@Risk is provided the opportunity but does not actively participate and/or is not properly prepared is not acceptable. Repeated instances of non-participation and/or lack of preparedness will be grounds for termination of CM@Risk Agreement for default.

17.2.4 CM@Risk must provide Pre-Construction Services, described herein, in a timely manner and consistent with the intent of the most current Drawings and Specifications. CM@Risk must promptly notify City in writing whenever CM@Risk determines any Drawings or Specifications are inappropriate for the Project and/or cause changes in the scope of Work that deviates more than the allowed contingencies within the Baseline Cost Model or requires an adjustment in the Baseline Cost Model, Detailed Cost Estimate, Detailed Project Schedule, GMP Proposals and/or in the Agreement Time for the Work, to the extent such as established.

- 17.2.5 CM@Risk when requested by City, must attend, make presentations and participate as may be appropriate in public agency and or community meetings, relevant to the Project. CM@Risk must provide drawings, schedule diagrams, budget charges and other materials describing the Project when their use is required or appropriate in any such public agency meetings.
- 17.2.6 Ownership of Work Product. All Work Product prepared or otherwise created in connection with the performance of this Agreement, including the Work, are to be and remain the property of City. For purposes of this provision, "Work Product" will include all designs, drawings, plans, specifications, ideas, renderings and other information or material, in whatever form created (e.g., electronic or printed) and in all media now know or hereinafter created. All Work Product will be considered Work Made for Hire as defined in the United States Copyright Act 17 U.S.C. §101 (Copyright Act). If for any reason any such Work is found not to be a work for hire, Contractor hereby transfers and assigns ownership of the copyright in such Work to City. The rights in this Section are exclusive to City in perpetuity.
- 17.2.7 CM@Risk represents to City in completing Pre-Construction Services and providing the reports and analysis required thereunder, that Work can be properly and timely constructed within the GMP Proposal, if accepted. CM@Risk does not assume any design responsibilities unless specifically called for in the scope of work, but CM@Risk will be responsible for their errors, omissions or inconsistencies included in the Work.
- 17.3 **DETAILED PROJECT SCHEDULE**
- 17.3.1 The fundamental purpose of the Detailed Project Schedule is to identify, coordinate and record the tasks and activities to be performed by all of the Project Team members and then for the Project Team to utilize that Deliverable as a basis for managing and monitoring all member's compliance with the schedule requirements of the Project. Each Project Team member is responsible for its compliance with the Detailed Project Schedule requirements. CM@Risk must, however, develop and maintain the Detailed Project Schedule on behalf of and to be used by the Project Team based on input from the other Project Team members. The Baseline Project Schedule must be developed as part of the Baseline Cost Model. The Detailed Project Schedule must use the Critical Path method ("CPM") technique, unless required otherwise, in writing by City. CM@Risk must use scheduling software acceptable to City to develop the Detailed Project Schedule. The Detailed Project Schedule must be presented in graphical and tabular reports as agreed upon by the Project Team. If Project phasing as described below is required, the Detailed Project Schedule must indicate milestone dates for the phases once determined. As part of construction phase, City may require CM@Risk to prepare a "resource loaded" schedule for all work, including work performed by Subcontractors, detailing each of the project tasks and the required/anticipated number of personnel per day for each task. CM@Risk must also indicate on the schedule its ability to meet said required/anticipated personnel requirements.
- 17.3.2 CM@Risk must include and integrate in the Detailed Project Schedule the services and activities required of City, Design Professional and CM@Risk including all construction phase activities based on the input received from City and the Design Professional. The Detailed Project Schedule must define activities as determined by City to the extent required to show: (a) the coordination between preliminary design and various pre-construction documents, (b) any separate long-lead procurements, (c) any permitting

issues, (d) any land, right-of-way, or easement acquisition, (e) bid packaging strategy and awards to Subcontractors and Suppliers, (f) major stages of construction, (g) start-up and commissioning, and (h) occupancy of the completed Work by City. The Detailed Project Schedule must include by example and not limitation, proposed activity sequences and durations for design, procurement, construction and testing activities, milestone dates for actions and decisions by the Project Team, preparation and processing of shop drawings and samples, delivery of materials or equipment requiring long-lead time procurement (if any), milestone dates for various construction phases, Total Float for all activities to the extent authorized by City, relationships between the activities, City's occupancy requirements showing portions of the Project having occupancy priority, and proposed dates for Final Acceptance.

- 17.3.3 A Baseline Project Schedule must be initiated with the project Baseline Cost Model and agreed to by the project team at the same time. CM@Risk must update and maintain a detailed Project Schedule throughout pre-construction such that it will not require major changes at the start of the construction phase to incorporate CM@Risk's plan for the performance of the construction phase Work. CM@Risk must provide updates and/or revisions to the Detailed Project Schedule for use by the Project Team, whenever required, but no less often than at the Project Team meetings. CM@Risk must include with such submittals a narrative describing its analysis of the progress achieved to-date vs. the Baseline Project Schedule, including any concerns regarding delays or potential delays, and any recommendations regarding mitigating actions.
- 17.3.4 If phased construction is deemed appropriate at the time of developing the Baseline Cost Model or during the development of the Detailed Project Schedule, and City approves, CM@Risk must review the design and make recommendations regarding the phased issuance of Construction Documents to facilitate phased construction of the Work, with the objective of reducing the Project Schedule and/or Cost of the Work. CM@Risk must take into consideration such factors as natural and practical lines of work severability, sequencing effectiveness, access and availability constraints, total time for completion, construction market conditions, labor and materials availability, and any other factors pertinent to saving time and cost.
- 17.3.5 Long Lead Time Items. As part of developing the Detailed Project Schedule, CM@Risk must identify all long lead time materials, fabrications, equipment, or other items which may impact the Project Schedule and may require early action on the part of the Project Team. Dates for selecting and ordering long lead time items will be included and highlighted in the Detailed Project Schedule
- 17.3.6 Equipment Plan. Contractor must develop an Equipment Plan that addresses all rental and owned equipment, regardless of whether such equipment will be provided by CM@Risk or subcontractor(s), that will be necessary to construct the Project and the cost of which will be included as a Cost of the Work in the GMP Proposal. The Equipment Plan will seek to minimize the cost of the equipment to City and maximize the efficient and coordinated use of the equipment for completion of the Project. The Equipment Plan will not only include the costs and allowable lease rates for the equipment, but will also include an equipment schedule that will be incorporated into the Detailed Project Schedule and the Schedule of Values submitted with the GMP Proposal.

17.4 **DESIGN DOCUMENT REVIEWS**

General Conditions

- 17.4.1 CM@Risk must evaluate periodically the availability of labor, materials/equipment, cost-sensitive aspects of the design; and other factors that may create an unacceptable variance to the Baseline Cost Model and/or Baseline Project Schedule.
- 17.4.2 CM@Risk must recommend, in conjunction with the Project Team, those additional surface and subsurface investigations that, in its professional opinion, are required to provide the necessary information for CM@Risk to construct the Project. These additional investigations, if agreed to be necessary by the Project Manager and the Design Professional, will be acquired by City and copies of the reports will be provided to CM@Risk.
- 17.4.3 CM@Risk must meet with the Project Team as required to review designs during their development. CM@Risk must familiarize itself with the evolving documents through pre-construction. CM@Risk must proactively advise the Project Team and make recommendations on factors related to construction costs, and concerns pertaining to the feasibility and practicality of any proposed means and methods, selected materials, equipment and building systems, and, labor and material availability. CM@Risk must furthermore advise the Project Team on proposed site improvements, excavation and foundation considerations, as well as, concerns that exist with respect to coordination of the Drawings and Specifications. CM@Risk must use established value analysis principles in recommending cost effective alternatives.
- 17.4.4 CM@Risk must routinely conduct constructability and bid-ability reviews of the Drawings and Specifications as necessary to satisfy the needs of the Project Team. The reviews must attempt to identify all discrepancies and inconsistencies in the Construction Documents especially those related to clarity, consistency, completeness and coordination of Work of Subcontractors and Suppliers.
- 17.4.4.1 CM@Risk must evaluate whether: (a) the Drawings and Specifications are configured to enable efficient construction; (b) design elements are standardized; (c) construction efficiency is properly considered in the Drawings and Specifications; (d) module/preassembly design is prepared to facilitate fabrication, transport and installation; (e) sequences of Work required by or inferable from the Drawings and Specifications are practicable; (f) the design has taken into consideration efficiency issues concerning access and entrance to the site, laydown and storage of materials, staging of site facilities, construction parking, and other similar pertinent issues; and (g) the design maintains continued operation of the existing City systems and maintains traffic on adjacent roadways. CM@Risk must also review the Drawings and Specifications to ensure that what is depicted therein can be constructed as designed and must promptly inform the Project Team of any issues.
- 17.4.4.2 CM@Risk must check cross-reference and complementary Drawings and sections within the Specifications and in general evaluate whether: (a) the Drawings and Specifications are sufficiently clear and detailed to minimize ambiguity and to reduce scope interpretation discrepancies; (b) named materials and equipment are commercially available and are performing well, or otherwise, in similar installations; (c) Specifications include alternatives in the event a requirement cannot be met in the field; and (d) in its professional opinion, the Project is likely to be subject to Differing Site Conditions.
- 17.4.4.3 The results of the reviews must be provided to Project Team in formal, written reports clearly identifying all reviewed documents and the discovered discrepancies and inconsistencies in the Drawings and Specifications with notations and recommendations

made on the Drawings, Specifications and other documents. CM@Risk must meet with Project Team to discuss any findings and review reports.

17.4.4.4 CM@Risk's reviews must be from a Contractor's perspective, and though it will serve to eliminate/reduce the number of RFIs) and changes during the construction phase, responsibility for the Drawings and Specifications will remain with the Design Professional and not CM@Risk.

17.4.5 It is CM@Risk's responsibility to assist the Design Professional in ascertaining that, in CM@Risk's professional opinion, the Construction Documents are in accordance with applicable Laws, Regulations, or Legal Requirements, building codes, sound engineering principle's rules and regulations. If CM@Risk recognizes that portions of the Construction Documents are at variance with applicable laws, statutes, ordinances, building codes, sound engineering principle's rules and regulations, it must promptly notify the Project Team in writing, describing the apparent variance of deficiency. However, the Design Professional is ultimately responsible for the compliance of the Drawings and Specifications with those laws, statutes, ordinances, building codes, rules and regulations.

17.4.6 The Project Team will routinely identify and evaluate using value analysis principles and alternate systems, approaches, design changes that have the potential to reduce Project costs while still delivering a high quality and fully functional Project consistent with the Project Program. If the Project Team agrees, CM@Risk in cooperation with the Design Professional, will perform a cost/benefit analysis of the alternatives and submit such in writing to the Project Team. City, through the Project Manager, will direct which alternatives will be incorporated into the Project. The Design Professional will have full design responsibility for the review and incorporation of CM@Risk suggested alternatives into the Drawings and Specifications. CM@Risk must analyze the costs and schedule impacts of the alternatives against the Baseline Cost Model and Schedule and provide a recommendation for the Project Team's consideration and City's approval prior to the establishment of the GMP.

17.5 **BASELINE COSTS MODEL, DETAILED COST ESTIMATES, AND SCHEDULE OF VALUES**

17.5.1 At the conclusion of the Master Planning and Programming, if required, CM@Risk will review all available information regarding the design and scope of the Project using CM@Risk's experience in performing similar work, knowledge of similar projects and current and projected construction costs and, based upon that review, must develop a Baseline Cost Model for review by the Project Team and approval by City. Once approved by City, the Baseline Cost Model will be continually referenced as detailed estimates are created as the design progresses throughout Pre-Construction until the final GMP for the entire Project is established. A final GMP for the entire Project must be established and approved by City prior to the start of construction. It is the responsibility of CM@Risk to ensure City has sufficient information to evaluate and approve a final GMP prior to the time necessary to start construction so construction can be completed within the Agreement Time. The Project Detailed Cost Estimate will be the best representation from CM@Risk of what the complete functional Project's construction costs will be as indicated by the most current available documents and will be constantly checked against the Baseline Cost Model. CM@Risk must communicate to the Project Team and assumptions made in preparing the Baseline Cost Model. The Baseline Cost Model must support CM@Risk's Detailed Cost Estimates and may be broken down initially as dictated by the available information, as required by City.

- 17.5.2 After receipt of the Design Professional's most current documents from certain specified pre- construction milestones, CM@Risk must provide a draft Detailed Cost Estimate including a detailed written report detailing any variances to the Baseline Cost Model and Baseline Project Schedule. The Design Professional and CM@Risk will reconcile any disagreements on the estimate to arrive at an agreed upon Detailed Cost Estimate for the construction costs based on the scope of the Project through that specified pre-construction milestone. Pre-Construction milestones applicable to this paragraph are: Master Planning and Programming, Schematic Design, 50% Design Development, 100% Design Development, and 50% Construction Drawings, If no consensus is reached, City will make the final determination. If the Project Team requires additional updates of the Detailed Cost Estimate beyond that specified in this paragraph, CM@Risk must provide the requested information in a timely manner.
- 17.5.3 If at any point the Detailed Cost Estimate submitted to City exceeds the previously accepted Baseline Cost Model or previously approved Detailed Cost Estimate agreed to as set forth in Section 17.5.2 above, CM@Risk must make appropriate recommendations to project Team on means/methods, materials, and or other design elements that it believes will reduce the estimated construction costs, such that it is equal to or less than the established Project Team's Baseline Cost Model.
- 17.5.4 Unless other levels of completion are agreed to in writing in the Construction Documents, at 50% Construction Drawings and included with the associated report, CM@Risk must also submit to the Project Team for review and approval a Schedule of Values that complies with the following requirements. The Schedule of Values must be based on City standard bid schedule and highlight significant variances from any previously submitted Schedule of Values. The Schedule of Values must be directly related to the breakdowns reflected in the Detailed Project Schedule and CM@Risk's Detailed Cost Estimate. In addition, the Schedule of Values must: (a) detail unit prices and quantity take-offs, (b) detail all other contingencies and unit price Work shown and specified in the detailed design documents.
- 17.5.5 CM@Risk is to track, estimate/price and address the Project Team's overall project cost issues that arise outside of the Baseline Cost Model and the latest approved Detailed Cost Estimate such as: City generated changes, Project Team proposed changes, alternate system analysis, constructability items and value engineering analysis. The system used to implement this process will be referred to as the Design Evolution Log. This is to be addressed between the Baseline Cost Model and the Master Planning and Programming Detailed Cost Estimate, and then (unless other levels of completion are agreed to in writing in the Construction Documents) between the Detailed Cost Estimates for each of the pre-construction milestones thereafter, Schematic Design, 50% Design Development, 100% Design Development, and 50% Construction Documents, and the bid packages for all Phases.
- 17.5.6 Upon request by City, CM@Risk must submit to City a cash flow projection for the Project based on the current updated/revised Detailed Project Schedule and the anticipated level of payments for CM@Risk during the design and construction phases. In addition, if requested by City and based on information provided by City, CM@Risk must prepare a cash flow projection for the entire Project based on historical records for similar types of projects to assist City in the financing process.
- 17.5.7 Construction Water. CM@Risk must estimate the quantity of water to be used and include the cost thereof in each Detailed Cost Estimate and GMP Proposal provided by City.

17.6 SUBCONTRACTOR AND MAJOR SUPPLIER SELECTIONS

- 17.6.1 There are two ways to select Subcontractors and major Suppliers prior to submission of a GMP Proposal: (1) qualifications-based selection; or (2) a combination of qualifications and price. Except as noted below, the selection of Subcontractors/Suppliers is the sole responsibility of CM@Risk. In any case, CM@Risk is solely responsible for the performance of the selected Subcontractors/Suppliers, and for compliance with the requirements of Title 34 of the Arizona Revised Statutes in the selection of a Subcontractors/Suppliers, to the extent applicable. CM@Risk must comply with its Subcontractor Selection Plan submitted with its Statement of Qualifications.
- 17.6.2 City may approve the selection of a Subcontractor(s) or Suppliers(s) based only on their qualifications when CM@Risk can demonstrate it is in the best interest of the Project. All Work that is performed, after such a qualifications-based selection, for a price that is negotiated by CM@Risk will be billed in accordance with the GMP for actual costs and may be subject to audit by City.
- 17.6.2.1 Qualifications based selection of a Subcontractor(s)/Supplier(s) should only occur prior to the submittal of the GMP Proposal.
- 17.6.2.2 If a Subcontractor/Supplier selection plan was submitted and agreed to by City, CM@Risk must apply the plan in the evaluation of the qualifications of a Subcontractor(s) or Supplier(s) and provide City with its review and recommendations.
- 17.6.2.3 CM@Risk must receive written City approval for each selected Subcontractor(s) and Supplier(s).
- 17.6.2.4 CM@Risk must negotiate costs for services/supplies from each Subcontractor/Supplier selected under this method.
- 17.6.3 All Work must be competitively bid unless a Subcontractor or Supplier was selected pursuant to Section 17.6.2 above.
- 17.6.3.1 CM@Risk must develop Subcontractor and Supplier interest, submit the names of a minimum of three qualified Subcontractors or Suppliers for each trade in the Project for approval by City and solicit bids for the various Work categories. If there are not three qualified Subcontractors/Suppliers available for a specific trade or there are extenuating circumstances warranting such, CM@Risk may request approval by City to submit less than three names. Without prior written notice to City, no change in the recommended Subcontractors/Supplies will be allowed.
- 17.6.3.2 If City objects to any nominated Subcontractor/Supplier or to any self-performed Work for good reason, CM@Risk must nominate a substitute Subcontractor/Supplier that is acceptable to City.
- 17.6.3.3 CM@Risk must distribute Drawings and Specifications, and when appropriate, conduct a Pre- Bid Conference with prospective Subcontractors and Suppliers.
- 17.6.3.4 If CM@Risk desires to self-perform certain portions of the Work, it must request to be one of the approved Subcontractor bidders for those specific bid packages. CM@Risk's bid will be evaluated in accordance with the process identified below. If events warrant and City concurs that it is necessary in order to ensure compliance with the Project Schedule and/or the most recent Detailed Cost Estimate, CM@Risk may be authorized to self-

perform Work without bidding or rebidding the Work. When CM@Risk self-performs work without bidding, only the actual costs associated with performing the Work in accordance with the approved GMP will be billed and may be subject to audit by City.

- 17.6.3.5 CM@Risk must receive, open, record and evaluate the bids; provided, however, that if CM@Risk or one of its affiliates is bidding to self-perform the Work that is the subject of the bid, then the bids must be received, opened, recorded and evaluated by Project Manager instead of CM@Risk. Bids for each category of Work must be opened and recorded at a pre-determined time. The apparent low bidders must be interviewed to determine the responsiveness of their proposals. In evaluating the responsiveness of bid proposals CM@Risk, in addition to bid price, may consider the following factors: past performance on similar projects, qualifications and experience of personnel assigned, quality management plan, approach or understanding of the Work to be performed, and performance schedule to complete the Work. The final evaluation of Subcontractor/Supplier bids must be done with Project Manager in attendance to observe and witness the process. CM@Risk must resolve any Subcontractor/Supplier bid withdrawal, protest or disqualification in connection with the award at no increase in the Cost of Work.
- 17.6.4 CM@Risk will be required to prepare two different reports on the subcontracting process.
- 17.6.4.1 Within fifteen days after each major Subcontractor/Supplier bid opening process; CM@Risk must prepare a report for City's review and approval identifying the recommended Subcontractors/Supplier for each category of Work. The report must detail: (a) the name of the recommended Subcontractor/Supplier and the amount of the Subcontractor/Supplier bid for each sub-agreement; (b) the sum of all recommended Subcontractor/Supplier bids received; (c) and trade work and its cost that CM@Risk intends to self-perform, if any.
- 17.6.4.2 Upon completion of the Subcontractor/Supplier bidding process, CM@Risk must submit a summary report to City of the entire Subcontractor/Supplier selection process. The report must indicate, by bid process, all Subcontractors/Suppliers contacted to determine interest, the Subcontractors/Suppliers solicited, the bids received and costs negotiated, and the recommended Subcontractors/Suppliers for each category of Work.
- 17.6.5 The approved Subcontractors/Suppliers will provide a Schedule of Values with their bid proposals, which will be used to create the overall Project Schedule of Values.
- 17.6.6 If after receipt of sub-bids or after award to Subcontractors and Suppliers, City objects to any nominated Subcontractor/Supplier or to any self-performed Work without any reasonable basis, CM@Risk must nominate a substitute Subcontractor or Supplier, preferably if such option is still available, from those who submitted Subcontractor bids for the Work affected. Once such substitute Subcontractors and Suppliers are consented to by City, CM@Risk's proposed GMP for the Work or portion thereof must be correspondingly adjusted to reflect any higher or lower costs from any such substitution.
- 17.7 **GMP PROPOSAL**
- 17.7.1 When a GMP Proposal is submitted for a phase of the Work, the GMP will have a Detailed Cost Estimate of the Costs of the Work (as set forth in Section 15.2) in each phase of the Work that is being proposed plus the current estimate for all other Work. City will not approve the GMP for the phase of work without a total estimate for the complete Project. City may request a GMP Proposal for all or any portion of the Project and at any time during pre-

construction. Any GMP Proposals submitted by CM@Risk must be based on and consistent with Baseline Cost Model and the current update/revised Detailed Cost Estimate at the time of the request and include any clarifications or assumptions upon which the GMP Proposal(s) are based.

- 17.7.2 A GMP Proposal for the entire Project will be the sum of the Cost of the Work, CM@Risk Fee, and General Conditions Cost. CM@Risk guarantees to complete the Project at or less than the final GMP Proposal amount plus approved Change Orders. CM@Risk will be responsible for any costs for expenses that would cause the Cost of the Work actually incurred, including the Construction Fee and General Conditions Costs, to exceed the GMP.
- 17.7.3 CM@Risk must prepare its GMP Proposal in accordance with City's request for GMP Proposal requirements based on the most current completed Drawings and Specifications at that time, which unless otherwise directed by City in writing, will be at 100% Construction Drawings. CM@Risk must mark the face of each document of each set upon which its GMP Proposal is based. These documents must be identified as the GMP Plans and Specifications. CM@Risk must send one set of those documents to the Project Manager, keep one set and return the third set to the Design Professional.
- 17.7.4 An updated/revised Detailed Project Schedule, Equipment Plan, and Schedule of Values must be included in any GMP Proposal(s), all of which must reflect the GMP Plans and Specifications the Detailed Project Schedule must be shown in relationship to the Project Schedule and identify any variance to the Baseline Project Schedule. Any such Detailed Project Schedule updates/revisions must continue to comply with the requirements of Section 17.3.1 through 17.3.5.
- 17.7.5 GMP Proposals(s) Review and Approval
- 17.7.5.1 CM@Risk must meet with the Project Team to review the GMP Proposal(s) and the written statement of its basis. In the event the Project Team discovers inconsistencies or inaccuracies in the information presented, CM@Risk must make adjustments as necessary to the GMP Proposal.
- 17.7.5.2 If during the review and negotiation of GMP Proposals design changes are required, City may authorize and cause the Design Professional to revise the GMP Plans and Specifications to the extent necessary to reflect the agreed-upon assumptions and clarifications contained in the final approved GMP Proposal. Such revised GMP Plans and Specification will be furnished to CM@Risk. CM@Risk must promptly notify the Project Team in writing if any such revised GMP Plans and Specifications are inconsistent with the agreed upon assumptions and clarifications.
- 17.7.6 All portions of or items comprising the GMP Proposal are subject to audit by City, as deemed appropriate by City, including, without limitation, any based upon unit prices or Work to be self- performed by CM@Risk, or its affiliates.
- 17.8 **PAYMENT PROCEDURE FOR PRE-CONSTRUCTION SERVICES**
- 17.8.1 Requests for monthly payments by CM@Risk for Pre-Construction Services must be submitted monthly and must be accompanied by a progress report, detailed invoices and receipts, if applicable. Any requests for payment must include, as a minimum, a narrative description of the tasks accomplished during the billing period, a listing of any Deliverables submitted, and copies of any Subconsultants' requests for payment, plus

similar narrative and listings of Deliverables associated with their Work. Payment for services negotiated as a lump sum will be made in accordance with the percentage of work completed during the preceding month.

17.8.2 In no event will City pay more than seventy-five (75%) of the Agreement Price until acceptance of ALL Pre-Construction Services and award of the final approved Construction Services Agreement for the entire Project by City Council. If CM@Risk does not prepare a GMP Proposal that is acceptable to City, or the GMP Proposal exceeds the City's Construction Budget, then CM@Risk understands and acknowledges that it will forfeit any right to receive the 25% of the Agreement Price being retained by City.

17.8.3 CM@Risk agrees that no charges or claims for costs or damages of any type will be made by it for any delays or hindrances beyond the reasonable control of City during the progress of any portion of Pre-Construction Services specified in this Agreement. Such delays or hindrances, if any, will be solely compensated for by an extension of time for such reasonable period and may be mutually agreed between the parties. It is understood and agreed, however, that permitting CM@Risk to proceed to complete any such Services, in whole or in part after the date to which the time of completion may have been extended, will in no way act as a waiver on the part of City of any of their respective legal rights herein.

17.8.4 No compensation to CM@Risk will be allowed contrary to Article I, Chapter I, Title 34 of the Arizona Revised Statutes.

17.8.5 If any service(s) executed by CM@Risk is abandoned or suspended in whole or in part, for a period of more than 180 days through no fault of CM@Risk, CM@Risk is to be paid for the services performed prior to the abandonment or suspension.

17.9 **SURVIVAL OF THE DESIGN SERVICES AGREEMENT, DUTIES, OBLIGATIONS AND WARRANTIES**

If the GMP Proposal is accepted by City and a Construction Agreement is entered into between City and CM@Risk, the duties, obligations and warranties of CM@Risk under the Pre- Construction Services Agreement survive and are incorporated into the resulting Construction Agreement.

General Conditions Appendices

SECTION 15 – APPENDICES

The following Appendices attached hereto are referenced in the General Conditions and are incorporated herein.

- Appendix 1 – Policy Statement for Calculating Delays and Damages
- Appendix 2 – Cost Reduction Incentive Proposals for Design Bid Build Agreements
- Appendix 3 – Contractor's Affidavit Regarding Settlement of Claims
- Appendix 4 – Forms of Performance Bond
- Appendix 5 – Forms of Payment Bond
- Appendix 6 – Dispute Resolution
- Appendix 7 – Certificate of Completion
- Appendix 8 – Construction Sign Detail
- Appendix 9 – Cost of the Work (Applicable solely to Construction Manager at Risk and Job Order Contracting)
- Appendix 10 – Landscape Establishment Period
- Appendix 11 – Standard Form Construction Escrow Agreement

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CALCULATING DELAYS AND DAMAGES

The purpose of this policy statement is to establish guidelines and procedures for negotiation between the Contractor and City of Chandler relating to compensation for delays pursuant to Arizona Revised Statutes (A.R.S.) 34-221(F). This policy statement contains notice requirements in addition to those set forth in the Agreement Documents, and will be the Agreement Provision contemplated by that statute.

NOTE: As used herein, the term "Engineer" will refer to the City of Chandler City Engineer or his/her designated representative. Nothing in this Policy Statement will be construed to void any provision in the Agreement which requires timely notice of delays or provides for arbitration or any other procedure for settlement or provides for liquidated damages.

I. TYPES OF DELAYS:

For the purposes of this document, there are essentially four types of delays encountered by City of Chandler Construction Contractors; excusable/compensable, excusable/non-compensable, non-excusable, and concurrent. Only delays that extend Agreement Completion Time set forth in the Agreement Document will be considered for issues relating to Agreement extensions or additional compensation. All other delays are considered to be activity delays and do not entitle the Contractor to either time extensions or additional compensation. Agreement Completion Time will be defined as the date set forth in Maricopa Association of Governments (MAG) Uniform Standard Specification Section 101 and as may be modified by the Agreement Documents.

A. Excusable/Compensable:

These are delays caused solely by the City's actions or inactions, are unreasonable under the circumstances, and which were not within the contemplation of the parties to the Agreement at or prior to the time of execution of the Agreement. Since the Contractor presumably has no control over the events causing the delay, he may be entitled to both Agreement time extensions and additional compensation for delay damages. Further, he/she may be entitled to additional compensation from the impact of that delay on other work. Examples of excusable/compensable (E/C) delays include: failure to properly locate an underground City-owned utility within 2 feet of the actual location; failure to relocate City-owned utilities far enough in advance of construction in an area where the Contractor is scheduled to work that it delays start or completion of the Contractor's regularly scheduled work; failure to provide City-furnished equipment or materials in a timely manner if required by the Agreement; failure to acquire necessary Right-of-Way or Public Utility Easements prior to the Contractor beginning Work in the area; failure to timely return Shop Drawings or other Agreement Submittals in accordance with the Agreement; unreasonable delay by the City in making decisions which affect critical activities; surveying errors when the City is contractually responsible for providing Project Surveying. This list is not meant to be all inclusive, but is intended merely as examples of the type of City action or inaction which can result in a Contractor's claim for additional time and compensation.

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B. Excusable/Non-compensable:

These are delays over which neither the City nor the Contractor had control. Since both parties to the Agreement have been potentially damaged by the delay, but neither have caused it, only Time Extensions are warranted. Examples of excusable, non-compensable (E/N) delays include: unusually severe weather; fire; acts of God; failure of non-City owned utilities (SRP, CenturyLink, Cable TV, Southern Pacific Railroad, and Southwest Gas, etc.) to properly or timely locate accurately; failure of non-City owned utilities to relocate in advance of construction; the voluntary or involuntary filing for Bankruptcy protection by a Supplier or Subcontractor which causes the Supplier/Subcontractor to fail to meet a contractual deadline provided the Contractor can provide documentation that he/she executed the required Purchase Orders/Subcontract Agreements and received delivery schedules which, if met, would have eliminated the delay; delays as a result of an incomplete shutdown of a City or non-City owned utility main (the City does not guarantee a complete shutdown). This list also is not necessarily all inclusive but merely indicative of type and class of E/N delays.

C. Non-excusable/Non-compensable:

These are delays caused by the actions or inactions of Contractor or an officer, employee, agent, Subcontractor, Supplier or any other party for whom the Contractor is responsible. Since the Contractor has assumed responsibility for the risks associated with the events that caused the delay, he/she are not entitled to either time extensions or monetary delay damages. All non-excusable delays are also non-compensable. Examples of non-excusable, non-compensable (N/N) delays include: failure to perform by the Contractor, its Subcontractors and/or Suppliers (except as noted in section I.B above); failure to provide adequate labor, materials, and/or equipment on the Project; failure to perform contractually-required coordination with utilities, agencies and other Contractors; failure to notify the Engineer, in writing, of delay impacts within two working days, as required by MAG 104.2.3, or the next work day, as required by MAG 109.8.2; failure to timely submit Shop Drawings; failure to pothole or otherwise visually locate utilities sufficiently ahead of the Work to allow the Engineer to direct corrective action when necessary; delays due to retesting of previously failed work, re-inspection, and/or restaking resulting from faulty workmanship, poor quality control, or lack of compliance with Agreement Specifications. Again, this list is not necessarily all inclusive.

D. Concurrent:

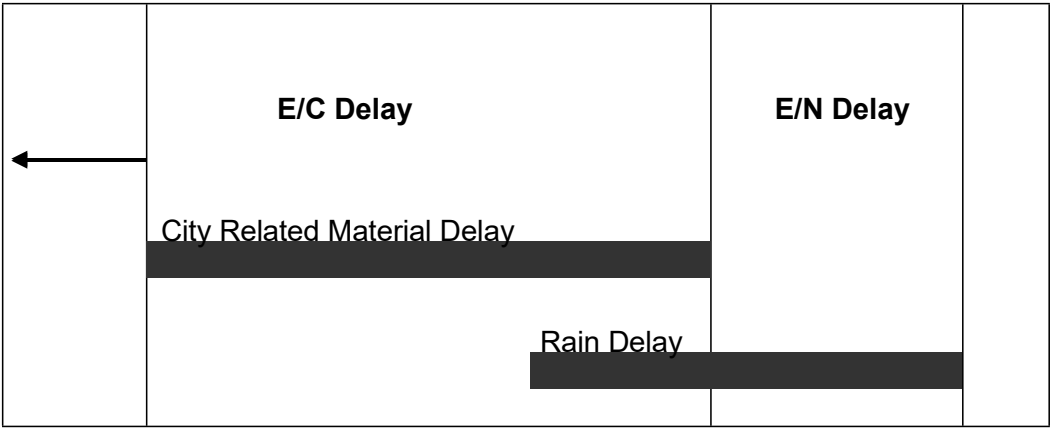
When two or more delays occur simultaneously or overlap, each delay is analyzed separately to determine its impact on the overall project completion date based on when that delay started. Once again, only those delays which actually extend the Agreement completion time are considered as delays. The concurrent delay is considered an additional delay only to the extent it prolongs the delay to the Agreement Completion Time beyond the date that the one it is concurrent with had already delayed that date. For example, if two delays are concurrent, and one is five days long and the second is seven days long, the second concurrent delay will only extend the Agreement Completion Time by two days. The same method of analysis is

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used when there are multiple concurrent delays. Only those extending the Project Completion Date are considered to be delays for the purposes of this policy. The portion of each concurrent delay that delays the completion of the work is classified in the same manner as described previously for individual delays and being either E/C, E/N or N/N.

An example of a concurrent delay is where the City delays furnishing material, but the Contractor could not have installed it anyway due to unusually severe weather. The effect of the first delaying activity will extend for the full duration and will be considered controlling on the Contractor’s schedule. A subsequent, concurrent delay will thereafter only be considered to effect the project completion (if at all) once the first delaying activity has ceased to impact the project completion. In this case, if the unusually severe weather continued and delayed the work after the material was delivered, the first portion of the delay would be classified E/C (delay for material) and the second as E/N (delay due to unusually severe weather). Using the procedure set forth above, the entire concurrent portion would be considered E/C as shown in the chart which follows.

Example of a Concurrent Delay:



II. ANALYZING THE DELAY:

The Contractor must provide all documents required or requested by the Engineer to analyze the delay(s). It is important to understand that, prior to the delay analysis, delays and their impacts are alleged issues. The information the Contractor provides will be compared with the Inspector’s Daily Log, Schedules and other available Project information and together they will support or refute that delays occurred and, if so, how they impact other work and the overall project completion. The Contractor’s delay in providing these documents will be considered prima facie evidence that either the delay did not occur or it did not impact the Project Completion Date and any claim for time extension or damages will be denied.

The Engineer will accept delay analyses in CPM format, as these may demonstrate to his/her satisfaction whether or not Project Completion has been impacted by a specific event. If the Contractor chooses not to use CPM scheduling procedures, then the burden will be on the Contractor to prove to the Engineer’s satisfaction that the Project Completion has been impacted. The procedures

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below assume that the Contractor is using CPM scheduling methods. As a minimum the Contractor must provide the following materials to the Engineer:

- A. As-Planned Schedule. The initial construction schedule, required by the Agreement Documents, will be considered the baseline schedule. It is to the Contractor's advantage that the As-Planned (baseline) Schedule be as detailed as possible in order for delays, as they occur, to be incorporated into the schedule in representative locations. It is also to the Contractor's advantage to use a computer software program to generate the schedule since updated schedules are required monthly by the Agreement Documents and since updated schedules are required to support delays and requests for additional compensation for delays. The As-Planned (baseline) Schedule must be presented in network format which clearly shows the interrelationships of the activities. The Contractor must also provide a printout of the activities showing early start, early finish, late start, late finish, duration and float. The activity list printout must also indicate predecessor and successor activities.
- B. As-Built Schedules. The as planned (baseline) schedule must be updated with complete progress-to-date information (actualized) up to the date of the start of the alleged delay. Each updated schedule will serve as the as-built schedule for analyzing the alleged delay and provide a new baseline as-planned schedule for the next delay. This process must be repeated for each alleged delay as it occurs. In updating the baseline schedule, the alleged delay must be treated as an activity and inserted into the schedule as a predecessor to the impacted activity (ies). When an activity that has already started is impacted, it is preferable to divide this activity into two parts and show the impact affecting the second part. For schedules which incorporate a time line (or data date), the delay activity must be inserted at the time it actually occurred. Some software scheduling programs have a PAUSE-RESUME feature that can be used to facilitate the requirements. The updated schedule must also be accompanied by a listing of activities as with the baseline schedule. This activities list must contain the alleged delay as an activity showing the duration and the activities which are predecessors and successors to it. When computer generated schedules are used, the Contractor must provide, in electronic media format, the complete data files for the updated schedule that included the delay activity, preferably either in Suretrak or in Microsoft Project. Each electronic media must contain a label identifying the Project name, Contractor's name, program name and version number, data date and project finish date.
- C. Other Documents: In order to determine the amount of the alleged delay and if it is compensable, the Contractor must provide all backup documentation relevant to the issue and as required by the Engineer. This documentation must include copies of such items as: purchase orders; delivery schedules; correspondence; memoranda of telephone calls; force account daily worksheets (initialed by the Inspector); payroll data; estimating (bid) worksheets; and any other materials which may be requested by the Engineer.
- D. Procedure: Only after receipt of sufficient documentation will the Engineer analyze each alleged delay and determine if it is supported or refuted. If supported, the Engineer will determine if it is excusable or non-excusable, compensable or non-

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compensable. If the Engineer determines that the delay did not affect the Project Completion, the as-planned schedule, which has been updated to the date of the alleged delay, must be revised to indicate this. If the Engineer determines the delay did occur but was N/N, then no time extension will be granted. It is imperative that an actualized schedule be submitted as soon as the occurrence of the alleged delay is known. In no event will the Contractor submit an actualized updated schedule later than 60 days after the occurrence of the alleged delay becomes known.

If the Engineer determines the delay did occur and was excusable but, due to a reason listed in section I.B. is non-compensable, he/she will determine the length of the E/N delay and prepare a Change Order to add that time to the Agreement. The Engineer's decision will be final.

If the Engineer determines the delay was excusable and compensable, he/she will determine the length of the E/C delay and proceed to review the Contractor's damage calculations in accordance with Section III. The Engineer will check the Contractor's calculations, review the backup documentation provided, and prepare a Change Order to cover both the additional compensation and the time extension. The Engineer's decision on both the time extension and additional compensation for the delay will be final.

If the issue involves a concurrent delay, the Engineer will analyze available data to determine the portions which are E/C, E/N, and/or N/N as described above. The Engineer will proceed to determine the length of E/C delay and verify the Contractor's delay damage calculations, if any are provided. Upon completion of this review, the Engineer will prepare a Change Order for the Contractor's review and signature. The Engineer's decision regarding excusable delay and additional compensation for the delay is final.

The amount of time the Engineer will require to analyze the alleged delay(s) will depend upon the Engineer's workload, the complexity of the delay analysis, availability of supporting data, extent of cooperation by the Contractor, and other factors beyond the Engineer's control. It is entirely possible other delay(s) may occur while the Engineer is analyzing particular claim for delay(s). The Engineer's failure to respond to the Contractor in a set period of time will not be used as the basis for a further delay claim or as justification for extending and existing delay claim. The time required for delay analysis by the Engineer will not be counted against the time allotted for processing Final Payment as required by (MAG Section 109.7(B)) or the release of retention and Final Payment as prescribed by A.R.S. Arizona Revised Statutes §34-221.

III. CALCULATING MONETARY DELAY DAMAGES:

Additional compensation for delay, when authorized by the Engineer, will be calculated in accordance with MAG Section 109.5 ACTUAL COST WORK with the following exceptions:

- A. No additional compensation or other monetary damages will be awarded or paid for any loss of anticipated profits by the Contractor, Subcontractors or Suppliers.

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- B. No additional compensation or other monetary damages will be awarded for home office overhead or non-project general conditions of the Contractor, Subcontractors or Suppliers.
- C. Equipment:
 - 1. Contractor-owned equipment rate calculations must be computed in accordance with Section 109.04(D)(3), Arizona Department of Transportation "Standard Specifications for Road and Bridge Construction," 2008 or latest edition and as modified herein. Year and regional adjustment factors must be based on the most recent publications of the Rental Rate Blue Book for Construction Equipment, published by the Equipment Guide-Book Company, San Jose, CA, same as provided by ADOT and in print as of the date of alleged delay. In no event will the compensation for Contractor-owned equipment exceed the purchase price, including tax, paid by the Contractor for the equipment. Compensation will not be allowed for small tools or equipment that show a daily equipment rental rate of less than \$5.00 per day or for unlisted equipment that has a value of less than for hundred dollars (\$400.00).
 - 2. For leased and rented equipment or equipment not otherwise listed in the Blue Book, rental contracts, or other supporting data will be used to establish the hourly rate. No hourly operating expense will be allowed for delay on standby equipment. In no case will equipment be considered for rental which exceeds the hourly rate for the first eight hours and the daily rate divided by eight for all additional hours as compared with similar equipment listed in the Blue Book. The hourly standby rate must be computed as the lesser of:
 - a. Dividing the monthly invoice or rental value by 176 hours per month when the equipment is utilized by the Contractor for more than three weeks;
 - b. Dividing the monthly invoice or rental value by 40 hours per week when the equipment is utilized by the Contractor for more than three days.

In no event will compensation be paid for delay at more than 8 hours per day or 40 hours per week.
 - 3. Except for vehicles used by supervisory personnel, all equipment will be paid at the "standby" rate during the delay period.
 - 4. Equipment brought solely to mitigate the delay (such as pumps, light plants, etc.) may be paid in accordance with ADOT section 109.04(D) (3).
 - 5. The Blue Book regional adjustment will apply in determining rental rates.
- D. Material:

Allowable material charges may include, in addition to material incorporated in the

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work material used to mitigate the delay such as barricades, plates, shoring, cold mix, etc. Except in emergencies the Contractor will not employ such material without the prior written approval of the Engineer.

E. Labor:

1. Except for Supervisory Personnel (Superintendent, Project Engineer, and Foremen), labor wages will not be paid after the first one-half day of claimed delay or impact. It is expected the Contractor will reassign or layoff unneeded employees.
2. For Foreman wages to be included, that Foreman must have been actively employed on the project prior to the commencement of the delay and be directly responsible for the activity being delayed.
3. Labor burden must be actual amounts incurred but must not exceed the ADOT approved rate.

F. All costs (equipment, material, and labor) must be substantiated by the City of Chandler's Daily Work Reports.

IV. DOCUMENT REQUIRED FOR CLAIM ANALYSIS:

For purposes of reviewing the Contractor's request for additional compensation, it will be required that the Contractor submit the following listed information. Information requested must be prepared on forms which are substantially similar to the City of Chandler's Daily Work Report form, a copy of which is attached as an exhibit.

A. Labor:

For each employee, laborer, and foreman, for which compensation is requested: Name, classification, dates of work performed, daily hours worked, total hours worked, labor rates, labor burden rates, overtime or premium time charges. Further, the Contractor must make available for inspection and copying to the Engineer the following listed documentation.

1. Certified payroll reports for the period of work claimed.
2. Accounting of Fringe Benefits – certified by a CPA.
3. Contractor's and Subcontractor's daily field reports and daily diaries.

B. Materials:

For all materials for which compensation is requested, if any, total quantities of materials, prices, extensions and transportation costs must be provided on a daily basis. Further, the Contractor must make available for inspection and copying to the Engineer the following listed documentation.

1. Invoices for all materials incorporated.
2. Weigh tickets.
3. Purchase orders.

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4. Delivery schedules.
5. Quotes or proposals from manufacturers or supplier.
6. Freight bills, Bills of Lading, or other documentation to show transportation costs.
7. Restocking charges-invoices from vendor.

C. Equipment:

For all equipment, the Contractor must provide the Engineer with the designation, dates and hours of usage, dates and hours of standby, if any, daily hours, total hours, rental rates and extension for each unit of equipment and machinery. Rental rates will be as established in Section III. Further, the Contractor must make available for inspection and copying to the Engineer the following listed documentation.

1. Owned:
 - a. Purchase contracts(s).
 - b. Depreciation schedule(s).
 - c. Invoices for fuel, lube, repairs and other operating costs.
2. Leased:
 - a. Lease agreement with hourly rate, overtime rate, double shift rate, etc.
 - b. Invoices or other documentation showing hours worked on a daily basis.

D. Subcontractors/Owner-Operators:

In the event the Contractor submits a claim which includes requests for compensation for Subcontractors of Owner-Operators, the same information requested of the Contractor must be provided by the Subcontractor/Owner-Operator. Further, the Contractor must make available for inspection and copying to the Engineer the following listed documentation.

1. Bid/Estimate work sheets and/or spreadsheets.
2. Subcontract Agreements or Agreements with Owner-Operator.
3. All invoices and billing statements received from the Subcontractor/Owner-Operator which relates to the amount requested.

E. Miscellaneous:

Further, the Contractor must make available for inspection and copying to the Engineer the following listed documentation.

1. Evidence of payment for bonds and insurance premiums (MAG 109.5.6).
2. Taxes – unless the Contractor can show otherwise, taxes are reimbursable at 65% of the total cost (less bonds and insurance).

V. TIME LIMIT ON SUBMISSIONS OF CLAIM FOR DELAY OR IMPACT DAMAGES:

No claims for delay or impact damages will be considered or allowed more than 45 days after the event or occurrence which the Contractor claims gives rise to the delay or impact. In no event will a

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claim for delay or impact damages be considered after submission by the Contractor of the Final Payment Request.

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COST REDUCTION INCENTIVE PROPOSALS FOR DESIGN BID BUILD AGREEMENTS

The Contractor may submit to the Engineer proposals for modifying the Plans, Specifications, or other requirements of the Agreement for the sole purpose of reducing the total cost of Project construction. The proposals must not impair in any manner the essential functions or characteristics of the project; including but not limited to service life, economy of operations, ease of maintenance, desired appearance, compatibility with existing or planned equipment, standardization of systems, or design and safety standards.

It must not be inferred from this Policy that the Engineer is required to consider any proposal submitted.

Submissions that propose changes in the basic design of a bridge, propose changes in pipe line size, materials, bedding conditions, pipe specifications; or that propose any change in pavement design will not be considered.

Proposals submitted pursuant to this Policy will be identified as Cost Reduction Incentive Proposals. They must be submitted in writing and, at a minimum, contain the following.

1. Complete the attached or similar cost reduction incentive proposal form.
2. A description of both the existing Agreement Requirements for performing the work and the proposed changes.
3. All Engineering Drawings and computations necessary for the thorough and expeditious evaluation.
4. An itemization of the existing Agreement Requirements that must be changed if the Proposal is adopted and a recommendation as to the manner in which the change should be made.
5. A detailed estimate of the cost of performing the Work under the existing Agreement and under the proposed changes, including the cost of developing and implementing the changes.
6. The Agreement items affected by the proposed changes and any variations in quantities resulting from the changes.
7. An objective estimate of any effects the proposal will have on collateral cost to the City, costs of related items, and cost of maintenance and operation.
8. A statement as to the effect that the Proposal will have on the time for the completion of the Project.
9. A statement as to the time by which a Change Order adopting the Proposal must be executed or when the Engineer must have given verbal approval.

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Proposals will be processed expeditiously; however, the City will not be liable for any delay in acting upon any Proposal nor for any failure to accept any Proposal pursuant to this Special Provision.

The Engineer will be the sole judge of the acceptability of a Proposal and of the estimated net savings in construction costs from the adoption of all or any part of the Proposal. The Contractor will be notified in writing by the Engineer as to whether his/her Proposal has been accepted. The decision by the Engineer is final.

When the City deems such action to be appropriate, it reserves the right to require the Contractor to share equally in the cost to the City of investigating, evaluating, and processing the proposal as a condition for the consideration of such Proposal. Such cost must be shared whether the Proposal is accepted or rejected. When such a condition is imposed, the City will estimate these costs and the Contractor must indicate his acceptance thereof in writing. Such acceptance will authorize the City to deduct the Contractor's share of the costs from any monies due or that may become due to the Contractor under the Agreement.

If the Contractor's Proposal is accepted in whole or in part, the necessary Agreement Modifications and Agreement Price Adjustments will be affected by the execution of a Change Order which will specifically state that it is executed pursuant to this Special Provision.

The Contractor must continue to perform the work in accordance with the requirements of the Agreement until a Change Order incorporating the Proposal has been executed or until he/she has been given verbal approval by the Engineer that his/her Proposal has been accepted. If the Change Order has not been executed or he/she has not been given verbal approval on or before the date specified on the attached cost reduction incentive proposal form or on or before such other date as the Contractor may have subsequently specified in writing, the Proposal may be deemed to be rejected.

The executed Change Order will incorporate the changes in the Plans, Specifications, or other requirements of the Agreement which are necessary to permit the Proposal, or such part of it which has been accepted, to be put into effect, and will include any condition – upon which the City's approval thereof is based, if such approval is conditional. The executed Change Order may also extend the time for the completion of the Agreement if such an extension has been deemed to be warranted by the Engineer as a result of his evaluation of the Proposal.

The executed Change Order will also establish the estimated net savings in the cost of performing the Work attributable to the Proposal effectuated by the Change Order. In determining the net savings, the right is reserved to the Engineer to disregard the Agreement bid prices if, in his/her judgment, such prices do not represent a fair measure of the value of the Work to be performed or to be deleted. The net savings will be established by determining the Contractor's cost of performing the Work, taking into account his/her cost of developing the Proposal and implementing the change, and reducing this amount by any ascertainable collateral costs to the City. The executed Change Order may provide that the Contractor be paid 50 percent of the estimated net savings amount.

The executed Change Order may also provide for the adjustment in Agreement prices. Agreement prices may be adjusted by subtracting the City's share of the accrued net savings.

The amount specified to be paid to the Contractor in the executed Change Order which effectuates a Cost Reduction Proposal will constitute full compensation to the Contractor for the Cost Reduction

General Conditions Appendix 2

Proposal and the performance of the work thereof pursuant to the said Change Order.

Upon acceptance of a Cost Reduction Incentive Proposal, any restrictions imposed by the Contractor on its use or on disclosure of the information will become void, and the City thereafter will have the right to use all or any part of the Proposal without obligation or compensation of any kind to the Contractor.

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Appendix 2

COST REDUCTION INCENTIVE PROPOSAL FORM

TO: CIP City Engineer

FROM:

PROJECT NAME: TUMBLEWEED RANCH PHASES 1 AND 2

CITY PROJECT NUMBER: CA2301.401

DATE:

Summary of Change (Brief description of proposed change including advantages and disadvantages):

ESTIMATED COST SUMMARY (Attached detailed estimate):

A.	Original Cost:	\$
B.	Proposed Cost:	\$
C.	Construction Savings (A-B):	\$
D.	Gross Savings (Included OH %, Bond %)	\$
E.	Contractor Implementing	\$
F.	City Implementing Cost:	\$
	Reduction in Agreement Price (C+D-E-F) x 50%:	\$

Date by which a Change Order must be issued so as to obtain maximum cost reduction:

General Conditions
Appendix 3

**CITY OF CHANDLER, ARIZONA
PUBLIC WORKS & UTILITIES DEPARTMENT**

CONTRACTOR'S AFFIDAVIT REGARDING SETTLEMENT OF CLAIMS

_____, Arizona
Date _____

Project Name: Tumbleweed Ranch Phases 1 and 2
City Project No.: CA2301.401

To the City of Chandler, Arizona

Gentlemen:

This is to certify that all lawful claims for materials, rental of equipment and labor used in connection with the construction of the above project, whether by subcontractor or claimant in person, have been duly discharged.

The undersigned, for the total compensation of \$_____, as set out in the final pay application, as full and complete payment under the terms of the Agreement, hereby waives and relinquishes any and all further claims or right of lien under, in connection with, or as a result of the above described project. The undersigned further agrees to indemnify and save harmless the City of Chandler against any and all liens, claims or liens, suits, actions, damages, charges and expenses whatsoever, which said City may suffer arising out of the failure of the undersigned to pay for all labor performances and materials furnished for the performance of said installation.

Signed and dated at _____, this _____ day of _____ 20____.

CONTRACTOR

By _____

STATE OF ARIZONA)
) SS
COUNTY OF MARICOPA)

The foregoing instrument was subscribed and sworn to before me this _____ day of _____ 20_____.

Notary Public

My Commission Expires

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Appendix 4

PERFORMANCE BOND

ARIZONA STATUTORY PERFORMANCE BOND
PURSUANT TO TITLES 28, 34, AND 41, ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Agreement amount)

KNOW ALL MEN BY THESE PRESENTS THAT:_____

(hereinafter "Principal"), and _____ (hereinafter "Surety"), a corporation organized and existing under the laws of the State of _____ with its principal office in the City of _____, holding a certificate of authority to transact surety business in Arizona issued by the Director of Insurance pursuant to Title 20, Chapter 2, Article 1, as Surety, are held and firmly bound unto _____(hereinafter "Obligee") in the amount of _____ (Dollars) (\$_____), for the payment whereof, Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Agreement with the Obligee, dated the _____ day of _____, 20__ for construction of **CA2301.401, Tumbleweed Ranch Phases 1 and 2** which Agreement is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all the undertakings, covenants, terms, and conditions of the Agreement during the original term of the Agreement and any extension of the Agreement, with or without notice of the Surety, and during the life of any guaranty required under the Agreement, and also performs and fulfills all the undertakings, covenants, terms, conditions, and agreements of all duly authorized modifications of the Agreement that may hereafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond will be determined in accordance with the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if it were copied at length in this Agreement.

The prevailing party in a suit on this bond may recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____ day of _____, 20__.

AGENT OF RECORD

By _____

AGENT ADDRESS

SURETY

SEAL

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PAYMENT BOND

ARIZONA STATUTORY PAYMENT BOND
PURSUANT TO TITLES 28, 34, AND 41, OF THE ARIZONA REVISED STATUTES
(Penalty of this Bond must be 100% of the Agreement amount)

KNOW ALL MEN BY THESE PRESENTS THAT:_____

(hereinafter "Principal"), as Principal, and _____(hereinafter "Surety"), a corporation organized and existing under the laws of the State of _____ with its principal office in the City of _____, holding a certificate of authority to transact surety business in Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1, as Surety, are held and firmly bound unto _____ (hereinafter "Obligee") in the amount of _____ (Dollars) (\$_____), for the payment whereof, the Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Agreement with the Obligee, dated the _____ day of _____, 20__ for construction of **CA2301.401, Tumbleweed Ranch Phases 1 and 2** which Agreement is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all moneys due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in said Agreement, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2 Arizona Revised Statutes, and all liabilities on this bond will be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if it were copied at length in this Agreement.

The prevailing party in a suit on this bond may recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____ day of _____, 20__.

_____ AGENT OF RECORD	_____ PRINCIPAL SEAL
_____ AGENT ADDRESS	By _____ _____ SURETY SEAL

DISPUTE RESOLUTION**A. INFORMAL DISPUTE RESOLUTION**

The parties to the Agreement agree that time is of the essence in relation to performance of the Agreement and completion of the Project, therefore any and all disputes in relation to the Agreement will initially be referred to the Project Manager, the Design Professional Representative and/or the Contractor Representative as applicable to the dispute, for immediate resolution. If, after good faith efforts to reach a resolution, none is reached, any party to the dispute may submit the dispute to the Dispute Resolution Representative ("DRR") process set forth below, which is intended to be an expedited process.

B. DISPUTE RESOLUTION REPRESENTATIVE ("DRR") PROCESS

1. The Parties under the Agreement agree that all claims and disputes in relation to the Project which are not resolved in the ordinary course of the Project ("Claim" or "Claims") will, as a prerequisite to any mediation, or litigation of the Claim, first be submitted for resolution between the designated Dispute Resolution Representatives of the Parties as set forth herein (the "DRR Process").
2. The DRR Process will be initiated through service of a DRR Notice as set forth below:
 - a. For claims by the Contractor or the Design Professional, the DRR Process will be initiated by the party asserting the claim serving written notice on the City setting forth in detail: (i) the basis for the claim; (ii) the effect of the Claim upon the construction of, and/or Project Schedule for, the Project; (iii) the specific relief requested, the amount thereof, and how such was calculated; (iv) the parties involved in the Claim, and how they are involved; (v) the specific Agreement provisions in the Agreement Documents (including, if applicable, drawings and specifications) which apply; and (vi) efforts made to date to resolve the Claim.
 - b. For claims by the City, the DRR process will be initiated by the City providing written notice to the other parties of the basis and amount of its claim, the parties involved in the Claim, and how they are involved, the provisions in the Agreement Documents that apply, and the relief requested.
 - c. The DRR Notice will be hand-delivered and e-mailed to the other parties' designated Dispute Resolution Representatives.
3. The other parties will respond in writing to the DRR Notice ("DRR Response") within ten (10) calendar days of receipt of the DRR Notice, setting forth those items set forth in the DRR Notice that they agree with, dispute, and/or have questions concerning. The DRR Response will be hand-delivered and e-mailed to the other parties' Dispute Resolution Representatives.

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4. The designated Dispute Resolution Representatives for the Parties to the claim will then meet as soon as possible and in any event within twenty (20) calendar days of submission of the DRR Notice (regardless of whether a DRR Response has been submitted by all parties involved in the dispute), at a mutually agreed upon time and place, to attempt to resolve the Claim based upon the DRR Notice and DRR Response.
5. At any time after the first meeting required above, either party may terminate the DRR Process by written notice to the other party.
6. The parties may agree, in writing, to extend or modify the time limits or other provisions of the DRR process in relation to a specific pending Claim.
7. Unless otherwise designated in a written notice to the other parties, the City and the representatives of the Contractor and of the Design Professional will act as the parties' designated Dispute Resolution Representatives.
8. If a resolution of the Claim is reached, that resolution must be set forth in writing and must be signed by the Parties' designated Dispute Resolution Representative. If the resolution involves a change in any Agreement Documents, the Agreement Price, the Project Schedule, or any other change requiring a written Change Order or Amendment, the parties must execute an appropriate written Change Order or Amendment pursuant to the terms of the Agreement Documents.

C. MEDIATION

1. Unless extended by written agreement of the parties involved in the dispute, any Claim not resolved through the DRR process set forth above within five (5) calendar days after the meeting required under B (4) above, or after the DRR is terminated pursuant to B (5) above, whichever is earlier, will be submitted to mediation as a condition precedent to litigation by either party.
2. The mediation will be commenced by written demand upon the other party for mediation. If the parties cannot agree upon a mediator within ten (10) calendar days of the written demand, either party may make a request to the Civil Presiding Judge of the Maricopa County Superior Court to appoint a mediator. The mediation will occur within forth (40) calendar days of the written demand for mediation, unless the parties agree, in writing, to a longer period of time.
3. The qualifications for the mediator will be that he/she be: (a) an experienced mediator, arbitrator or litigator of construction disputes; and (b) having engaged a significant portion of his/her time involving and/or resolving construction disputes for at least the past five (5) years.
4. Each party will provide to the other party and the mediator all of the information and documentation required under B(1) and (2) above, together with any additional information and documentation which the party believes relevant. In addition, the parties will exchange, and provide to the mediator such additional memoranda, information and/or documentation, as the

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mediator may request, and in the form and at such times, as the mediator may direct.

5. The parties will share the mediator's fee and any filing fees equally. The mediation will be held in Chandler, Arizona, unless another location is mutually agreed upon. Agreements reached in mediation will be specifically enforceable in any court having jurisdiction thereof.

D. LITIGATION

Any claim arising out of or related to the Agreement, except Claims relating to aesthetic effect and except those claims waived as provided for in the Agreement Documents, must be resolved through litigation in the Maricopa County, Arizona Superior Court.

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**CITY OF CHANDLER, ARIZONA
PUBLIC WORKS & UTILITIES DEPARTMENT**

CERTIFICATE OF COMPLETION

PROJECT NAME:	TUMBLEWEED RANCH PHASES 1 AND 2		
CITY PROJECT NO.:	CA2301.401		
If Federally Funded:			
FEDERAL NO.:		ADOT NO:	

(This section to be completed by Prime)

I HEREBY CERTIFY THAT ALL GOODS AND/OR SERVICES REQUIRED BY CITY OF CHANDLER FOR THIS PROJECT HAVE BEEN DELIVERED IN ACCORDANCE WITH THE AGREEMENT DOCUMENTS AND BID SPECIFICATIONS AND ALL ACTIVITIES REQUIRED BY THE AGREEMENTOR UNDER THE AGREEMENT HAVE BEEN COMPLETED AS OF THE COMPLETION DATE LISTED HERE:

<u>FINAL ACCEPTANCE DATE:</u>	
--------------------------------------	--

PRIME CONTRACTOR:

FIRM NAME:			
PRINCIPAL:			
TITLE:			
SIGNATURE:		DATE:	

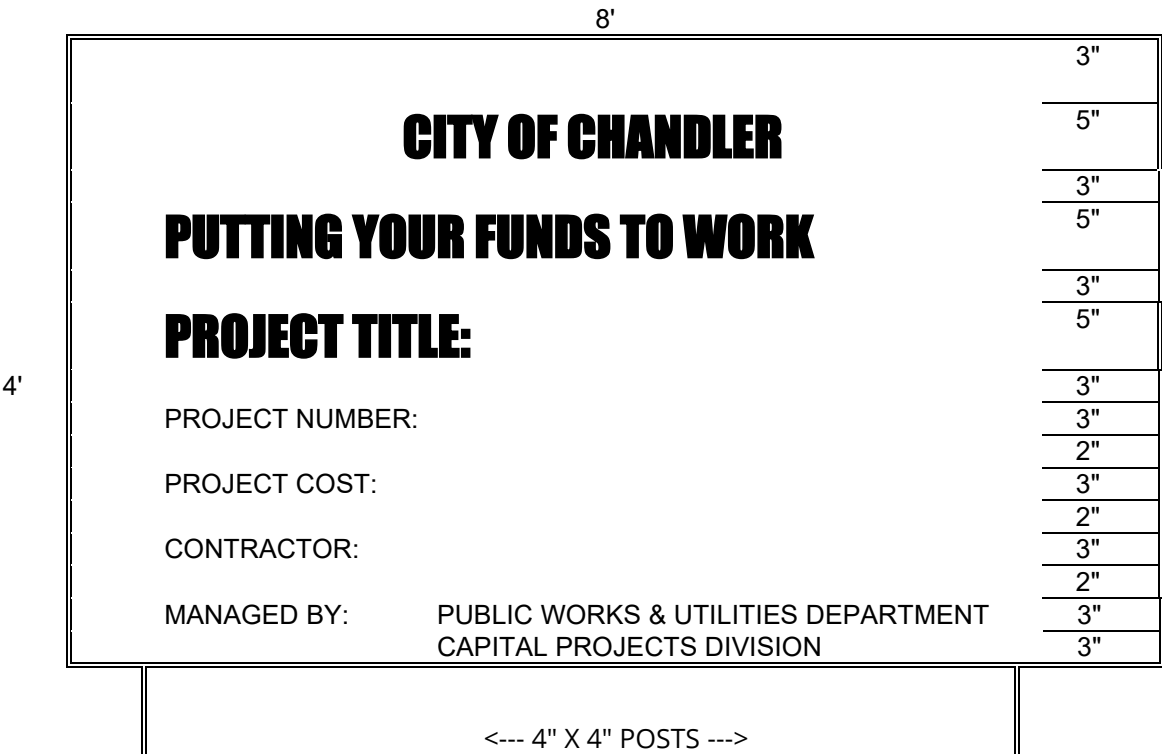
CERTIFIED BY *[INSERT NAME AND TITLE OF PARTY THAT OVERSEES CONSTRUCTION]:*

FIRM NAME:			
SIGNATURE:		DATE:	

PROJECT ACCEPTED BY CITY OF CHANDLER:

NAME:			
SIGNATURE:		DATE:	

CONSTRUCTION SIGN DETAIL



NOTES:

SIGN(S) MUST BE FURNISHED AND ERECTED PRIOR TO COMMENCEMENT OF CONSTRUCTION. POSTS MUST BE ANCHORED A MINIMUM OF TWO FEET INTO THE GROUND. BOTTOM OF SIGN MUST BE A MINIMUM OF FOUR FEET ABOVE THE GROUND.

TYPICAL PROJECT IDENTIFICATION SIGN FOR GENERAL PROJECTS MUST BE NON-REFLECTORIZED GREEN BACKGROUND, AND NON-REFLECTORIZED WHITE LETTERS AND NUMERALS.

ONE SIGN MUST BE ERECTED FOR BUILDINGS AND OTHER LIMITED AREA SINGLE SITES. FOR MULTIPLE SITES, ONE SIGN MUST BE ERECTED AT EACH SITE.

FOR LINEAR PROJECTS ONE HALF MILE OR LONGER, PLACE ONE SIGN AT EACH END OF THE PROJECT.

COST OF THE WORK

(APPLICABLE SOLELY TO CONSTRUCTION MANAGER AT RISK AND JOB ORDER CONTRACTING)

SECTION 1 – COSTS TO BE REIMBURSED

1.1 Cost of the Work

The term Cost of the Work will mean costs necessarily incurred by Contractor in the proper performance of the Work. Such costs must be at rates not higher than the standard paid at the place of the Project except with prior consent of City. The Cost of the Work will include only the items set forth in this Section 1.

1.2 Labor Costs

- 1.2.1 Wages of construction workers directly employed by the Contractor to perform the construction of the Work at the site or, with City's approval, at off-site workshops. Cost to be reimbursed will be the actual wages paid to the individuals performing the work.
- 1.2.2 Wages or salaries of the Contractor's supervisory and administrative personnel when stationed at the site with City's approval. No Contractor personnel stationed at the Contractor's home or branch offices will be charged to the Cost of the Work. Non-field office based Contractor management and support personnel are expected to provide service and advice from time to time throughout the job and his/her time devoted to Project matters is considered to be covered by the Contractor's Fee.
- 1.2.3 Wages and salaries of Contractor's supervisory or administrative personnel who would normally be stationed at the field office in accordance with Section 1.2.2 but who become engaged, at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of his/her time required for the Work. Employee bonuses and/or costs associated with Employee Stock Ownership Plans ("ESOP") will not be considered reimbursable labor or labor burden costs and will be considered non-reimbursable costs considered to be covered by the Contractor's Fee.
- 1.2.4 Costs paid or incurred by Contractor for taxes, insurance, contributions, assessments and benefits required by law or collective bargaining agreements and, for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holiday, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work under Subparagraphs 1.2.1 through 1.2.3.
 - 1.2.4.1 Cost of the Work will include the actual net cost to Contractor for worker's compensation insurance attributable to the wages chargeable to the Cost of Work per this Agreement. The actual net cost of worker's compensation must take into consideration all cost adjustments due to experience modifiers, premium discounts, policy dividends, retrospective rating plan premium adjustments, assigned risk pool rebates, any applicable weekly maximums, etc. Contractor may charge an estimated amount for worker's compensation insurance costs, but will make appropriate cost adjustments to actual costs within 45 days of receipt of actual cost adjustments from the insurance carrier.

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- 1.2.4.3 Overtime wages paid to salaried personnel (if approved in advance in writing by City) will be reimbursed at the actual rate of overtime pay paid to the individual. No time charges for overtime hours worked on the Project will be allowed if the individual is not paid for the overtime worked.
- 1.2.4.4 Any overtime premium or shift differential expense to be incurred by Contractor for hourly workers will require City's advance written approval before the incremental cost of the overtime premium or shift differential will be considered a reimbursable cost. If the Contractor is required to work overtime as a result of an inexcusable delay or other coordination problems caused by the Contractor or anyone he/she is responsible for, the overtime premium and/or shift differential expense portion of the payroll expense and related labor burden costs will be considered as cost not to be reimbursed.
- 1.2.4.5 Reimbursable labor burden costs will be limited to payroll taxes, worker's compensation insurance, the employer's portion of union benefit costs for union employees working on the Project, and the actual verifiable fringe benefit costs incurred by Contractor for non-union individuals working on the Project subject to the following maximum percentages for the following reimbursable non-union fringe benefit costs. The following maximums (as a percentage of reimbursable actual wages by individual) will apply for each of the following types of fringe benefit costs specifically attributable to each of the non-union personnel working on the Project:

- Medical Insurance, Dental, Life & AD&D Insurance: 12.00%
- Holiday, vacation and other paid time not worked: 10.00%
- Pension Plan Contributions to Vested Employee Account, Simplified Employee Pension Plans, or 401K matching plans (Note: ESOP related costs are covered by the Contractor Fee) 10.00%

For non-union personnel, no other fringe benefit costs (other than the three specific categories listed immediately above, will be considered reimbursable Cost of Work. Any labor burden costs that are in excess of the amounts considered reimbursable or are otherwise not considered reimbursable under the terms of this agreement are intended to be covered by the Contractor Fee.

1.3 Subcontract Costs

- 1.3.1 Payments made by Contractor to Subcontractors in accordance with the requirements of the subcontracts.
- 1.3.2 For Scope of Work Bid Packages typically performed by Subcontractors, Contractor may "self- perform" such work on an actual cost basis subject to an agreed upon Guaranteed Maximum Price for the "self-performed work". The Contractor must, unless agreed to by City in writing, bid his/her proposed guaranteed Maximum Price for the work to be "self-performed" against at least three other interested trade Contractors. All savings under any such Subcontract for "self-performed work" must be applied to reduce the Cost of Work under the Agreement and the Guaranteed Maximum Price. For purposes of defining "self-performed work" subject to this provision, any division of Contractor, or any separate Contractor or Subcontractor that is partially owned or wholly owned by the Contractor or any of his/her employees or employee's relatives will be considered a related party entity and will be subject to this provision regarding "self-performed work". No self-performed work will

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be allowed to be performed on a Fixed Price basis.

- 1.3.3 Contractor (with respect to its Suppliers, Subcontractors and all lower tier Subcontractors) must provide City advance written notice and must obtain City's approval for any proposed Subcontract Change Order, Material Purchase Order, or other financial commitment in an amount in excess of \$5,000 prior to placing such order or entering into such agreement (regardless of whether or not any such commitment will affect the prime Agreement Guaranteed Maximum Cost). It is agreed that sums applicable to any Subcontract Change Order, Purchase Order or other financial commitment entered into in violation of the above notice and approval requirement will not be included in the amounts owing to Contractor, Subcontractors or Suppliers whether as Costs of the Work or as reasonable termination costs in the event of termination.

1.4 Costs of Material and Equipment Incorporated in the Completed Construction

- 1.4.1 Costs, including transportation and storage, of materials and equipment incorporated or to be incorporated in the completed construction.
- 1.4.2 Costs of materials described in the preceding Subparagraph 1.4.1 in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, in any, will become City's property at the completion of the Work or, at City's option, may be sold by the Contractor. Any amounts realized from such sales must be credited to City as a deduction from the Cost of Work.
- 1.4.3 Proceeds from the sale of recyclable materials, scrap, waste, etc. will be credited to job cost.

1.5 Costs of Other materials and Equipment, Temporary Facilities and Related Items

- 1.5.1 Costs, including transportation and storage, installation, maintenance, dismantling and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by construction workers, that are provided by the Contractor at the site and fully consumed in the performance of the Work; and cost (less salvage value) of such items if not fully consumed, whether sold to others or retained by Contractor. Cost for items previously used by Contractor will mean fair market value.
- 1.5.2 Rental charges for temporary facilities, machinery, equipment, and hand tools not customarily owned by construction workers that are provided by Contractor at the site, whether rented from Contractor or others, and costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof. Rates and quantities of equipment rented will be subject to City's prior written approval.
- 1.5.2.1 The Projected usage for each piece of equipment to be rented for use on the Project and the estimated total rentals must be considered by Contractor before the piece of equipment is rented so that an appropriate rent versus buy decision can be made. Purchased equipment must be considered "job owned". At the completion of the Project, Contractor must transfer title and possession of all remaining job-owned equipment to City, or Contractor may keep any such equipment for an appropriate fair market value credit to job cost, which will be mutually agreed to by City and Contractor.
- 1.5.2.2 Each piece of equipment to be rented must have hourly, daily, weekly and monthly rates and

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the most economical rate available will be reimbursed based on the circumstances of actual need and usage of the piece of equipment while it is stationed at the jobsite. When the piece of equipment is no longer needed for the work, no rental charges will be reimbursed if the piece of equipment remains at the jobsite for the convenience of Contractor.

1.5.2.3 Equipment Rental Rates

1.5.2.3.1 Compensation for equipment used on the Project will be paid in accordance with the Equipment Plan submitted by Contractor in the accepted GMP Proposal and no payments will be made in excess of the rates set forth in the Equipment Plan, or actual documented costs, whichever is less.

1.5.2.3.2 All equipment rental rates and costs are subject to City's right to audit when submitted as part of Equipment Plan and/or at any time during the Project.

1.5.2.4 The aggregate rentals chargeable for each piece of Contractor owned tools or equipment must not exceed 50% of the fair market value of such equipment at the time of its commitment to the Work. The original purchase price and date of purchase of the equipment will be documented with a copy of the purchase invoice for the piece of equipment. Such aggregate limitations will apply and no further rentals will be charged even if a piece of equipment is taken off the job and is later replaced by a similar piece of equipment. For purposes of computing the aggregate rentals applicable to aggregate rental limitations, rental charges for similar pieces of equipment will be combined if the pieces of equipment were not used at the same time.

1.5.2.5 Fair market value for used material and equipment as referred to in the Agreement Documents will mean the estimated price a reasonable purchaser would pay to purchase the used material or equipment at the time it was initially needed for the job. Note: This is usually lower than the price a reasonable purchaser would pay for similar new construction material or construction equipment.

1.5.2.6 All losses resulting from lost, damaged or stolen tools and equipment will be the sole responsibility of Contractor, and not City, and the cost of such losses will not be reimbursable under the Agreement.

1.5.2.7 Contractor will be required to maintain a detailed equipment inventory of all job-owned equipment (either purchased and charged to job cost or job-owned through aggregate rentals) and such inventory must be submitted to City each month. For each piece of equipment, such inventory should contain at a minimum (1) original purchase price or acquisition cost (2) acquisition date (3) approved Fair Market Value at the time the piece of equipment was first used on the job and (4) final disposition.

1.5.2.8 All costs incurred for minor maintenance and repairs will be reimbursed at actual cost. Such costs include routine and preventative maintenance, minor repairs and other incidental costs. Repairs and/or replacement of a capital nature are considered to be covered by the rental rates. Major repairs and overhauls are not considered routine and ordinary; consequently such costs are not reimbursable and are intended to be covered by the rental rates.

1.5.3 Costs of removal of debris from the Site.

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- 1.5.4 Costs of document reproductions, facsimile transmissions and long-distance telephone calls, postage and parcel delivery charges, telephone service at the site and reasonable petty cash expenses of the site office.
- 1.5.5 That portion of the reasonable expenses of Contractor's personnel incurred while traveling in discharge of duties connected with the Work.
 - 1.5.5.1 No travel expenses will be reimbursed to Contractor's representatives unless Project related travel required them to travel to a destination more than 100 miles from the Project location. Any travel involving airfare will require advance written approval by an authorized City's representative.
- 1.5.6 Costs of materials and equipment suitably stored off the site at a mutually acceptable location, if approved in advance by the City.
- 1.5.7 Reproduction costs will be the actual costs of reproduction subject to a maximum of five cents (\$.05) per square foot for prints and a maximum of five cents (\$.05) per 8 ½ by 11-inch page for offset print or photo copied agreement documents, specifications, etc. Telephone costs will be the actual costs paid to the third party telephone company for the field office telephone.

1.6 Miscellaneous Costs

- 1.6.1 That portion of insurance and bond premiums that can be directly attributed to the Agreement. The City will reimburse Contractor for contractually required bond at time of first pay application for GMP and Cost-Based Agreements upon receipt of proof of payment from the Contractor. If the Contractor completes Work for less than the Agreement Price, Contractor must credit the City a pro-rated amount for the unused portion of the bond payment
 - 1.6.1.1 Contractor's actual cost for insurance will be considered to be included within the Maximum limit for General Conditions Costs. All premiums for any insurance and bonds required for the Project must reflect the net actual costs to Contractor after taking into consideration cost adjustments due to experience modifiers, premium discounts, policy dividends, retrospective rating plan premium adjustments, assigned risk pool rebates, refunds, etc.
 - 1.6.1.2 The amount to be reimbursed to Contractor for all contractually required insurance will be actual costs not to exceed a total of 2% of the Agreement Value, unless Contractor establishes to City's satisfaction that the actual cost is higher and City agrees to such actual higher cost in writing. If Contractor's cost of contractually required insurance is greater than the amount agreed to be reimbursed per this Agreement Provision, the difference will be considered to be covered by the Contractor's Fee. The City will reimburse Contractor for contractually required insurance on a monthly basis for GMP and Cost-Based Agreements. If Contractor can demonstrate substantial savings by paying for all insurance in advance, the City may agree to reimburse all insurance costs at time of first pay application for GMP and Cost-Based Agreements with proof of payment from Contractor.
- 1.6.2 Sales, use or similar taxes imposed by a governmental authority that are related to the Work.

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- 1.6.3 Fees and assessments for the building permit and for other permits, licenses and inspections for which Contractor is required by the Agreement Documents to pay.
- 1.6.4 Fees of laboratories for tests required by the Agreement Documents, except those related to defective or nonconforming Work and which do not fall within the scope of ¶ 1.7.3 below.
- 1.6.5 Royalties and license fees paid for the use of a particular design, process or product required by the Agreement Documents; the cost of defending suites or claims for infringement of patent rights arising from such requirement of the Agreement Documents; and payments made in accordance with legal judgments against Contractor resulting from such suites or claims and payments of settlements made with City's consent. However, such costs of legal defenses, judgments and settlements must not be included in the calculation of the Contractor's Fee or subject to the Guaranteed Maximum Price.
- 1.6.6 Data processing costs related to the Work. However, any such data processing costs will be limited to the cost of personal computer hardware used at the field office in the normal day to day administration, management and control of the Project. The aggregate charges for any such hardware must not exceed the Fair Market Value of the hardware at the time it was brought to the field office. If the total charges for any particular piece of hardware reach an amount equal to the Fair Market Value, that particular piece of hardware must be turned over to City whenever it is no longer needed for the Project. If Contractor elects to keep the particular piece of hardware, the job costs must be credited with a mutually agreeable amount which will represent the Fair Market Value of the particular piece of hardware at the time it was no longer needed for the job. Software or other costs associated with the use of computer programs will not be considered to be a reimbursable cost and will be considered to be covered by the Contractor's Fee.
- 1.6.7 Deposits lost for causes other than Contractor's negligence or failure to fulfill a specific responsibility to City as set forth in the Agreement Documents.
- 1.6.8 Legal, mediation and arbitration costs, including attorneys' fees, other than those arising from disputes between City and Contractor, reasonably incurred by Contractor in the performance of the Work and with City's prior written approval; which approval will not be unreasonably withheld.
- 1.6.9 Expenses incurred in accordance with Contractor's standard personnel policy for relocation and temporary living allowances of personnel required for the Work, if pre-approved by City in writing. If City authorizes the reimbursement of relocation costs, the reimbursable relocation expenses will be limited to a maximum of \$50,000 per person. Any relocation cost incurred by Contractor in excess of the amount reimbursed by City will be considered to be covered by the Contractor's Fee.

1.7 Other Costs and Emergencies

- 1.7.1 Other costs incurred in the performance of the Work if and to the extent approved in advance in writing by City.
- 1.7.2 Costs due to emergencies incurred in taking action to prevent threatened damage, injury or

General Conditions
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loss in case of an emergency affecting the safety of persons and property.

- 1.7.3 Costs of repairing or correcting damaged or nonconforming Work executed by Contractor, Subcontractors or Suppliers, provided that such damaged or nonconforming Work was not caused by negligence or failure to fulfill a specific responsibility of Contractor and only to the extent that the cost of repair or correction is not recoverable by Contractor from insurance, sureties, Subcontractors or Suppliers.

1.8 Related Party Transactions

- 1.8.1 The term “related party” will mean a parent, subsidiary, affiliate or other entity having common ownership or management with Contractor; any entity in which any stockholder in, or management employee of, Contractor owns any interest in excess of ten percent in the aggregate; or any person or entity which has the right to control the business or affairs of Contractor. The term “related party” includes any member of the immediate family of any person identified above.
- 1.8.2 If any of the costs to be reimbursed arise from a transaction between Contractor and a related party, Contractor must notify City in writing of the specific nature of the contemplated transaction, including the identity of the related party and the anticipated cost to be incurred, before any such transaction is consummated or cost incurred. If City, after such notification, authorizes in writing the proposed transaction, then the cost incurred will be included as a cost to be reimbursed, and Contractor must procure the Work, equipment, goods or service from the related party, as a Subcontractor. If City fails to authorize the transaction, Contractor must procure the Work, equipment, goods or service from some person or entity other than a related party.

SECTION 2 – COSTS NOT TO BE REIMBURSED

- 2.1 The Cost of Work must not include:
- 2.1.1 Salaries and other compensation of Contractor’s personnel stationed at Contractor’s principal office or offices other than the site office, except as specifically provided in Subparagraphs 1.2.2 and 1.2.3.
- 2.1.2 Expenses of Contractors’ principal office and offices other than the site office.
- 2.1.3 Overhead and general expenses, except as may be expressly included in Section 1.
- 2.1.3.1 Costs of Contractor’s home office computer services or other outside computer processing services will be considered overhead and general expense. Accordingly, Contractor should not plan to perform any such computer related services or alternatives at the field office when such services or functions can be performed at Contractor’s home or branch offices, or other outside service locations.
- 2.1.4 Contractor’s capital expenses, including interest on Contractor’s capital employed for the Work.
- 2.1.5 Rental costs of machinery and equipment, except as specifically provided in subparagraph 1.5.2.

General Conditions
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- 2.1.6 Except as provided in Subparagraph 1.7.3 of the Agreement, costs due to the negligence or failure to fulfill a specific responsibility of Contractor, Subcontractors and Suppliers or anyone directly or indirectly employed by any of them or for whose acts of them may be liable.
- 2.1.7 Any cost not specifically and expressly described in Section 1.
- 2.1.8 Costs, other than costs included in Change Orders approved by City that would cause the GMP to be exceeded.

SECTION 3 – DISCOUNTS, REBATES, REFUNDS AND SAVINGS

- 3.1 Cash discounts obtained on payments made by Contractor will accrue to City if (1) before making the payment, Contractor included them in an Application for Payment and received payment therefore from City, or (2) City has deposited funds with Contractor with which to make payments; otherwise, cash discounts will accrue to Contractor. Trade discounts, rebates, refunds and amounts received from sales or surplus materials and equipment will accrue to City, and Contractor must make provisions so that they can be secured.
- 3.1.1 Cost of the Work will be credited with all insurance policy discounts, performance and payment bond rebates or refunds, refunds or return premiums from any Subcontractor default insurance, refunds or rebates from any Contractor controlled insurance programs applicable to the Project, merchandise rebates of any nature, refunds of any nature, insurance dividends; and a portion of any volume rebates or free material credits earned with purchase of material or other goods and services charged to the job.
- 3.1.2 “Cash” discounts which may accrue to Contractor will be limited to a maximum of 1.5% of invoice cost. Any portion of “Cash” discounts greater than 1.5% will automatically accrue to City if Contractor is eligible to take advantage of the discounts.
- 3.2 Amounts that accrue to City in accordance with the provisions of Paragraph 3.1 will be credited to City as a deduction from the Cost of the Work.
- 3.3 Any and all savings on the GMP, or any separately guaranteed items comprising the GMP, will belong to City, subject to any express right in the Agreement for Contractor to share in savings. Savings are subject to City’s right to audit, and may be audited separately.

SECTION 4 – GENERAL CONDITIONS COSTS

- 4.1 General Conditions Costs may include, but are not limited to, the following types of costs incurred by Contractor during construction of the Work to the extent they are reimbursable Costs of the Work as delineated above: payroll costs for Work conducted at the site, payroll costs for the superintendent and full-time general foremen, payroll costs for management personnel resident and working on the site workers not included as direct labor costs engaged in support (e.g. loading/unloading, clean-up, etc.), administrative office personnel, costs of offices and temporary facilities including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities and telephone services at the site, costs of liability insurance premiums not included in labor burdens for direct labor

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costs, costs of bond premiums, costs of consultants not in the direct employ of Contractor or Subcontractors, fees for permits and licenses.

- 4.2 General Conditions Costs may be paid on a percentage of the Agreement Price or on a lump/stipulate sum basis as set forth in the Agreement. All costs included in the General Conditions Costs will not be separately invoiced to or paid by City.
- 4.3 The total amount of General Conditions Costs for the Work may be divided by the number of days allowed for performance of the Work, to determine a fixed daily rate for General Conditions Costs that may be used in computing the General Conditions Costs allocated to any period of time, or for any adjustments in the General Conditions Costs agreed to in writing by City.

LANDSCAPE ESTABLISHMENT PERIOD

Section 1 – Description and General

Contractor is in direct control of work performed under the Landscape Establishment Period. If work is subcontracted, a representative of the Contractor will be present at the site of the work for all hours that the subcontractor works. Subcontracting of Landscape Establishment work will be permitted for weed eradication with herbicides, because of special licensing. A licensed temporary service may be used to supply labor to Contractor if Contractor has received approval from City Representatives. Contractor will submit the required subcontract documentation.

Contractor must provide adequate personnel to accomplish the required maintenance of the plant materials at intervals acceptable to City Representatives.

If not healthy at the end of the maintenance period, the maintenance must be continued until the plant material is approved by City.

1.1 Time and Schedule

Unless otherwise expressly agreed to in writing by City, the Landscape Establishment Period will be per General Conditions Section 6.5.4.

1.2 Planted Stock and Seeding Establishment

- 1.2.1 Tree planting and staking must be per City of Chandler Standard Detail C-801.
- 1.2.2 All trees will stand erect on their own without stakes when brought to this site. If the tree cannot stand on its own when nursery stakes are removed, the tree will be removed and replaced.

1.3 Pre-Emergent Herbicide and Weed Control

- 1.3.1 Contractor will provide three applications of an approved pre-emergent herbicide on all unpaved areas of the project, as directed by City Representatives, to control weed growth in all areas of the project. The number of applications may be increased as directed by the City Representative, and at no additional cost to City, if the City Representative deems additional applications are required to control weed growth.
- 1.3.2 Application sequence will be approved in advance by City. The first application of pre-emergent will be completed prior to the application of Decomposed Granite and will be included with the cost of the Decomposed Granite as specified and part of the Construction Phase portion of work. The second application of pre-emergent will be completed after installation of the Decomposed Granite and no later than half-way through the Landscape Establishment Period. The third and final application of pre-emergent will be applied 15 days prior to completion of the Landscape Establishment portion of the project. The second and third pre-emergent applications will be included with the cost of Landscape Establishment. Watering will be completed in accordance with the manufacturer's recommendations, as included and as related to each application.
- 1.3.3 The pre-emergent herbicide will be applied in accordance with the Technical Specifications and the recommendations of the pre-emergent herbicide manufacturer, as approved by City Representatives.

General Conditions Appendix 10

- 1.3.4 The control of weeds will be accomplished by the use of herbicides. Manual removal of weeds will be required, after herbicides have taken affect.
- 1.3.5 Contractor is responsible for the removal and disposal of all trash and debris that during the Landscape Establishment Period. Contractor will keep the project in a neat and orderly manner during the duration of the Landscape Establishment Period.

1.4 Water

The water used during Landscape Establishment to properly maintain the plant material will be furnished by City, at designated sources from within the project limits, at no charge to Contractor. Contractor will be responsible for all equipment, materials and labor necessary to load, transport and unload water for watering purposes.

1.5 Plant Material Replacements

The plant material replacement will be considered as included in the work for Landscape Establishment, and will be made at no charge to the City.

- 1.5.1 Shrub and Plant Replacement - During the second half of the Landscaping Establishment period, Contractor will provide, where required, plant replacements as follows:

<u>Original Size</u>	<u>Replacement Size</u>
1 gallon	5 gallon
5 gallon	15 gallon
15 gallon	24-inch box
36-inch box	48-inch box

- 1.5.2 Tree Replacement – During the second half of the Landscape Establishment Period, Contractor will provide plant material replacements for existing plants that die as follows:

<u>Existing Plant Material Sizes</u>	<u>Replacement Size</u>
Trees:	
2-inch Caliper	24-inch box
4-inch Caliper	36-inch box
6-inch Caliper and greater	54-inch box
Shrubs:	
All Existing Shrubs	15 gallon

1.6 Measurement and Payment

See Technical Specifications for Measurement Payment provisions.



**CONSTRUCTION ESCROW AGREEMENT
(In Lieu of Retention)
City of Chandler Project No.**

THIS AGREEMENT ("Escrow Agreement") is made as of Date by and between the City of Chandler, an Arizona municipal corporation ("Owner") and Contractor Name, an Business Org Type ("Contractor") and Bank Name, a national banking association ("Escrow Agent").

RECITALS

- A. Owner and Contractor entered into a Construction Contract dated Agreement Effective Date ("Construction Contract") for the City of Chandler Project Name Construction Project No. Project # ("Project").
- B. Arizona Revised Statutes ("A.R.S.") § 34-221 requires a 10% retention of progress payments to ensure Contractor's performance.
- C. Contractor has requested to deposit substitute securities in lieu of retention, and Owner has agreed, subject to the terms of this Escrow Agreement.

AGREEMENT

1. Deposit of Securities.

- 1.1.** Contractor will deposit with Escrow Agent concurrently with the submission of a payment request qualified securities (as defined in A.R.S. § 34-221(C)(5)) ("Securities") in an amount at least equal to the required retention percentage of the payment request. These Securities must be accompanied with an assignment of securities in the same amount in the form attached as Exhibit "A" (collectively "Escrowed Funds"). The Escrowed Funds will be held in a dedicated account for the benefit of Owner.
- 1.2.** Each month Bank will furnish Contractor a statement that shows the Escrowed Funds transactions and current balance as of the last day of the preceding month. Contractor must include this monthly statement with Contractor's payment request submitted to City.

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2. Owner's Sole Right to Release Escrowed Funds.

2.1. Unilateral Release: Notwithstanding any other provision, Escrow Agent is authorized to release any portion of the Escrowed Funds to Owner upon receipt of a written demand signed by the Owner's representative, certifying that the Contractor has failed to fulfill contractual obligations, or is in breach, or that a dispute exists regarding the Project. **No consent or signature from the Contractor is required.**

2.2. Final Completion Release: The Escrowed Funds will only be released to Contractor upon final completion, acceptance of the work by the Owner, and submission of all final Project documents, as determined solely by the Owner.

3. Deposit of Additional Securities. If the market value of the Escrowed Funds falls below 10% of all approved or pending Project payment requests, the Contractor will, within 10 days of notice, deposit additional Securities to restore the 10% value. Contractor's failure to do so constitutes a material breach of the Construction Contract.

4. Interest Earnings. Interest earned on the Escrowed Funds may be paid to Contractor as provided in A.R.S. § 34-221. If Escrowed Funds are released to the Owner due to Contractor's breach and such Escrowed Funds are insufficient to hold Owner harmless for Contractor's breach, any and all accrued interest may also be released to Owner to satisfy any deficiency.

5. Escrow Fees. All fees, costs, and expenses of the Escrow Agent to establish and maintain the escrow account will be paid exclusively by Contractor.

6. Disputed Work/Withholding. In the event of a dispute between Owner and Contractor, the Owner may direct the Escrow Agent to withhold a maximum of 150% of the estimated cost to remedy defective work or settle third-party claims.

7. Governing Law. This Escrow Agreement will be governed by the laws of the State of Arizona.

8. Construction Contract; Conflict in Terms. The terms and conditions of the Construction Contract are incorporated into and made a part of this Escrow Agreement by this reference. If there is a conflict or ambiguity created by or that arises between the Construction Contract and this Escrow Agreement, the terms and conditions of the Construction Contract prevail and control.

Remainder of page left blank intentionally

DATED THIS ____ day of _____, 2026.

“CONTRACTOR”
CONTRACTOR NAME

_____ Signature	_____ Date
_____ Print Name	
_____ Title	
_____ Signer Email Address	

“ESCROW AGENT”
BANK NAME

_____ Signature
_____ Print Name
_____ Title
_____ Signer Email Address

“CITY”
City of Chandler, Arizona

CIP City Engineer

APPROVED AS TO FORM:

City Attorney

ATTEST:

_____ City Clerk	_____ Seal
---------------------	---------------

Exhibit "A"**ASSIGNMENT OF SECURITIES IN LIEU OF TEN PERCENT RETENTION**SECURITY DESCRIPTION: Escrow AccountACCOUNT NO.: Escrow Account #

Archer Western Construction, LLC, an Arizona corporation, hereinafter referred to as "Assignor", having been awarded a construction contract in connection with City of Chandler's Construction Project No. Project #, and desiring to take advantage of A.R.S. Sec. 34-221 and assign certain securities in lieu of ten percent (10%) retention of the contract proceeds as required by statute, hereby assigns to the CITY OF CHANDLER, an Arizona municipal corporation, hereinafter referred to as "Assignee", all of the Assignor's right, title and interest in and to the above identified securities up to the sum of \$_____.

This assignment shall remain in force and effect until the construction project identified above is completed and accepted by Assignee, at which time Assignee shall release all of its interest in the assignment.

"ASSIGNOR"

Contractor Name

By: _____

Title: _____

RECEIPT AND WAIVER

The undersigned financial institution hereby acknowledges to the CITY OF CHANDLER, an Arizona municipal corporation, that it has received written notice from Assignor Contractor Name, a Business Org Type, of the assignment to the CITY OF CHANDLER of the above-identified securities in the amount of \$Dollar Amount, held in Account No. Escrow Account #. The undersigned financial institution further hereby waives any and all rights or powers of set-off of said financial institutions against the CITY OF CHANDLER, in relation to the above-identified securities. The undersigned financial institution further warrants to the CITY OF CHANDLER that it has on deposit the securities described in the foregoing assignment and in the amount assigned.

"Financial Institution"

Bank Name

By: _____

Title: _____

EXHIBIT C

TECHNICAL SPECIFICATIONS

City of Chandler
Project No. CA2301.401
Technical Specifications

Tumbleweed Ranch Phase 1 and 2



TUMBLEWEED RANCH PHASE 1 AND 2

CITY OF CHANDLER PROJECT NO. CA2301.401

TECHNICAL SPECIFICATIONS

PREPARED FOR:

CITY OF CHANDLER
PUBLIC WORKS & UTILITIES
CAPITAL PROJECTS

PREPARED BY:

HUITT-ZOLLARS, INC.

DATE: JUNE 2026

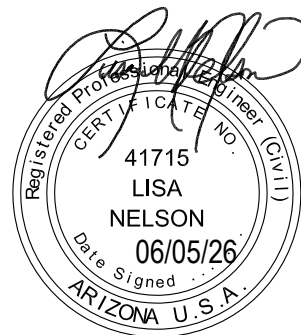


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City of Chandler
 Project No. CA2301.401
 Technical Specifications

Tumbleweed Ranch Phase 1 and 2

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PART A: BID ITEMS

The following items, though not a comprehensive list, are non-payment items being considered incidental to the project, the costs of which are to be included within other bid items:

- Saw cutting
- Locating (or pothole) of new or existing utilities
- Concrete curb and gutter transition, MAG Std. Det. 221
- Curb openings
- Curb transition, MAG Det. 220-2 and 221
- SWPPP preparation and document maintenance
- Agreementor's site office or yard.
- Roadway sweeping
- Any and all permits - preparation costs and permit fees
- Protective fencing or plating for open trenches
- Photographing and videotaping of the project
- Preparation of record drawings
- Crown line
- Temporary pavement as required for all pipeline and underground work
- Removal of existing landscape irrigation pipe, tubing, and equipment

ITEM NO. 001 CONSTRUCTION SURVEYING AND LAYOUT

Description:

The Agreementor will furnish all labor, materials, and equipment necessary to perform all surveying, staking, laying out of control lines, and verifications of the accuracy of all existing control points that are delineated in the Agreement Documents. The work will be done under the direction of a Registered Land Surveyor (RLS) licensed to practice in the State of Arizona.

Construction Requirements:

Staking Outline: Prior to beginning any survey operations, the Agreementor will furnish to the Engineer, for approval, a written outline detailing the method of staking, interval of stakes, marking of stakes, grade control for various courses of materials, referencing, structure control, and any other procedures and controls necessary for survey completion. A part of this outline will also be a schedule that will show the sequencing of the survey and layout work, throughout the course of the Agreement, listing a percentage of completion for each month.

Field Books: The Agreementor will furnish field books to be used for recording survey data and field notes. These books will be available for inspection by the City at any time

and will become the property of the City upon completion of the work.

Survey Control Verification: Control Points (horizontal and vertical) -The existence and location of all survey monuments, bench marks, and control points will be verified prior to demolition or construction activity. Immediately notify the City of Chandler Project Manager when location discrepancies greater than 0.02 foot horizontal or 0.01 foot vertical are found. All datum will be based upon the City of Chandler datum.

Control Lines: Construction control lines with grade breaks, transition points, horizontal and vertical curves, etc., will be established and referenced prior to construction.

Temporary Bench Marks: Temporary bench marks will be established prior to construction, maintained and periodically verified for accuracy throughout the construction phase.

Pre-Construction Location Survey: All existing features will be located prior to construction, referenced to survey monuments along control lines by stationing in accordance with the construction documents and by offset distance from the control lines. All features will be re-locatable after construction. Distances measured will be within 0.01 foot.

Survey monuments: The land surveyor will follow the requirements of A.R.S. § 33-103 when establishing, replacing or setting Public Land System Survey monuments at Section or Quarter Section corners and will follow the requirement in Section 9(C) of the Arizona Boundary Survey Minimum Standards when establishing new or replacement boundary monuments and witness corner monuments. Finally, land surveyors will also comply with the requirements of A.R.S. § 104 through 106 when establishing, replacing or setting any type of boundary monument. Whenever any monuments are established, including those set to replace missing or damaged monuments of a previous survey, those actions require the surveyor to create and record a survey drawing documenting the new monumentation as established.

Water and Sewer Line Appurtenances: Water and sewer line surface appurtenances such as manholes, valves, and cleanouts that lie within the construction area will be located and noted on the Agreementor's approved construction documents prior to any demolition or excavation.

Match Points and Removals: Verify the location (horizontal and vertical) of existing facilities to which the project connects. Immediately notify City Representatives when location discrepancies of connecting facilities greater than 0.10 foot horizontal or 0.02 foot vertical are found.

Construction Stakes: The Agreementor will set construction stakes and marks establishing lines and grades for road work, curbs, gutters, sidewalks, structures, buildings, centerlines for utilities and necessary appurtenances, and other work as indicated in the Agreement Documents and will be responsible for their conformance with the Project Plans and Technical Specifications.

The stakes will be established in accordance with the following guidelines which represent

the minimum standard and the Agreementor will provide additional stakes and controls necessary to perform the work. The Agreementor will be held responsible for the preservation of all stakes and marks and will replace, at no additional cost to the City, any construction stakes or marks which have been carelessly or willfully destroyed by any party.

(a) Sidewalk and Bike Paths: Stakes are not required for sidewalks five feet or less in width which are adjoining existing curb and gutter.

- (1) Sidewalk stakes will be set to grade on an offset and tacked for line at 25 foot intervals at the beginning and end of horizontal and vertical curves and grade breaks.

(b) Storm Sewer and Drainage: All cuts will be to the invert of the pipe, given to the nearest 0.01 of a foot.

- (1) Stakes for storm sewer will be driven flush with the existing ground, set on an offset at 50 foot intervals. Stakes will be marked with the offset and indicated cut.
- (2) Wyes for laterals will be marked with a line only stake.
- (3) Manholes will be marked with the offset and indicated cut to top of manhole grade and inverts.
- (4) Stakes for storm water inlets, two per inlet, will be set on a line normal to the roadway at the center line of the inlet five and ten feet from the face of curb. The stakes will be marked with the offset to the face of curb and the cut or fill to the top of curb and inverts.
- (5) Cut sheets will be supplied to the Agreementor and City of Chandler Inspector.

(c) Water: All cuts will be to the invert of the pipe, given to the nearest 0.10 of a foot.

- (1) Stakes for water will be driven flush with the existing ground, set on an offset at 50 foot intervals and specified grade breaks. Stakes will be marked with the offset and indicated cut.
- (2) Fittings or other critical points such as tees will be marked with a line only stake.
- (3) Fire hydrants will be located with two stakes per hydrant set parallel with the roadway five feet from the centerline of the hydrant. The stakes will be marked with the offset to the hydrant and indicated cut to the top of curb at the centerline of the hydrant.
- (4) Water meters will be located with two stakes per meter set parallel with the roadway five feet from the centerline of the meter. The stakes will be marked with the offset to the meter and indicated cut to the top of curb at the

centerline of the meter.

- (5) Cut sheets will be supplied to the Agreementor and City of Chandler Inspector.

(d) **Traffic Striping:** The Agreementor will delineate the procedures and controls to be utilized in the Staking Outline.

(e) **Inspection and Acceptance of Work:** The City reserves the right to make inspections and random checks of any portion of the staking and layout work. If, in the City's opinion, the work is not being performed in a manner that will assure proper control and accuracy of the work, the City may order any or all of the staking and layout work redone at no additional cost.

Measurement and Payment:

Construction Surveying and Layout will be measured as a single complete unit of work and paid at the agreement lump sum price, which price will be full compensation for the work as described herein and required to provide all necessary survey stakes and control. The approved schedule showing the sequencing and percentage of the survey and layout work will be the basis on which monthly progress payments will be made. This schedule will be subject to periodic review, at the request of either party, if the survey and layout work lags or accelerates. If necessary, the schedule will be revised to reflect changes in survey and layout progress. When approved, the revised schedule will become the basis for payment.

ITEM NO. 002 EROSION CONTROL (SWPPP PREPERATION, INSTALLATION, MAINTENANCE, AND REMOVAL)

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary to furnish, install, maintain and remove (if applicable) erosion control best management practices as specified in the Project Plans and directed by City Representatives.

Materials:

All materials will conform to the requirements of Arizona Department of Transportation (ADOT) Standard Specifications Section 810-2 and Flood Control District of Maricopa County (FCDMC) Erosion Control Manual.

Construction Requirements:

All work under this item will be completed in conformance with the Project Plans and all applicable City, County, State, and Federal regulations.

Measurement and Payment:

Erosion Control (SWPPP Preparation, Installation, Maintenance, and Removal) will be measured as a single complete unit of work and paid at the Agreement lump sum price, which price will be full compensation for the work described herein and complete in place.

No payment will be made for rejected best management practices, for maintenance after a storm event, or for damage by the Agreementor. No allowance will be made for extra material used in overlapping at splice joints.

ITEM NO. 003 MOBILIZATION/DEMOBILIZATION**Description:**

The work under this item will consist of furnishing all materials, labor, and equipment necessary to conform to MAG Uniform Standard Specifications Section 109.10.

Measurement and Payment:

Mobilization/Demobilization will be measured as a single complete unit of work and paid at the contact lump sum price, which price will be full compensation for the work, complete in place.

ITEM NO. 004 CLEARING AND GRUBBING**Description:**

The work under this item will consist of furnishing all materials, labor, and equipment necessary to conform to MAG Uniform Standard Specifications Section 201. The Agreementor should review the landscape plans to identify trees to be protected in place. The Agreementor will clear and grub only the areas required to construct the project improvements.

Construction Requirements:

All work under this item will be completed in conformance with MAG Uniform Standard Specifications Section 201 in its entirety except as modified herein.

Burning of trash, debris, plant material, wood, or any other waste material will not be allowed.

Measurement and Payment:

Clearing and Grubbing will be measured as a single complete unit of work and paid at the contact lump sum price, which price will be full compensation for the work, complete in

place. No separate measurement will be made for trees 12 inches or less in diameter at 1-foot above the original ground surface.

ITEM NO. 005 EARTHWORKS

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary to conform to recommendations in the Geotechnical Report, Architectural and Civil Project Plans, and MAG Uniform Standard Specifications Section 210 AND 211. Work includes mass and rough grading, landscape berm fill and compaction, and grading of V-swailes.

Construction Requirements:

All work under this item will be completed in conformance with the Geotechnical Report and MAG Uniform Standard Specifications Section 210 and 211 in its entirety except as modified herein.

Measurement and Payment:

Earthworks will be measured as a single complete unit of work and paid at the contact lump sum price, which price will be full compensation for the work, complete in place. No separate measurement will be made for haul costs for imported or exported material, structural backfill, or imported material of any kind.

ITEM NO. 006 ASPHALTIC CONCRETE PAVEMENT (2 IN SURFACE COURSE, A-12.5 EVAC)

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary for mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixture and asphalt binder to form a pavement course upon a previously prepared base or sub base at all locations as specified in the Project Plans. The work under this item also includes furnishing all materials, labor, and equipment necessary for the excavation for the grading, placement of pavement aggregate base course, and construction of the pavement as specified in the Project Plans.

Materials:

Asphalt Concrete Pavement mix design will conform to current East Valley Asphalt Committee (EVAC) Hot Mix Approved Asphalt Mixes as follows:

2 in surface course will be A-1/2

3 in surface course will be A-1/2

3 in base course will be A-3/4

For current EVAC specifications see City of Mesa website located here:
<https://www.mesaaz.gov/Business-Development/Engineering/Approved-Products-Equipment-Contractors>

Aggregate Base will all comply with MAG Standard Specifications Section 702 in its entirety, except as modified herein.

The graded aggregate base course will meet City requirements, as shown in the table below:

Select Aggregate Base Conditions	
SIEVE SIZE (PER ASTM D422-63)	PERCENT PASSING BY WEIGHT
1 1/4 INCH	100
No. 4	38-65
No. 8	25-60
No. 30	10-40
No. 200	3-12
P.I. MAX	5

Construction Requirements:

Subgrade Preparation will comply with MAG Standard Specifications Section 205 and 301 in its entirety, except as modified herein.

The work required for aggregate base will comply with MAG Standard Specifications Section 310 in its entirety, except as modified herein.

Asphalt work under this item will comply with MAG Standard Specifications Section 321 in its entirety, except as modified herein.

The base prepared by the Agreementor, on which the asphalt concrete pavement is to be placed, will be smooth, firm, and true to grade and cross-section as specified in the Project Plans, and will be so maintained throughout the period of placing asphalt concrete. If necessary, in order to obtain the above specified base condition, and if ordered by City Representatives, a leveling course of asphalt concrete compacted in layers not exceeding 2 inches in thickness or aggregate base will be spread to level irregularities such as dips, depressions, and sags. All irregularities such as humps or high spots will be removed in order to provide a smooth base of uniform grade and cross-section, so that subsequent surfacing will be of uniform thickness. No additional compensation will be allowed for furnishing and placing these materials and for all work incidental to the correcting of irregularities will be considered as included in the Agreement price for asphalt concrete

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pavement.

Cold joints between pavement sections will be sawcut.

Measurement and Payment:

Asphaltic Concrete Pavement, subgrade preparation, and aggregate base at the thickness specified on Project Plans will be measured per square yard for the pavement section and will be paid for at the Agreement unit price per square yard which price will be full compensation for the work, complete in place.

No additional payment will be paid for saw cutting associated with cold joints. Tack coat is incidental to this item.

ITEM NO. 007 PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) TRASH ENCLOSURE

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to construct concrete bus bays and private driveways as specified in the Project Plans.

Materials:

Portland Cement Concrete Pavement will comply with Class "A" Concrete according to MAG Standard Specifications Section 725 in its entirety, except as modified herein.

Construction Requirements:

The work under these items will comply with MAG Uniform Standard Specifications Section 324 in its entirety, as well as City Detail C-113.

Measurement and Payment:

Portland Cement Concrete Pavement will be measured per square foot and will be paid for at the Agreement unit price per square foot, which price will be full compensation for the item, complete in place.

ITEM NO. 008 PAVEMENT REPLACEMENT, MAG DET 200-1 & 200-2, T TOP

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary for the pavement replacement and base materials per MAG Detail 200-1 &

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200-2, T Top, for the installation of a [INSERT SPECIFIC ITEM] that will be located outside of the proposed roadway reconstruction limits along [INSERT SPECIFIC LOCATION].

Construction Requirements:

Pavement Replacement will comply with MAG Details 200-1 and 200-2. Existing material will be properly disposed off-site by Agreementor.

Measurement and Payment:

Pavement Replacement will be measured by the square yard and will be paid for at the Agreement unit price per square yard, which price will be full compensation for the item, complete in place.

No additional measurement or payment will be made for saw cutting and disposal of existing materials, the cost being considered incidental to this item.

ITEM NO. 009	VERTICAL CURB & GUTTER, TYPE A, H=6 IN, MAG DET 220-1
ITEM NO. 010	CONCRETE RIBBON CURB, TYPE B, MAG DET 220-1
ITEM NO. 011	MOUNTABLE CURB & GUTTER, TYPE E, MAG DET 220-2
ITEM NO. 012	SINGLE CURB, TYPE A, MAG DET 222

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to construct new vertical curb and gutter, ribbon curb, mountable curb, and single curb, as specified in the Project Plans.

Materials:

Curb & Gutter and Ribbon Curb (modified to 12 inch wide) and transitions will comply with MAG Details 220-1, 220-2, 221, and 222. Single Curb, Type A will conform to MAG Detail 222. Single Curb, Type A will conform to MAG Detail 222. MAG Standard Specification Section 725 applies in its entirety.

Construction Requirements:

The work under these items will comply with MAG Standard Specifications Section 340 in its entirety, MAG Details 220-1, 220-2, and 222, and City Detail C-225. Concrete curb/curb and gutter transitions will be constructed in accordance with MAG Detail 221.

Measurement:

All curb will be measured per linear foot. Curb transitions and curb openings are incidentals to this item.

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ITEM NO. 013 VALLEY GUTTER, MAG DET 240

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to construct new 3 foot wide valley gutter as specified in the Project Plans.

Materials:

Valley Gutter will comply with a MAG Detail 240 with a modified width to 3 feet will conform to MAG Standard Specifications Section 725 in its entirety.

Construction Requirements:

The work under these items will comply with MAG Standard Specifications Section 340 in its entirety, and MAG Detail 240.

Measurement:

Valley Gutter will be measured per square foot.

Payment:

Valley Gutter measured as provided above, will be paid for at the Agreement unit price per square foot, which price will be full compensation for the work, complete in place.

No additional payment will be paid for median nose transitions or curb/curb and gutter transitions, the cost being considered incidental to this item.

- ITEM NO. 014 CONCRETE SIDEWALK 4" THICK, MAG DET 230**
- ITEM NO. 015 CONCRETE SIDEWALK 6" THICK, MAG DET 230**
- ITEM NO. 016 6 IN CONCRETE RISER**
- ITEM NO. 017 CONCRETE APRON, PHASE 1 DET 3 SHEET C3.01**

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary construct new concrete sidewalk of various depth, 6-inch concrete riser per Detail 5 on Sheet C3.01 in Phase 1, concrete apron, and concrete base per MAG Detail 230, and Detail 3 on Sheet 3.01 within Phase 1 Project Plans, and at all locations as specified in the Project Plans.

Materials:

All materials will conform to MAG Detail 230 in their entirety, except as modified herein. Sidewalk drain shall be per Project Plans. Woven wire mesh and reinforcement shall be per Project Plans and MAG Specification Section 727.

Construction Requirements:

Comply with Chapter 4 - Street Design and Access Control, of City of Chandler Engineering & Design Standards Manual, MAG Detail 230, Project Plans, and City Detail C-113 in their entirety and all City of Chandler supplements, except as modified herein. Sidewalk drain where specified in the Project Plans is incidental to the Concrete Sidewalk 4" Thick Item.

Measurement and Payment:

Concrete Sidewalk, Concrete Apron, and Concrete Base will be measured per square foot and will be paid for at the Agreement unit price per square foot, which price will be full compensation for the work, complete in place. 6-inch Concrete Riser Item includes the riser and associated reinforcement; the 4 foot landing is included as part of the sidewalk measurement and payment. will be measured per unit each and paid at the Agreement unit price. No additional payment will be provided for sidewalk drains or reinforcement.

ITEM NO. 018 CONCRETE PARALLEL CURB RAMP, MAG 238-3**Description:**

The work under this item will consist of furnishing of all materials, labor, and equipment necessary to construct concrete curb ramps at locations as specified in the Project Plans.

Materials:

All materials will conform to MAG Specification Section 725 and City Details C-257 in their entirety, including all City of Chandler supplements.

Construction Requirements:

Concrete Parallel Curb Ramps will comply with MAG Detail 238-3 and as specified in the Project Plans and all City of Chandler supplements.

Measurement:

Concrete Curb Ramps will be measured as a unit for each, including detectable warnings, additional sidewalk area, and concrete curb as specified in the Project Plans.

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Payment:

The accepted quantities of Concrete Parallel Curb Ramps, measured as provided above, will be paid for at the Agreement unit price each, which price will be full compensation for the item, complete in place.

No additional payment will be made for additional sidewalk area, concrete curb, and detectable warnings. The cost is considered incidental to this item.

ITEM NO. 019 CONCRETE CURB RAMP PER PHASE 1 DETAIL

Description:

The work under this item will consist of furnishing of all materials, labor, and equipment necessary to construct concrete curb ramps at locations as specified in the Project Plans.

Materials:

All materials will conform to MAG Specification Section 725 and City Details C-257 in their entirety, including all City of Chandler supplements.

Construction Requirements:

Concrete Curb Ramp is 4 feet long meeting maximum slope of 1 inch per foot and will comply with Ramp Grading Detail on C3.00 withing Phase 1 of Project Plans and all City of Chandler supplements.

Measurement:

Concrete Curb Ramps will be measured as a unit for each, including detectable warnings, additional sidewalk area, and concrete curb as specified in the Project Plans.

Payment:

The accepted quantities of Concrete Curb Ramp Per Phase 1 Detail, measured as provided above, will be paid for at the Agreement unit price each, which price will be full compensation for the item, complete in place.

No additional payment will be made for additional sidewalk area or concrete curb. The cost is considered incidental to this item.

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ITEM NO. 020 CONCRETE CURB RAMP PER PHASE 2 DETAIL

Description:

The work under this item will consist of furnishing of all materials, labor, and equipment necessary to construct concrete curb ramps at locations as specified in the Project Plans.

Materials:

All materials will conform to MAG Specification Section 725 and City Details C-257 in their entirety, including all City of Chandler supplements.

Construction Requirements:

Concrete Curb Ramp is 6 feet long meeting maximum slope of 1 inch per foot and will comply with Curb Ramp Detail (Detail 2) on C3.00 within Phase 2 of Project Plans and all City of Chandler supplements.

Measurement:

Concrete Curb Ramps will be measured as a unit for each, including detectable warnings, additional sidewalk area, and concrete curb as specified in the Project Plans.

Payment:

The accepted quantities of Concrete Curb Ramp Per Phase 2 Detail, measured as provided above, will be paid for at the Agreement unit price each, which price will be full compensation for the item, complete in place.

No additional payment will be made for additional sidewalk area or concrete curb. The cost is considered incidental to this item.

ITEM NO. 021 REMOVE ASPHALTIC CONCRETE PAVEMENT

Description:

The work under these items will consist of furnishing all materials, labor, and equipment for the removal and disposal of existing asphaltic concrete pavement at locations as specified in the Project Plans.

Construction Requirements:

The work under these items will comply with MAG Standard Specifications Section 350 in its entirety.

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Measurement and Payment:

Remove Asphaltic Concrete Pavement will be measured per square yard will be paid for at the Agreement unit price per square yard, which price will be full compensation for the work, complete in place. Any sawcutting is considered incidental to this item.

ITEM NO. 022 REMOVE PORTLAND CEMENT CONCRETE PAVEMENT
ITEM NO. 023 REMOVE CONCRETE HEADWALL

Description:

The work under this item will consist of furnishing all materials, labor, and equipment for the removal and disposal of existing concrete headwalls at locations as specified in the Project Plans.

Construction Requirements:

Removal and disposal of existing concrete headwalls will comply with MAG Standard Specifications Section 350 in its entirety, except as modified herein.

The Agreementor will be responsible for removing the identified existing concrete headwall in its entirety. The Agreementor will backfill and compact the excavated area per MAG 206.

Measurement and Payment:

Remove Concrete Headwall will be measured as a unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place. No additional payment will be made for backfilling, compaction, sawcutting, or disposal, the cost being considered incidental to these items.

ITEM NO. 024 REMOVE CONCRETE SINGLE CURB
ITEM NO. 025 REMOVE CONCRETE DITCH & BACKFILL

Description:

The work under these items will consist of furnishing all materials, labor, and equipment for the removal and disposal of existing header curb, concrete single curb, concrete curb & gutter, and concrete irrigation ditch at locations as specified in the Project Plans.

Construction Requirements:

Removal and disposal of existing concrete single curb, and concrete irrigation ditch will comply with MAG Standard Specifications Section 350 in its entirety, except as modified herein.

The Agreementor will be responsible for removing the identified concrete improvements in their entirety. The Agreementor will backfill the excavated area per the City's requirements for backfilling and compaction.

Measurement and Payment:

Remove Concrete Single Curb will be measured per linear foot and will be paid for at the Agreement unit price per linear foot. Remove Concrete Ditch & Backfill will be paid for at the Agreement unit price per square foot. Prices will be full compensation for the work, including all removals, disposals, backfilling, and compaction, complete in place. Any sawcutting is considered incidental to these items.

ITEM NO. 026 REMOVE PAVERS
ITEM NO. 027 REMOVE CONCRETE SIDEWALK

Description:

The work under these items will consist of furnishing all materials, labor, and equipment for the removal and disposal of existing concrete sidewalks, pavers, and slabs at locations as specified in the Project Plans.

Construction Requirements:

The work under these items will comply with MAG Standard Specifications Section 350 in its entirety, except as modified herein.

The Agreementor will be responsible for removing and disposal of the identified concrete improvements in their entirety. The Agreementor will backfill the excavated area per the City's requirements for backfilling and compaction.

Measurement and Payment:

Remove Concrete Sidewalk or Pavers will be measured per square foot and will be paid for at the Agreement unit price per square foot, which price will be full compensation for the work, including all removals, disposals, backfilling, and compaction, complete in place.

ITEM NO. 028 REMOVE CONCRETE STRUCTURES AND OBSTRUCTIONS

Description:

The work under this item will consist of furnishing all materials, labor, and equipment for the removal and disposal of existing concrete structures such as junction box and obstructions as specified in the Project Plans.

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Construction Requirements:

Removal and disposal of existing concrete structures and obstructions will comply with MAG Standard Specifications Section 350 in its entirety, except as modified herein.

The Agreementor will be responsible for removing and disposing of the identified concrete structures in its entirety. The Agreementor will backfill the excavated area per MAG 206.

Measurement and Payment:

Remove Concrete Structures and Obstructions will be measured as a single complete unit of work and will be paid at the Agreement lump sum price, which price will be full compensation for the work, complete in place, including all removals, disposals, backfilling, and compaction.

ITEM NO. 029 REMOVE FLAG POLE AND FOUNDATIONS

Description:

The work under this item will consist of furnishing all materials, labor, and equipment for removing flag pole and associated foundations at locations as specified in the Project Plans.

Construction Requirements:

Pole foundations will be removed completely. The Agreementor will backfill the excavated area per the City's requirements for backfilling and compaction.

Measurement and Payment:

Remove Flag Pole and Foundations will be measured as a unit each and will be paid for at the Agreement unit price each, which price will be full compensation for the item, complete in place.

ITEM NO. 030 REMOVE BOLLARD AND SALVAGE ASSEMBLY ITEM NO. 031 REMOVE AND REINSTALL SIGN

Description:

The work under this item consists of furnishing all equipment, labor, and materials necessary to remove and reinstall existing signs and removing bollards and salvaging the bollard assemblies at locations as specified in the Project Plans or directed by City Representatives.

Construction Requirements:

The Agreementor will be responsible for removing, storing, and reinstalling the identified existing signs, and if necessary removing the existing sign foundation, sign post, hardware and appurtenances and reinstalling sign to a new sign post and foundation with new hardware and appurtenances.

The work under this item will comply with MAG Standard Specifications Section 350 and City of Chandler Standard Detail C-613 and C-611.

Prior to the removal of signs, the Agreementor will make arrangements for the City Representative to inspect all signs to be removed. Any signs deemed not salvageable, as determined by the City Representative, will be disposed of by the Agreementor at his expense. Any signs damaged during removal or storage will be replaced at no cost to the City.

Measurement and Payment:

Remove and Reinstall Sign and Remove Bollard and Salvage Assembly will be measured as a unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place.

No additional payment will be made for new hardware, appurtenances, sign post, foundation, backfill, compaction or disposal, the cost being considered incidental to this item.

ITEM NO. 032 TRAFFIC CONTROL**Description:**

Traffic Control is per City's General Conditions and MAG Uniform Standard Details for Public Works Construction, Section 401 "TRAFFIC CONTROL".

Construction Requirements:

Traffic Control is per City's General Conditions and MAG Uniform Standard Details for Public Works Construction, Section 401 "TRAFFIC CONTROL".

Measurement:

Traffic Control is measured as a lump sum and includes all labor and materials to install and uninstall. No additional payment will be made for flaggers.

Payment:

Traffic Control will be measured as a lump sum unit and will be paid for at the Agreement unit price each, which price will be full compensation for the item, complete in place.

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ITEM NO. 033 8 FT HEIGHT CHAIN LINK FENCE

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary to construct new 8 ft chain-link fence at all locations as specified in the Project Plans.

Materials:

All materials will conform to MAG Standard Specifications Sections 772 and 725, except as modified herein.

Construction Requirements:

The work under this item will comply with MAG Standard Specifications Section 420 in its entirety and as illustrated and detailed on the project plans, except as modified herein.

Barbed wire will not be installed.

Measurement:

Chain Link Fence will be measured per linear foot, including excavation, backfill, compaction, foundations, posts, post caps, hardware, paint, and appurtenances necessary to construct fence.

Payment:

The accepted quantities of 8 ft Chain Link Fence, as measured as provided above, will be paid for at the Agreement unit price per linear foot, which price will be full compensation for the work, complete in place.

No additional payment will be made for excavation, backfill, compaction, foundations, posts, post caps, hardware, paint, and appurtenances, the cost be considered incidental to this item.

ITEM NO. 034 CHAIN LINK FENCE GATE, 24 FT DOUBLE SWING, MAG DET 160

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary to construct new chain link fence gate at all locations as specified in the Project Plans.

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Materials:

All materials will conform to MAG Detail 160.

Construction Requirements:

The construction of Chain Link Fence Gate will comply with MAG Detail 160 except as modified herein.

Barbed wire will not be installed.

Measurement:

Chain Link Fence Gate will be measured as a unit for each, including excavation, backfill, compaction foundations, posts, post caps, hardware, paint, and appurtenances.

Payment:

The accepted quantities of Chain Link Fence Gate, a measured as provided above, will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place.

No additional payment will be made for excavation, backfill, compaction, foundations, posts, post caps, hardware, paint, and appurtenances, the cost be considered incidental to this item.

ITEM NO. 035 4 IN WHITE TRAFFIC PAINT STRIPE
ITEM NO. 036 4 IN YELLOW TRAFFIC PAINT STRIPE

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to install traffic paint stripes at the locations as specified in the Project Plans.

Materials:

The work under these items will conform to the current editions of the City of Chandler Standard Details C-614.

Construction Requirements:

The work under these items will conform to the layouts in the Project Plans and City Detail C-614, unless otherwise revised by the City Representative.

Measurement:

4 Inch White Traffic Paint Stripe and 4 Inch Yellow Traffic Paint Stripe will be measured

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per linear foot. No measurement will be made for the number of linear feet of gaps in dashed lines.

Payment:

The accepted quantities of 4 Inch White Traffic Paint Stripe and 4 Inch Yellow Traffic Paint Stripe, measured as provided above, will be paid for at the Agreement unit price per linear foot, which price will be full compensation for the item, complete in place.

**ITEM NO. 037 THERMOPLASTIC/PREFORMED SYMBOL ACCESSIBLE
MARKING SET**

Description:

The work under these items consists of furnishing all labor, equipment and materials, and equipment necessary for the installation of thermoplastic striping and symbols at the locations as specified in the Project Plans.

Materials:

The work under these items will conform to the current editions of the City Details C-612 and the Project Plans.

Construction Requirements:

The work under these items will conform to the layouts in the Project Plans and in accordance with City Detail C-612, unless otherwise adjusted by the City Representative.

Measurement:

Thermoplastic/Preformed Symbols for Accessible Set will be measured as a unit for each pavement symbol installed.

Payment:

The accepted quantities of Thermoplastic/Preformed Symbols for Accessible Marking Set, measured as provided above, will be paid for at the Agreement unit price per each, which price will be full compensation for the item, complete in place.

ITEM NO. 038 PERFORATED SIGN POST AND FOUNDATION

Description:

The work under this item will consist of furnishing all materials, labor, and equipment

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necessary to install concrete perforated sign post and foundations, including anchor, sleeve, and associated hardware to attach post to foundation at the locations as specified in the Project Plans.

Materials:

All materials required to install concrete perforated sign post and foundations and attachment of post will conform to City Detail C-613.

Construction Requirements:

The work under this item will conform to City Detail C-613 and as specified in the Project Plans.

Measurement and Payment:

Perforated Sign Post and Foundation will be measured as a unit for each post and foundation installed and will be paid for at the Agreement unit price per each, which price will be full compensation for the item, complete in place. No additional payment will be made for anchor, sign post sleeves, and associated hardware to attach post to foundation, the cost be considered incidental to this item.

ITEM NO. 039 CONCRETE SCUPPER, CITY DET C-500, W=4 FT
ITEM NO. 040 CONCRETE SCUPPER, CITY DET C-500, W=5 FT

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to construct scuppers, of the widths indicated, at all locations as specified in the Project Plans. Each scupper will include a storm drain inlet marker per the City Detail C-508.

Materials:

All materials will conform to City Detail C-500 and MAG Detail 203 in their entirety.

Construction Requirements:

The work under these items will comply with City Detail C-500 and MAG Detail 203 in their entirety and with a modified width and depth as shown in the Project Plans.

Measurement:

Concrete Scupper will be measured as a unit for each including storm drain inlet marker and painting of exposed angle iron.

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Payment:

The accepted quantities of Concrete Scupper, measured as provided above, will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place, including inlet marker and painting of exposed angle iron.

ITEM NO. 041 ADJUST EX VALVE TO GRADE PER MAG DETAIL 391-1.
ITEM NO. 042 REMOVE, SALVAGE, AND REINSTALL IRRIGATION VALVE, 12 IN
(MAG DET 506)

Description:

The work under this item will consist of removing irrigation valve, where shown, and associated concrete aprons, furnishing all materials, labor, and equipment necessary for installing irrigation valves at locations and to dimensions shown on the Project Plans and in accordance to MAG Detail 506. Where existing valves are to remain, the valve shall be adjusted to elevations as shown in the Project Plans and a concrete poured.

Materials and Construction Requirements:

Irrigation valves will be constructed in compliance with MAG Detail 506, adjusted per MAG Detail 391-1, and all referenced specifications therein in their entirety. Concrete aprons shall be as shown in Project Plans and have material specifications per MAG Detail 506 and MAG Specification Section 725.

Measurement and Payment:

Adjust Existing Valve to Grade per MAG Det 391-1 and Remove, Salvage, and Reinstall Irrigation Valve, 12 inch (MAG Det 506) will be measured as a unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, including removals, salvage, and completed valves in place. No additional payment will be made for removal of obstructions, excavation, bedding, backfilling, compacting, concrete apron, and joint materials, the cost being considered incidental to this item.

ITEM NO. 043 12 IN SDR 41, PLASTIC IRRIGATION PIPE
ITEM NO. 044 24 IN SDR 41, PLASTIC IRRIGATION PIPE

Description:

The work under these items consists of furnishing all materials, labor, and equipment necessary to install polyvinyl chloride (PVC) pipe and fittings, including excavation and backfilling at the locations as specified in on the Project Plans, these Technical Specifications and MAG Specifications.

Materials:

Pipe and fittings will be polyvinyl chloride, hereinafter PVC, conforming to the requirements of the City of Chandler Engineering & Design Standards Manual.

All materials and fittings will be new and of the manufacturer's most current design. Plastic pipe and fittings will be installed in accordance with the requirements specified herein and the manufacturer's recommendations.

Construction Requirements:

Installation of PVC pipe and fittings will conform to the requirements of the City of Chandler Engineering & Design Standards Manual and MAG Specification Section 601.

Re-installation of the steel access barrier at existing headwall is included in this item.

All piping will be installed as detailed on the Project Plans and will have a minimum cover as shown. Fittings and connections are considered incidental.

The Agreementor will furnish to City Representatives, prior to pipe installation, all installation instructions as published by the plastic pipe and fitting manufacturers. Installation of PVC piping and fittings will be in accordance with the published instructions, the project documents and as directed by City Representatives.

Measurement:

Pipe will be measured by the linear foot from interior wall of junction structures. Fittings such as bends or tees are considered incidental to this item. No additional payment will be made for steel access barrier.

Payment:

Irrigation Pipe will be measured on a per linear foot basis and will be paid for by the linear foot, which price will be full compensation for the work, complete in place, as specified herein and on the Project Plans. Fittings and connections to existing pipes or structures are considered incidental to this item and no additional payment will be made.

ITEM NO. 045	PIPE PLUG, MAG DET 427
ITEM NO. 046	CONCRETE PIPE COLLAR FOR 12 IN, MAG DET 505
ITEM NO. 047	CONCRETE PIPE COLLAR FOR 24 IN, MAG DET 505

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary to install pipe plugs and pipe collars at all locations as specified in the Project Plans.

City of Chandler
Project No. CA2301.401
Technical Specifications

Tumbleweed Ranch Phase 1 and 2

Materials:

Pipe plugs will conform to MAG Detail 427. Concrete Pipe Collars will conform to MAG Detail 505.

Construction Requirements:

Pipe plugs will conform to MAG Detail 427. Concrete Pipe Collars will conform to MAG Detail 505.

Measurement and Payment:

Any temporary pavement needs will be considered included in this bid item. Pipe plugs and collars will be paid on an each basis.

ITEM NO. 048 12 IN RGRCP, CLASS IV

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary for installing 12-inch RGRCP storm drain pipe and flared end sections as specified in the Project Plans.

Materials:

12-inch RGRCP Class IV storm drain pipe and flared end sections will be in conformance with MAG Uniform Standard Specifications Section 618.2 and 735, and manufacturer's specifications.

Construction Requirements:

This work also includes the trench excavation, bedding and backfill per MAG Specification Section 601. All storm drain and reinforced concrete pipe construction will be constructed in compliance with MAG Standard Specifications Section 618 in its entirety.

Measurement and Payment:

All RGRCP Storm Drain Pipe will be measured per linear foot of pipe and will be paid for at the Agreement unit price per linear foot, which price will be full compensation for the item, complete in place, including the pipe, connections to existing facilities/pipelines, removal of obstructions, excavation, bedding, backfilling, compacting, testing, temporary pavement and joint materials.

No additional payment will be made for slurry of pipe segments as determined by the City, or flared end sections, these costs being considered incidental to this item.

ITEM NO. 049 CONCRETE BLOCK JUNCTION BOX, MAG DTL 504**Description:**

The work under this item will consist of furnishing all materials, labor, and equipment necessary to construct storm drain manholes at locations as specified in the Project Plans.

Materials and Construction Requirements:

Concrete Block Junction Boxes will comply with MAG Detail 504 in its entirety. Concrete masonry block to meet MAG Specification Sections 510, 775, and 776, with the concrete base complying with Section 725.

Measurement and Payment:

Concrete Block Junction Boxes will be measured as unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place as reflected in MAG Detail 504 and the Project Plans.

ITEM NO. 050 24 IN IRRIGATION GATE WITH HANDWHEEL LIFT**Description:**

The work under this item will consist of furnishing all materials, labor, and equipment necessary for installing irrigation gates at locations and to dimensions shown on the Project Plans and in accordance to MAG and Manufacturer Specifications.

Materials and Construction Requirements:

Irrigation gates will be constructed in compliance with Detail 2 on Sheet 5.01 on the Phase 2 portion of the Project Plans, MAG Specifications, MAG Detail 503, and manufacturer recommendations in their entirety. The Agreementor shall provide manufacturer cut sheets for review by the Engineer of Record, prior to construction.

Measurement and Payment:

24 inch Irrigation Gate with Handwheel Lift will be measured as a unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place. Appurtenances are incidental to this item. No additional payment will be made for removal of obstructions, excavation, bedding, backfilling, compacting, and joint materials, the cost being considered incidental to this item.

ITEM NO. 051 WATER LINE REMOVALS

Description:

The work under this item will consist of furnishing all materials, labor, and equipment necessary for removing water lines, valves, fittings, yard hydrants, stand pipes, hose bibs and any other associated water line appurtenance removals to dimensions and locations shown on the Project Plans and in accordance with MAG Specifications.

Construction Requirements:

Removal and disposal of existing pipe lines and appurtances will comply with MAG Standard Specification Section 350 in its entirety, except as modified herein or on the Project Plans.

The Agreementor will be responsible for removing and disposing of the identified materials in their entirety. The Agreementor will backfill the excavated area per MAG 206.

Measurement and Payment:

Removal and disposal of materials will be measured as a single complete unit of work and will be paid at the Agreement lump sum price, which price will be full compensation for the work, complete in place, including all removals, disposals, backfilling, and compaction.

- ITEM NO. 052 8 IN DUCTILE IRON PIPE WATERLINE WITH FITTINGS**
- ITEM NO. 053 4 IN PVC C-900, CLASS 250 WATERLINE WITH FITTINGS**
- ITEM NO. 054 8 IN PVC C-900, CLASS 250 WATERLINE WITH FITTINGS**
- ITEM NO. 055 DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY, CITY DET C-315, FD102, & C-105**
- ITEM NO. 056 HOSE BIB**
- ITEM NO. 057 YARD HYDRANT**
- ITEM NO. 058 8 IN GATE VALVE WITH BOX AND COVER**
- ITEM NO. 059 TAPPED CAP WITH BLOW-OFF VALVE, MAG DET 390**
- ITEM NO. 060 GATE VALVE, BOX, & COVER PER MAG DET 340 & STAINLESS-STEEL TAPPING SLEEVE**

Description:

The work under these items will consist of furnishing all materials, labor, and equipment necessary waterlines and associated thrust blocks at locations as specified in the Project Plans in addition to those required by City of Chandler Requirements.

Materials:

Per the requirements of MAG and AWWA.

Construction Requirements:

Thrust blocks will be installed in accordance with MAG.

All pipe lines, valves and fittings 16 inches and smaller in diameter will be blocked with concrete thrust blocks in accordance with standard details and as shown on the project plans. Locations of thrust blocks required at tie-in locations have been identified and quantified on the Project Plans. However, if thrust blocks required for valves are not identified or quantified, but will be installed per MAG.

Double check Valve Backflow Prevention Assembly shall be per Project Plans, MAG, and City Fire Department Details.

Agreementor shall provide manufacturer cut sheets to the Engineer of Record for materials.

Measurement and Payment:

Measured and paid by each or linear foot as specified complete in place including trenching, backfill, and surface restoration.

Any thrust blocks, restoration of pavement, or landscaping are incidental to the unit pay item (may require more than one bid item).

No additional payment will be made for blocking for valves, the cost will be considered incidental to this item.

ITEM NO. 061 1 IN SCH. 40 PVC WATER LINE PIPE
ITEM NO. 062 2-1/2 IN SCH. 40 PVC WATER LINE PIPE

Description:

The work under these items consists of furnishing all materials, labor, and equipment necessary to install polyvinyl chloride (PVC) pipe and fittings of the various sizes complete, including excavation and backfilling at the locations as specified in on the Project Plans and these Technical Specifications.

Materials:

Pipe and fittings will be polyvinyl chloride, hereinafter PVC, conforming to the requirements of the City Detail C-308, C-408, and City Supplement to MAG Specification Section 601. 2024 International Plumbing Code applies.

All materials and fittings will be new and of the manufacturer's most current design.

Plastic pipe and fittings will be installed in accordance with the requirements specified herein and the manufacturers recommendations.

Bedding and Cover Material:

Bedding and cover material for PVC piping will conform to the following gradation requirements when tested in accordance with Arizona Test Method 201:

Sieve Size	Percent Passing
No. 4	100
No. 16	30 - 80
No. 50	0 - 30
No. 100	0 - 25
No. 200	0 - 20.0

Construction Requirements:

Installation of PVC pipe and fittings will conform to the requirements of the City of Chandler Engineering & Design Standards Manual and ASTM D1785.

All piping will be installed as detailed on the Project Plans and will have a minimum cover as shown.

The Agreementor will furnish to City Representatives, prior to pipe installation, all installation instructions as published by the plastic pipe and fitting manufacturers. Installation of PVC piping and fittings will be in accordance with the published instructions, the project documents, as directed by City Representatives, and 2024 International Plumbing Code.

Measurement and Payment:

PVC pipe will be measured on a per linear foot basis and will be paid for by the linear foot, which price will be full compensation for the work, complete in place, as specified herein and on the Project Plans. No additional payment will be provided for fittings and associated connections.

ITEM NO. 063 BACKFLOW METAL MESH ENCLOSURE

Description:

The work under this item consists of furnishing and installing the backflow prevention enclosure, an associated pad if one does not exist, and any removals as needed.

Materials:

The backflow preventer will conform to the requirements of City Detail C-311.

The concrete pad will be as shown on the plans and concrete will be 2,500-psi at 28 days and will conform to the requirements of Section 922, Utility Concrete for Miscellaneous Construction, of the Standard Specifications. Reinforcing steel will conform to the requirements of Section 1003, Reinforcing Steel of the Standard Specifications.

The steel enclosure for the backflow prevention unit will be pre-manufactured. A commercial grade lock with two keys, compatible with the City of Chandler Maintenance Department locking system and approved by City Representatives, will be provided for each enclosure. The pre-manufactured enclosure will meet the following material requirements:

- The enclosure will be welded to the pipe and angle frame at 4-inch-on center and will be coated with heat applied powder-coated finish color, Desert Tan.
- The enclosure will be hinged on one end in order to allow access. The enclosure will be secured to the concrete slab with eyebolts, brackets and lock hasps provided by the manufacturer.
- The enclosure will be secured to the concrete slab on the other end by an eyebolt staple and a steel strap designed to fit over the eyebolt.
- The enclosure will be constructed of bent 1-¼ inch Schedule 40 pipe, 1 x 1 x 1/8 inch angle steel bottom rail and ½ -inch-13 gauge rolled, expanded steel.
- The enclosure will be the size recommended by the enclosure manufacturer for the City of Chandler model of backflow preventer used and will be a minimum of 10 inches wide, 24 inches high and 20 inches long and large enough to accommodate the controller and backflow preventer as detailed.
- A lock shield will be provided to protect the lock from vandalism. The lock shield will be constructed of 3/16-inch-thick steel and will measure approximately 2 inches by 4 inches. The lock shield will be an integral part of the enclosure.

Construction Requirements:

All backflow prevention reinforcing, anchor bolts and other embedded items will be in place and inspected by City Representatives prior to placing the concrete slab.

The concrete slab will be constructed at the locations and in accordance with the details shown on the project plans, these Technical Specifications and will be approved by City Representatives.

The Agreementor will excavate and grade the area of the enclosure as shown on project plans and as directed by City Representatives.

The surfaces upon which the enclosure slab is to be placed will be fine graded and

compacted to a density of not less than 95 percent of the maximum density in accordance with the requirements of the Material Testing Manual of the Materials Section.

Concrete work will conform to the applicable requirements of Section 601 of the Standard Specifications. Unless otherwise detailed or specified all exposed concrete slabs will have a light, broom finish.

The enclosure will be installed according to the manufacturer's installation recommendations which describe how to set the enclosure on a partially hardened slab, while still embedding the eyebolt in the slab using slab pour voids and a wetter, more plastic concrete. Eyebolts, with nuts attached near the end of the threads will be wrapped in multiple layers using electrician's vinyl tape. Tamper-proof bolts provided by the manufacturer will be used to prohibit removal of brackets.

No penetrations will be located within eight inches of the edge of the concrete slab.

Measurement:

The enclosure is measured as a unit for each and will be paid for at the Agreement unit price each, which price will be full compensation for the work, complete in place, as specified herein and in the Project Plans, including any coordination required with City and furnishing and placing steel enclosure and concrete pad.

SOILS INFORMATION

The material boring logs shown in the Geotechnical Report and are provided in Architectural Specifications. It is not intended to imply that the character of materials shown in the logs is representative throughout the project. The soil borings are indicative of the soil characteristics only at the locations and to the depths of each of the borings.

Even if not specifically shown on the boring logs, the Agreementor may encounter large cobbles, boulders, caliche, conglomerate, hard rock, sand, perched groundwater, historic or prehistoric cultural resources, or other differing site conditions on this project. There will be no additional compensation made for any differing site condition that may be encountered. It is the Agreementor's responsibility to include the cost of any additional work items, such as trench boxes, laying back trenches, soil pumping mitigation, etc., associated with unforeseen soil conditions in all Agreement bid items requiring earthwork and will be considered incidental.

PERMITS

The Agreementor will comply with the requirements of MAG Standard Specifications Sections 107.2 except as modified herein.

The Agreementor will obtain all permit(s) required to construct the project, including but

not limited to:

City Water Meter Permit

The Agreementor will obtain City permit(s) required for fire hydrant water trucks (Agreementor submits and pays for this permit, no separate payment will be made for this permit; the cost being considered as included in the price of other Agreement items) and new landscape water meters (City pays for the permit but Agreementor must sign and pick up the permit).

City Encroachment, Civil and Building Permits

The Agreementor will obtain City permit(s) required for encroachment, civil and structures. The City pays for the permits but Agreementor must sign and pick up the permit.

City Administrative Use Permits

The Agreementor will pay and obtain City permit(s) required for construction trailer and temporary facilities. No separate payment will be made for this permit, the cost being considered as included in the price of other Agreement items.

Maricopa County Permits

The Agreementor will pay and obtain Maricopa County permit(s) required for traffic control within their jurisdiction. No separate payment will be made for this permit, the cost being considered as included in the price of other Agreement items.

Air Quality Permit

The Agreementor will obtain a Maricopa County Air Quality Permit for this project. The Agreementor will be required to prepare a comprehensive fugitive dust control plan, in accordance with the guidelines established in Rule 310 of Maricopa County Regulation III, Control of Air Contaminants. The Agreementor will complete and submit the control plan with the permit application and obtain approval from the County prior to any activities which may produce dust pollutants.

No separate payment will be made for the preparation, implementation of the fugitive dust control plan, or permit fees, the costs being considered as included in the price of Agreement items.

Erosion Control Permit

The Agreementor will submit the Arizona Pollutant Discharge Elimination System Notice of Intent (NOI) and the Notice of Termination (NOT) to the Arizona Department of

Environmental Quality. The Agreementor and the City Representatives will jointly review the Stormwater Pollution Prevention Plan (SWPPP) prior to submission of the NOI and prior to the start of work. The SWPPP will be maintained throughout the duration of the project in accordance with the APDES requirements and a current version will be available at all times at the project site.

No separate payment will be made for the preparation, implementation of the SWPPP, or permit fees, the costs being considered as included in the price of Agreement items.

NESHAP Permit

The Agreementor will test structures for hazardous materials prior to the start of demolition/relocation to determine if an Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) permit will be required and obtain permit if necessary. The Agreementor will submit said NESHAP notification to the Arizona Department of Environmental Quality at least 10 working days before the start of any demolition activity.

No separate payment will be made for this testing and permit fees, the costs being considered as included in the price of Agreement items.

TRAFFIC CONTROL

Access Requirements for Pedestrians:

The Agreementor will maintain ADA accessible passable walkway along Pioneer Parkway at all times during construction.

Traffic-Related Work Restrictions:

No lane restrictions or intersection closures will be allowed during special events or holiday times as determined by the City.

No trenches will be left open overnight in areas that are not fenced in to prohibit access to vehicles and pedestrians. All trenches within the roadway will be plated or backfilled and paved prior to allowing vehicles to travel on the section of roadway.

COOPERATION BETWEEN AGREEMENTORS AND OTHER AGENCY PROJECTS

Agreementor will conform to the requirements of MAG Section 105.7 except as modified herein.

The Agreementor is advised that there will be construction activity by others adjacent to the project site. The Agreementor will coordinate the work to accommodate the construction activities.

City of Chandler
Project No. CA2301.401
Technical Specifications

Tumbleweed Ranch Phase 1 and 2

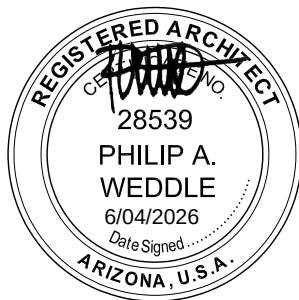
The Agreementor will contact the City of Chandler, Chandler Municipal Airport, Federal Aviation Administration (FAA), SRP, Maricopa County Department of Transportation (MCDOT), Flood Control District of Maricopa County (FCDMC), and adjacent private development Agreementors to verify other nearby projects in the vicinity of this project.

The Agreementor is advised to schedule and coordinate all work activities and regional transit so as not to adversely conflict with this work. The Agreementor will be expected to attend any monthly coordination meetings set up by other agencies or other prime Agreementors working on adjacent projects to discuss coordination.

PROJECT MANUAL

The Ranch at Tumbleweed Park

Chandler, Arizona



EXPIRES: 12/31/27

BID SET

June . 2026

WEDDLE GILMORE architects


WEDDLE GILMORE ARCHITECTS

date: June 2026

project: The Ranch at Tumbleweed Park – Bid Set
wg2203

re: Architectural, Structural, Electrical & Landscape Specification Table of Contents

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**REPORT ON
GEOTECHNICAL INVESTIGATION**



DESIGNATION: The Ranch at Tumbleweed Park

LOCATION: NWC McQueen Road & Ryan Road
Chandler, Arizona

CLIENT: Weddle Gilmore Architects

PROJECT NO: 250062SA

REVISED DATE: July 3, 2025



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APPENDIX – Field and Laboratory Data



1.0 INTRODUCTION

This **updated** report presents the results of a subsoil investigation carried out at the site of the proposed *The Ranch at Tumbleweed Park* development, to be located at the northwest corner of McQueen Road and Ryan Road in Chandler, Arizona. The general site location is shown in Figure 1.0.1. *Updated information includes additional recommendations for pavement design, trash enclosures, and concrete sidewalks. No new field or laboratory work was conducted.*

We understand that construction will consist of improvements to the existing park. The improvements will consist of two barns totaling 9,600 square feet and a relocated red shed theater along with several minor structures. The barns will be steel frame/masonry construction with slab on grade. Structural loads are expected to be light to moderate and no special considerations regarding settlement tolerances are known at this time, although we assume that the industry standard of a maximum of 1-inch of total settlement will be allowed and used for design. Adjacent areas will be landscaped and used for stormwater detention.



Figure 1.0.1 General Site Location Map

2.0 GENERAL SITE AND SOIL CONDITIONS

2.1 Site Conditions

The area of the proposed new structures are located near the northeast corner of *Tumbleweed Ranch*. The ranch is bounded on the north by Pioneer Parkway, to the west by Anvil Drive, to the south by Ryan Road, and to the east by a small agricultural field followed by McQueen Road. Several structures including shade canopies are located throughout the area of the proposed construction. The area of the proposed construction contains several mature trees along with light amounts of grass and weeds. Irrigation systems are present throughout the grassy areas of the park. The northeast corner of the ranch (B-3 and P-3 area) is currently being utilized as a retention area. Refer to the following figures.



Figure 2.1.1 – View of Mature Trees



Figure 2.1.2 – View of Red Shed Theater



**Figure 2.1.3 – View of Northeast Corner of Site
(B-3 and P-3)**



Figure 2.1.4 – View of Bathroom/Structures

A cursory review of historical aerials indicates the site appears to have been part of larger agricultural farm fields. By 1996 the tennis courts within the park to the northeast were constructed. By 2001 the eastern portion of the site was graded and structures are evident. The western portion appears to have remained agricultural farm land. By 2003 additional structures are evident within the ranch. By 2006 Pioneer Parkway was expanded to the west. By 2008 canopies appear to have been added near the red shed theater area. Anvil Drive appears to have been graded and paved in 2008 and 2009, respectively. The park appears to have undergone minor improvements since. **It is recommended to obtain a Phase I/II Environmental Site Assessment for more information regarding any site history that may impact site development.** Refer to the following historical aerial photos:

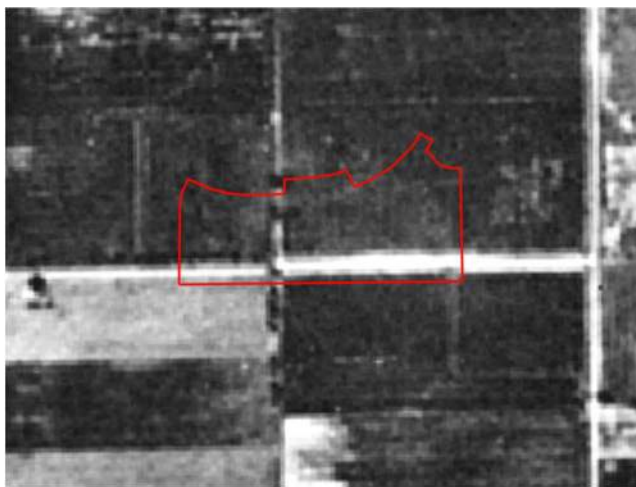


Figure 2.1.5 – Dated 1937



Figure 2.1.6 – Dated 1996



Figure 2.1.7 – Dated 2002



Figure 2.1.8 – Dated 2008

**Figure 2.1.9 – Dated 2013****Figure 2.1.10 – Dated 2022**

“Historical Aerial Photography,” ArcGIS Web Application. [Online]. Available: <https://gis.maricopa.gov>.

2.2 Geologic Conditions

The site is near known areas that have undergone considerable subsidence due to groundwater removal. Areas of subsidence are known to produce earth fissuring, which has affected areas within several miles of the site. Subsidence is a basin wide phenomenon that would result in differential elevation changes over long distances, which would not affect the type of improvements proposed for this site. No evidence of earth fissures was observed on the site. Fissure gullies form over subsurface irregularities such as bedrock highs, which cause tensional stresses and differential subsidence. Where such anomalies are not present, subsidence tends to be uniform over a wide area, this having minimal effect on surficial structures. The closest known earth fissures are in the Chandler Heights area, about 5.5 miles southeast from this site. Based on local experience, subsidence and earth fissures historically have **not** been a problem in this area.

2.3 Seismic Design Parameters

The project area is in a seismic zone that is considered to have low historical seismicity. The seismicity of the Phoenix area has had only three magnitude 3.0 events in over 100 years. Liquefaction is not considered a concern as groundwater exceeds 50 feet below ground surface.

Although borings were not advanced to 100 feet, based on the nature of the subsoils encountered in the borings and geology in the area, Site Class Definition, Class D may be used for design of the structures. In addition, the following seismic parameters may be used for design (based on ASCE 7-16 and ASCE 7-22, utilizing the ASCE Hazard Tool):

Table 2.3.1 Seismic Parameters

Standard Reference:	ASCE 7-16	ASCE 7-22
MCE ¹ spectral response acceleration for 0.2 second period, S_s :	0.178g	0.180g
MCE ¹ spectral response acceleration for 1.0 second period, S_1 :	0.065g	0.058g
Site coefficient, F_a :	1.6	-
Site coefficient, F_v :	2.4	-
MCE ¹ spectral response acceleration adjusted for site class, S_{MS} :	0.285g	0.290g
MCE ¹ spectral response acceleration adjusted for site class, S_{M1} :	0.155g	0.160g
5% Damped spectral response acceleration, S_{DS} :	0.190g	0.190g
5% Damped spectral response acceleration, S_{D1} :	0.103g	0.110g
NOTE 1: MCE = maximum considered earthquake		

2.4 General Subsurface Conditions

S&A obtained information about the subsurface conditions at the site using three 7-inch diameter hollow-stem auger soil borings to record the soil conditions and collect samples for laboratory testing. All borings were drilled to their intended advancement depth of approximately 16.5 feet below the existing ground surface (bgs).

Although not indicated on the logs, fill or disturbed soil is likely present at the subject site due to the former farming activities and construction of the existing structures and infrastructure. The soil profile generally consists of layers of sandy lean clay and silty sand to a depth of approximately 16.5 feet bgs, the maximum depth of investigation. In addition, subordinate amounts of gravel and weak degrees of calcareous cementation were noted throughout the profile. The standard penetration resistance test (SPT) values range from 7 to 50+ blows per foot. **Loose soil conditions were encountered within Boring B-2 at depths of 10 to 15 feet bgs.** No groundwater was encountered during this investigation. Based on visual and tactile observation, the shallow surface soils were in a range from ‘dry to moist’ state at the time of investigation. An increased level of moisture may be present in the area of the proposed building relocation (B-3) due to the area being utilized as a retention.

Laboratory testing indicates in-situ dry densities of the upper soil ranging from 93.2 to 101.6 pcf with water contents ranging from 5.4 to 11.7 percent at the time of investigation. Liquid limits ranged from 24 to 40 percent with plasticity indices ranging from 10 to 20. The upper clayey soils exhibit volume increase (**swell**) due to wetting of **3.1 percent** when compacted to moisture and density levels normally expected during construction. ‘Undisturbed’ samples displayed minor to moderate (1.3 to 2.4 percent) compression due to

incremental loading to a maximum confining load of 3,200 pounds per square foot (psf) and **significant (6.1 to 8.9 percent)** additional compression due to inundation (**hydro-collapse**).

3.0 ANALYSIS AND RECOMMENDATIONS

3.1 Analysis

Analysis of the field and laboratory data indicates that subsoils at the site are generally favorable for the support of the proposed structures on shallow foundations and slab-on-grade or structural mat slabs, subject to remedial earthworks. An option to support the canopy structures or light poles on drilled shafts is also provided. Some special site preparation will be required with respect to the existing retention area in the northeast corner of the site, relocation of the existing structure (red shed theater), related elements, and underground utilities. Some site preparation will also be required with respect to the removal and replacement of the existing pavement in the parking lots. It is assumed that grades will remain essentially the same (± 2 feet).

Plastic irrigation lines and storm drains may be present that were not traceable by standard means. It is highly recommended to locate all utilities to determine what foundations may need to be moved to avoid conflicts. Any foundation should be located at least 5 feet from any existing wet utility and should not be situated such that the foundation places a load on to the utility.

It is assumed that the existing red shed theater will be supported upon new shallow foundations and slab-on-grade or a structural mat slab, upon relocation to the northeast corner of the site.

Laboratory and field testing indicate that the primary geotechnical concern is the presence of inconsistent relative densities and the potential for additional compression, potentially significant and rapid, due to inundation (**hydro-collapse**). In addition, development and modification of the current site has likely resulted in disturbed soils. Secondly, demolition of any existing structure, site features, will result in disturbed soils. Accordingly, recommendations are made to over-excavate and re-compact the bearing soils to increase density, reduce (**but not eliminate**) the potential for collapse and provide a more uniform bearing condition. The over-excavated and re-compacted soil will mitigate, but not eliminate the potential for additional settlement if the deeper soils become wet. Attention must be paid to provide proper drainage to limit the potential for water infiltration of deeper soils. This includes during construction when foundations are open and most vulnerable.

The **swell potential** of the fine portion of the **upper clayey soils is a concern**. The potential is strong enough to cause differential movements of slabs-on-grade such as floors, sidewalks, patios and lightly

loaded foundation but not enough to cause damage to heavier structures. Accordingly, it is paramount to provide proper drainage to limit the potential for water infiltrating under slabs. A minimum slope of at least 5 percent for 10 feet is recommended for unpaved landscaped areas.

Typical recommendations to **reduce (not eliminate)** the swell potential include reducing the compaction requirements and requiring higher moisture contents during pad preparation. This option reduces capacity of the soil to support the industrial slabs on grade. For this reason, it is recommended to provide at least **12-inches of non-expansive material** to be placed directly beneath the building slabs, structural mat slabs, and slabs contiguous to the structure such as sidewalks. See comments below for higher preforming slabs.

For standard foundations to perform as expected, attention must be paid to provide proper drainage to limit the potential for water infiltration of deeper soils. It is assumed that the landscape plan will use mostly low water use or "green" desert type plants (xeriscape). It is preferred to keep irrigated plants at least 5 feet away from structures with irrigation schedules set and maintained to run intermittently. **Unpaved planter areas should be sloped at least 5 percent for a distance of at least 10 feet away from the building.** While this is the ideal condition, we recognize that this is not always possible to meet ADA slope requirements for the adjacent sidewalks. The slope may be reduced to 2 percent provide extra care is taken to ensure sidewalks and other hardscape features do not create a "dam" that prevents positive drainage away from the buildings that creates a "pond" adjacent to the building. Sidewalks should not be placed (or planters graded) that could create a "pond" adjacent to the building. Roof drainage should also be directed away from the building in paved scuppers. Pre-cast loose splash blocks should not be used as they can be dislodged and/or eroded. Roof drains should not be allowed to discharge into planters adjacent to the structure. It is preferred that they be directed to discharge to pavement (per photo example), retention basins or discharge points located at least 10 feet away from the building.



It is reiterated that shallow spread footings may be used for the exterior walls and other light interior columns since this is the most economical system available. However, this shallow system relies on the dry strength of the unsaturated native soils. A limited depth of re-compaction is recommended to increase density of the near surface soils that are more likely to encounter seasonal moisture changes, or deeper foundations. **The deeper native soils are moisture sensitive and could experience differential settlement if subjected to significant surface water infiltration.** Recognizing the need to minimize significant water

penetration adjacent to the building perimeter that could detrimentally impact the building foundation, the following additional recommendations are made to protect foundations:

1. Take extra precaution to backfill and compact native soil fill to 95 percent in all exterior wall locations.
2. Avoid utility trenches passing through retention basins leading to the building. If unavoidable, backfill the trench with MAG Section 728 ½-sack CLSM to cut off preferred drainage paths.
3. Create and maintain positive drainage away from the exterior wall. Follow the general guidelines presented in IBC 1804.4 Site Grading.
4. **Surface stormwater retention basins should be kept at least 10 feet away from foundations. Underground storage systems should be kept at least 15 feet away from foundations.**
5. Avoid sidewalks, curbs or other elements that create a dam that could cause water to pond within 5 feet of the perimeter wall.
6. Include no irrigated landscape materials in the first 3 feet next to the building.
7. Between 3 feet and 5 feet, include only landscape materials that can be irrigated with a maximum of 1 gallon per hour emitter heads. Set and maintain irrigation controllers to prevent 24/7 flows.
8. Any landscape materials requiring greater than 1 gallon per hour irrigation, including turf, shall be at least 5 feet from the outside face of the building.
9. All irrigation feeder lines, other than those that supply individual emitters, shall not be placed closer than 5 feet to the building.

Groundwater is not expected to be a factor in the design or construction of shallow foundations and underground utilities. Excavations may also encounter layers of loose sandy soil conditions, which could cause excavation trenches to be unstable. Adequate precautions must be taken to protect workmen in accordance with all current governmental regulations. Groundwater in the vicinity is reported to be more than 100 feet deep and is not expected to be a factor in the design or construction of foundations and underground utilities.

For exterior slabs-on-grade, frequent jointing is recommended to control cracking and reduce tripping hazards should differential movement occur. It is also recommended to pin the landing slab to the building floor/stem wall. This will reduce the potential for the exterior slab lifting and block the operation of out-swinging doors. Pinning typically consists of 24-inch-long No. 4 reinforcing steel dowels placed at 12-inch centers.

3.2 Site Preparation

The entire area to be occupied by the proposed construction should be stripped of all vegetation, debris, rubble, undocumented fills, and obviously loose surface soils. Tree removal should include the major

root ball and resulting disturbed soils. Any existing structures that are to be removed should be removed in their entirety, including any foundations, along with soil disturbed by this activity. Carefully remove all concrete and other elements as well as any deleterious materials that may be encountered. The thickness of the existing pavement is not known, but it is assumed to be at least 1.5 inches thick on a nominal thickness of aggregate base. The existing asphaltic concrete in the parking lot may be cold-milled in-place to a gradation like that of an ABC and it, along with the existing aggregate base, stockpiled for reuse under new slabs-on-grade (with owner approval) and under paved areas as sub-base. Final grades should allow for the placement of 12 inches of non-expansive fill on the building pad.

Special attention must be paid to backfilling existing retention basin at the northeast corner of the site. Any soft wet material should be removed, generally to a depth of 1 to 2 feet, re-placed and compacted. **Increased compaction efforts are required for fill placements of greater than 4 feet.** Due to the disturbance of the surface soils, **at least the upper 12 inches** of native soils should be pre-compacted within the entire building footprint prior to placing fills. **Depending on the type of equipment used, partial** over-excavation may be required to attain the required moisture conditioning and compaction.

It is not known how the existing canopy structures (and light poles) were constructed. It is assumed that the canopy is most likely placed on drilled shaft foundations. If the existing canopy structures are supported on drilled shafts that cannot be pulled out and backfilled with slurry, then the shafts should be cut down at least 4 feet below finished grade or deeper to not conflict with any new foundations or utilities. Do not attempt to push drilled shafts over, as this will result in further disturbance and require additional remediation.

Subsoils directly beneath shallow foundation elements should be further over-excavated to a depth of **at least 2 feet** below proposed footing bottom elevation, or existing grade, **whichever is deeper**, extending at least 5 feet beyond footing edges and re-compacted as set forth herein. This width may be reduced to 2 feet where adjacent conflicts occur, and the exact footing locations are known. The entire building pad does not require this deep over-excavation if footing lines can be accurately located during grading operations. It may be more feasible to over-excavate the entire building pad if the building footprint is relatively small and/or there are numerous interior footings. A representative of the Geotechnical Engineer should examine the subgrade once sub-excavation is complete and prior to backfilling to ensure removal of deleterious materials. Fill placement and quality should be as defined in the "Fill and Backfill" section of this report.

It is not known whether underground utilities on the site will need to be relocated. If any utility is located within 5 feet of any proposed foundation, relocation and/or abandonment of the utility should be provided. They should either be removed and replaced with engineered fill or abandoned in-place. In the case

of manholes and pipelines, it may be possible to abandon them in-place. The tops of manholes should be removed and filled with a weak (~500 psi) cementitious grout. Pipelines larger than 6 inches should be capped and filled with grout. If the contractor decides to abandon the pipes in-place, the onus should be put on him to demonstrate that the trench backfill is adequately compacted. Speedie and Associates should be notified of the circumstance for our review. If removal of a pipeline is not possible, the foundations should be deepened to bear in undisturbed soil so that the zone of influence under the foundation does not encroach on the pipeline and/or trench. This zone is any area below a 45° line drawn down and away from the bottom of the foundation edges.

Prior to placing structural fill (if needed), the exposed grade should be scarified to a depth of 8 inches, moisture-conditioned to optimum (± 2 percent) and compacted to at least 95 percent of maximum dry density as determined by ASTM D-698.

All cut areas and areas above footing bottom elevation that are to receive floor slab only fill should be scarified 8 inches, moisture conditioned to at least optimum to 3 percent above optimum and lightly but uniformly compacted to 90 but not more than 95 percent of maximum dry density as determined by ASTM D-698.

3.3 Foundation Design

The following bearing capacities can be utilized for design:

Table 3.3.1 Foundation Bearing Capacities

Structure	Foundation Type	Bearing Depth ⁽¹⁾	Bearing Medium	Allowable Bearing Capacity	Comments
Minor Structures	Spread	1.5 ft.	Compacted Subgrade	1,500 psf	2
	Mat	0.5 ft.	1 ft. Non-Expansive	k=150 pci	3
Main Structures	Spread	1.5 ft.	Min. 2 ft. Engineered Fill	2,500 psf	4
Canopy	Drilled Shaft	6.0 ft. Min	Dense Native Soils	4,000 psf	5

Notes:

1. Depth refers to bottom of footing elevation below lowest adjacent grade elevation within 5 feet of the structure.
2. Minor structures are not connected to any main structure. **These include low screen walls, trash enclosures, retaining walls, etc.** The bottom of footing excavation should moisture-conditioned to optimum (± 2 percent) and compacted to at least 95 percent of maximum dry density as determined by ASTM D-698.
3. For a structural mat foundation, a subgrade modulus k=150 pci can be used for design bearing 12 inches of low to non-expansive fill plus 4 inches of aggregate base, or a full 12 inches section of aggregate base.
4. Shallow spread footings bearing on minimum of 2 feet of engineered fill plus 8 inches pre-compacted subgrade extending at least 5 feet beyond the building. Continuous and spread footings should not exceed 4.5 feet and 9 feet, respectively, to stay within design settlement tolerances. Refer to Figure 3.3.1.
5. For canopy structure or light poles, an alternative option to spread footings is the use of drilled shafts or excavated shafts. An allowable end bearing capacity of **4,000 psf** can be used for design bearing on undisturbed dense native soils at a **minimum depth of 6 feet** below finished grade.

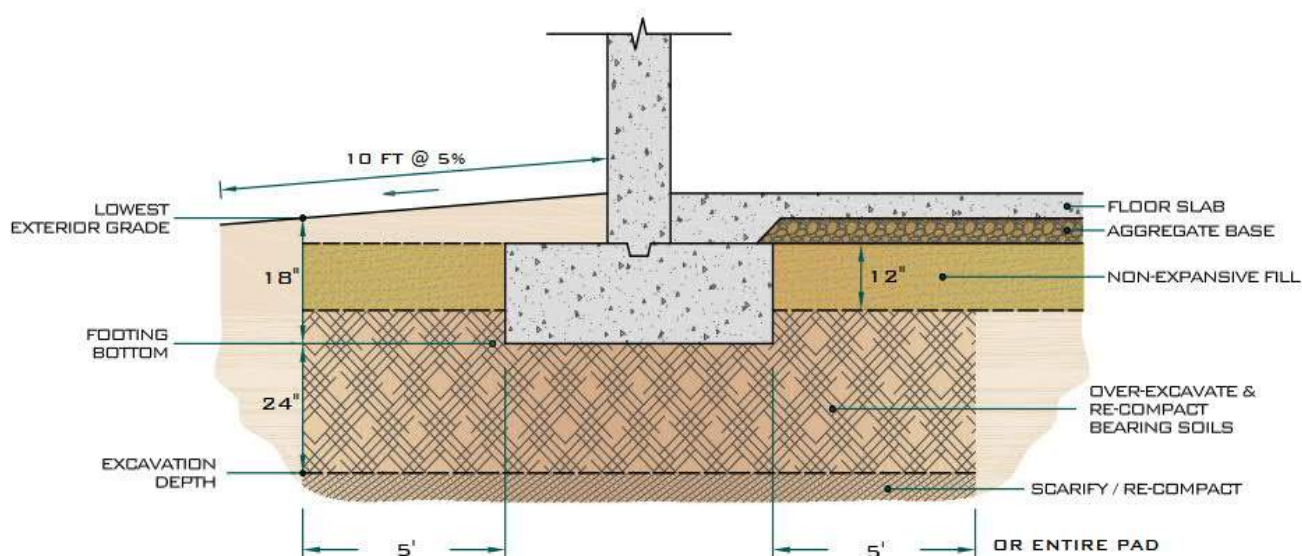


Figure 3.3.1 Foundation Detail – Bearing on Compacted Subgrade

These bearing capacities refer to the total of all loads, dead and live, and are net pressures. They may be increased one-third for wind, seismic or other loads of short duration. All footing excavations should be level and cleaned of all loose or disturbed materials. **Positive drainage away from the proposed buildings must always be maintained.**

Continuous masonry wall footings and isolated rectangular footings should be designed with minimum widths of 16 and 24 inches respectively, regardless of the resultant bearing pressure. Lightly loaded interior partitions (less than 800 plf) may be supported on reinforced thickened slab sections (minimum 12 inches of bearing width).

Caissons should consist of drilled shaft foundations bearing on or in the dense native soils. A minimum caisson depth of 6 feet below grade is recommended. **Shaft deepening to dense bearing soils is recommended to penetrate any loose soils encountered at tip elevation.** Design and construction should assume straight shaft caissons. Sloughing is possible in the gravel/sand layers typically starting around 5 feet below existing grades, resulting in concrete quantities higher than neat dimension calculations. A minimum shaft diameter of 18 inches is recommended to allow access for cleaning and inspection. All caissons should be examined by a representative of the geotechnical engineer to verify cleaning, depth, dimensions, and proper bearing strata. Straight shaft caissons may be "machine cleaned" provided the contractor can show the ability to adequately remove loose material. Adjacent caisson base (tip) elevations should not vary by more than 45 degrees.

Estimated settlements under design loads are on the order of ½ to 1-inch, virtually all of which will occur during construction. Post-construction differential settlements will be on the order of one-half the total settlement, under existing and compacted moisture contents. Additional localized settlements of the same magnitude could occur if native supporting soils were to experience a significant increase in moisture content. **Positive drainage away from structures and controlled routing of roof runoff must be provided and maintained to prevent ponding adjacent to perimeter walls.** Planters requiring heavy water should **not** be placed adjacent to or within 5 feet of the building. Care should be taken in design and construction to ensure that domestic and interior storm drain water is contained to prevent seepage. Roof drainage should be directed to paved areas or storm drains. They should not discharge into planters adjacent to the structures.

Continuous footings and stem walls should be reinforced to distribute stresses arising from small differential movements, and long walls should be provided with control joints to accommodate these movements. Reinforcement and control joints are suggested to allow slight movement and prevent minor floor slab cracking.

3.4 Lateral Pressures

The following equivalent fluid lateral pressure values may be utilized for the proposed construction:

Active Pressures

Unrestrained Walls	35 psf/ft
Restrained Walls	60 psf/ft

Passive Pressures

Continuous Footings	300 psf/ft
Spread Footings or Drilled Piers	350 psf/ft
Coefficient of Friction (w/ passive pressure)	0.35
Coefficient of Friction (w/out passive pressure)	0.45

All backfill must be compacted to not less than 95 percent (ASTM D-698) to mobilize these passive values at low strain. Expansive soils should not be used as retaining wall backfill, except as a surface seal to limit infiltration of storm/irrigation water. The expansive pressures could greatly increase active pressures.

Soil resistance to lateral loading of drilled shafts may be calculated using 200 psf/ft. An increase of 1/3 is permitted when using the alternate load combinations in IBC Section 1605.3.2 that include wind or earthquake loads. For increased capacity, a detailed site-specific analysis using L-pile or similar program should be conducted. Per IBC Section 1810.2.1 the unsaturated soils are not fluid or subject to liquefaction and therefore provide enough lateral support to prevent buckling.

3.5 Fill and Backfill

Subsoils are considered suitable for use in general grading and engineered structural fill but **should not be used** in the top 12-inches of building slab pad fill, structural mat slabs, and contiguous sidewalks. The top 12-inches of pad fill should be completed with an approved low or non-expansive soil, either approved imported common borrow or select granular soil. If select granular soil (AB) is used, the 4 inches of under-slab aggregate base may be included as part of the top 12-inches. Otherwise, 12-inches of approved common borrow should be used in addition to the normal 4 inches of aggregate base. Native clayey soils can also be treated with lime, contact this office if needed.

Imported common fill for use in site grading should be examined by a Soils Engineer to ensure that it is of low swell potential and free of organic or otherwise deleterious material. In general, the fill should

have 100 percent passing the 3-inch sieve and no more than 60 percent passing the #200 sieve. For the fine fraction (passing the 40 sieve), the liquid limit and plasticity index should not exceed 30 percent and 10 percent, respectively. It should exhibit less than 1.5 percent swell potential when compacted to 95 percent of maximum dry density (ASTM D-698) at a moisture content of 2 percent below optimum, confined under a 100 psf surcharge, and inundated.

Fill should be placed on subgrade which has been properly prepared and approved by a Soils Engineer. The fill must be wetted and thoroughly mixed to achieve optimum moisture content, ± 2 percent (optimum to +3 percent for under-slab and sidewalk fill). Fill should be placed in horizontal lifts of 8-inch thickness (or as dictated by compaction equipment) and compacted to the percent of maximum dry density per ASTM D-698 set forth as follows:

A. Building Areas		
1.	Below footing level (fills ≥ 4 feet)	98
2.	Below footing level (fills < 4 feet)	95
3.	Below slabs-on-grade (non-expansive soils)	95
4.	Below slabs-on-grade (expansive soils)	90-95 (max)
5.	(Not recommended for the top 12-inches of building pad)	
B. Pavement Subgrade or Fill		95
C. Utility Trench Backfill		95
D. Aggregate Base Course		
1.	Below floor slabs	95
2.	Below asphalt paving	100
E. Landscape Areas		90
F. Below onsite/offsite curb, gutter & sidewalks		90-95 (max)

3.6 Utilities Installation

Trench excavations for shallow utilities will be possible using conventional trenching equipment. Trench walls should stand near-vertical for the short periods of time required to install shallow utilities although some sloughing may occur in looser and/or sandier soils, if encountered, requiring laying back of side slopes and/or temporary shoring. Adequate precautions must be taken to protect workers in accordance with all current governmental regulations.

Backfill of trenches above bedding zones may be carried out with native excavated material, provided over-sized materials (>3 inches) are removed. This material should be moisture-conditioned, placed

in 8-inch lifts and mechanically compacted. Water settling is not recommended. Compaction requirements are summarized in the "Fill and Backfill" section of this report.

3.7 Slabs-on-Grade

To facilitate fine grading operations and aid in concrete curing, a 4-inch-thick layer of granular material conforming to the gradation for Aggregate Base (A.B.) as per M.A.G. Specification Section 702 should be utilized beneath the slab. Dried subgrade soils **must** be re-moistened prior to placing the aggregate base if allowed to dry out, especially if fine-grained soils are used in the top 12-inches of the pad.

The native soil can store a significant amount of moisture, which could increase the natural vapor drive through the slab. Accordingly, if moisture sensitive flooring and/or adhesive are planned, the use of a vapor barrier or low permeability concrete should be considered. Vapor barriers should be a minimum 15-mil thick polyolefin (or equivalent), which meets ASTM E 1745 Class A specifications. The vapor barrier should be placed **directly under the slab**. Vapor barriers do increase the potential for slab curling and water entrapment under the slab. Accordingly, if a vapor barrier is used, additional precautions such as low slump concrete, frequent jointing and proper curing will be required to reduce curling potential and detailed to prevent the entrapment of outside water sources.

3.8 Pavement Design

If earthwork in proposed paved areas is carried out to finish subgrade elevation as set forth herein, the subgrade will provide adequate support for conventional surfaced pavements. The location designation is for reference only. The designer/owner should choose the appropriate sections to meet the anticipated traffic volume and life expectancy. The section capacity is reported as daily ESALs, Equivalent 18-kip Single Axle Loads. Typical heavy trucks impart 1.0 to 2.5 ESALs per truck depending on load. It takes approximately 1,200 passenger cars to impart 1 ESAL.

As an alternative to a traditional asphalt or concrete pavement section, it is understood that the development will utilize unpaved access drives and fire lanes on portions of the site. Details on the loading have not been provided, however it is assumed that the unpaved surface will need to be designed to accommodate fire trucks weighing up to 96,000 lbs. Emergency fire lanes should be delineated as recommended by the civil engineer. The native subgrade soils will provide suitable support, provided they are scarified 8-inches, properly moisture conditioned, and compacted to a minimum of 95 percent based on a standard proctor (ASTM D 698).

Table 3.8.1 Pavement Sections

Area of Placement	Flexible (AC Pavement)			Rigid (PCC Pavement)	
	Thickness AC (0.39)	Thickness ABC (0.12)	Daily 18-kip ESALs	Thickness PCCP	Daily 18-kip ESALs
Normal Duty Auto Parking	2.0"	4.0"	2	5.0"	9
Heavy Duty, Main Drives, & Fire Lanes	3.0"	4.0"	9	6.0"	23
	3.0"	6.0"	20	7.0"	53
Unpaved Fire Lanes	--	8.0"	1	--	--
<u>Notes:</u> 1. Designs are based on AASHTO design equations and ADOT correlated R-Values. 2. The PCCP thickness is increased to provide better load transfer and reduce potential for joint & edge failures. Design PCCP per ACI 330R-21. 3. Full depth asphalt or increased asphalt thickness can be increased by adding 1.0-inch asphalt for each 3 inches of base course replaced.					

Pavement Design Parameters:

Assume: One 18-kip Equivalent Single Axle Load (ESAL)/Truck
Life: 20 years

Subgrade Soil Profile:

% Passing #200 sieve: 61%
Plasticity Index: 12%
k: 100 pci (assumed)
R value: 28 (per ADOT tables)
M_R: 16,400 (per AASHTO design)

These designs assume that all subgrades are prepared in accordance with the recommendations contained in the "Site Preparation" and "Fill and Backfill" sections of this report, and paving operations are carried out in a proper manner. If pavement subgrade preparation is not carried out immediately prior to paving, the entire area should be proof-rolled at that time with a heavy pneumatic-tired roller to identify locally unstable areas for repair.

Pavement base course material should be aggregate base per M.A.G. Section 702 Specifications. Asphalt concrete materials and mix design should conform to M.A.G. 710. It is recommended that a ½-inch or ¾-inch mix designation be used for the pavements. Pavement installation should be carried out under applicable portions of M.A.G. Section 321 and municipality standards. The asphalt supplier should be informed of the pavement use and be required to provide a mix that will provide stability and be aesthetically acceptable. Some of the newer M.A.G. mixes are very coarse and could cause placing and finish problems. A mix design should be submitted for review to determine if it will be acceptable for the intended use.

For sidewalks and other areas not subjective to vehicular traffic a 4-inch section of concrete will be sufficient. For areas subject to heavier traffic, such as the entrance apron, a thicker section of 6 inches of concrete is recommended.

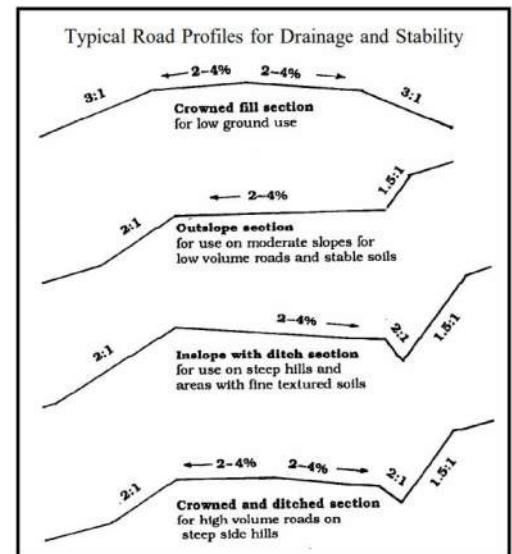
Portland Cement Concrete Pavement must have a minimum 28-day flexural strength 550 psi (compressive strength of approximately 3,700 psi). It may be cast directly on the prepared subgrade with proper compaction (reduced) and the elevated moisture content as recommended in the report. Lacking an aggregate base course, attention must be paid to using low slump concrete and proper curing, especially on the thinner sections. No reinforcing is necessary. Joint design and spacing should be in accordance with ACI recommendations. Construction joints should contain dowels or be tongue-and-grooved to provide load transfer. Tie bars are recommended on the joints adjacent to unsupported edges. Maximum joint spacing in feet should not exceed 2 to 3 times the thickness in inches. Joint sealing with a quality silicone sealer is recommended to prevent water from entering the subgrade allowing pumping and loss of support.

Proper subgrade preparation and joint sealing will reduce (but not eliminate) the potential for slab movements (thus cracking) on the expansive native soils. Frequent jointing will reduce uncontrolled cracking and increase the efficiency of aggregate interlock joint transfer.

It must be noted that all new asphalt pavements will eventually crack. Cracking in asphalt pavement is typical and should be expected over the life of the pavement. In fact, it has been our experience of late that the new asphalt binders that are available, we are seeing the onset or earlier aging and block shrinkage cracking. These require routine maintenance to prevent accelerated deterioration. Accordingly, it is highly recommended to establish a maintenance program where the cracks are routinely filled as they appear beginning at about the second year of life. It is also recommended that surface fog seal coats be considered beginning at about year 5 and every 5 years after. This will help preserve the pavements, extending the service life.

To support emergency vehicles, including fire trucks up to 96,000 lbs, on an unpaved surface it is recommended to install a minimum structural section of 8 inches of aggregate base (MAG Spec. 702 crushed rock AB) compacted to 100 percent per ASTM D 698. The aggregate base should consist of new AB meeting the gradation and plasticity requirements of the MAG 702 Specification. The surface may consist of at least 2 inches of decomposed granite (DG). This material does not add to the structural capacity and is only used for aesthetics and dust control. To increase the performance and reduce the amount of maintenance, it is recommended to consider stabilization of the DG surface (if used) with Soilshield-LS™ or similar product applied at a rate of at least 1 gallon per 80 square feet. The surface should be routinely inspected (especially after a storm event) and maintained or repaired in the event of any damage.

Adequate drainage will be critical for long-term performance of the unpaved roadway. Special attention must be paid to proper crowning (crossfall) and/or longitudinal slope to prevent ponding on the roadway and adequate drainage provisions for the subgrade. A minimum cross slope of 2 percent is recommended for stabilized areas. Refer to the adjacent figure for typical road profiles for drainage and stability. Unpaved roads will require periodic maintenance to address compaction, rutting, shoving, and drainage issues over time. Maintenance may include the addition of millings, regrading, compaction, and reapplication of a dust palliative, or a combination of them all. Unpaved roads will likely undergo aging and wear at a different rate than paved roads. Therefore, an uneven transition may occur at adjacent (if any) paved and unpaved sections. It may be possible to slow the onset of these aging conditions as well as reduce the thickness of aggregate base/millings by geogrid product. Alternatively, it may be possible to reduce the thickness of aggregate base by treating the subgrade with cement or lime. Additional analysis would be required to determine how much of a reduction in aggregate base may be possible if using one of these alternatives.



3.9 Percolation Test Results

Three infiltration tests were completed in the proposed retention areas near the northeast corner, western end, and near southeast corner of the property. The infiltration tests were conducted by following ASTM D3385 Double Ring Infiltrometer falling head method in shallow hand excavated test pits (removal of the upper disturbed soils and grass). The double rings were embedded approximately 1 inch into the soil at the test location at approximately 0.2 to 0.5 feet below existing grade. The subsoils generally consisted of sandy lean clay with subordinate amounts of gravel. The soil was in a 'dry to moist' state at the time of testing.

A copy of the test readings and chart showing the infiltration rate over time are included in the appendix. The following stabilized infiltration rates were achieved from the inner ring:

Table 3.9.1 Percolation Test Results

Location	Soil Type	Installation Depth from Grade (feet)	Stabilized Percolation Rate		
			Infiltration Rate inches/hour	Percolation Rate minutes/inch	cu ft/hour/sq ft of drainage area
P-1	Sandy Lean Clay	0.5	2.0	30.0	0.167
P-2	Sandy Lean Clay	0.2	2.0	30.0	0.167
P-3	Sandy Lean Clay	0.5	3.0	20.0	0.250

Notes: Rates shown represent the lowest stabilized value obtained in the inner ring. These rates represent the actual rates obtained in the field and a proper factor of safety should be applied. Refer to the attachments in the appendix for detailed information regarding the test data.

Maricopa County Drainage standards and any City of Chandler requirements should be followed for determination of the design infiltration rate for the ASTM D3385 tests to allow for future working conditions in the retention system. For higher capacity, drywell(s) may need to be considered.

4.0 GENERAL

The scope of this investigation and report includes only regional published considerations for seismic activity and ground fissures resulting from subsidence due to groundwater withdrawal, not any site-specific studies. The scope does not include any considerations of hazardous releases or toxic contamination of any type.

Our analysis of data and the recommendations presented herein assume that soil conditions do not vary significantly from those found at surrounding site sample locations. As indicated above, a final comprehensive investigation is recommended for final design. Our work has been performed in accordance with generally accepted engineering principles and practice; this warranty is in lieu of all other warranties expressed or implied.

We recommend that a representative of the Geotechnical Engineer observe and test the earthwork and foundation portions of this project to ensure compliance to project specifications and the field applicability of subsurface conditions which are the basis of the recommendations presented in this report. If any significant changes are made in the scope of work or type of construction that was assumed in this report, we must review such revised conditions to confirm our findings if the conclusions and recommendations presented herein are to apply.

Respectfully submitted,
SPEEDIE & ASSOCIATES, LLC

Juan C. Salas



Brian Lingnau, Ph.D., P.E.



Keith R. Gravel, P.E.



APPENDIX

FIELD AND LABORATORY INVESTIGATION

SOIL BORING LOCATION PLAN

SOIL LEGEND

LOG OF TEST BORINGS

TABULATION OF TEST DATA

CONSOLIDATION TEST

MOISTURE-DENSITY RELATIONS

SWELL TEST DATA

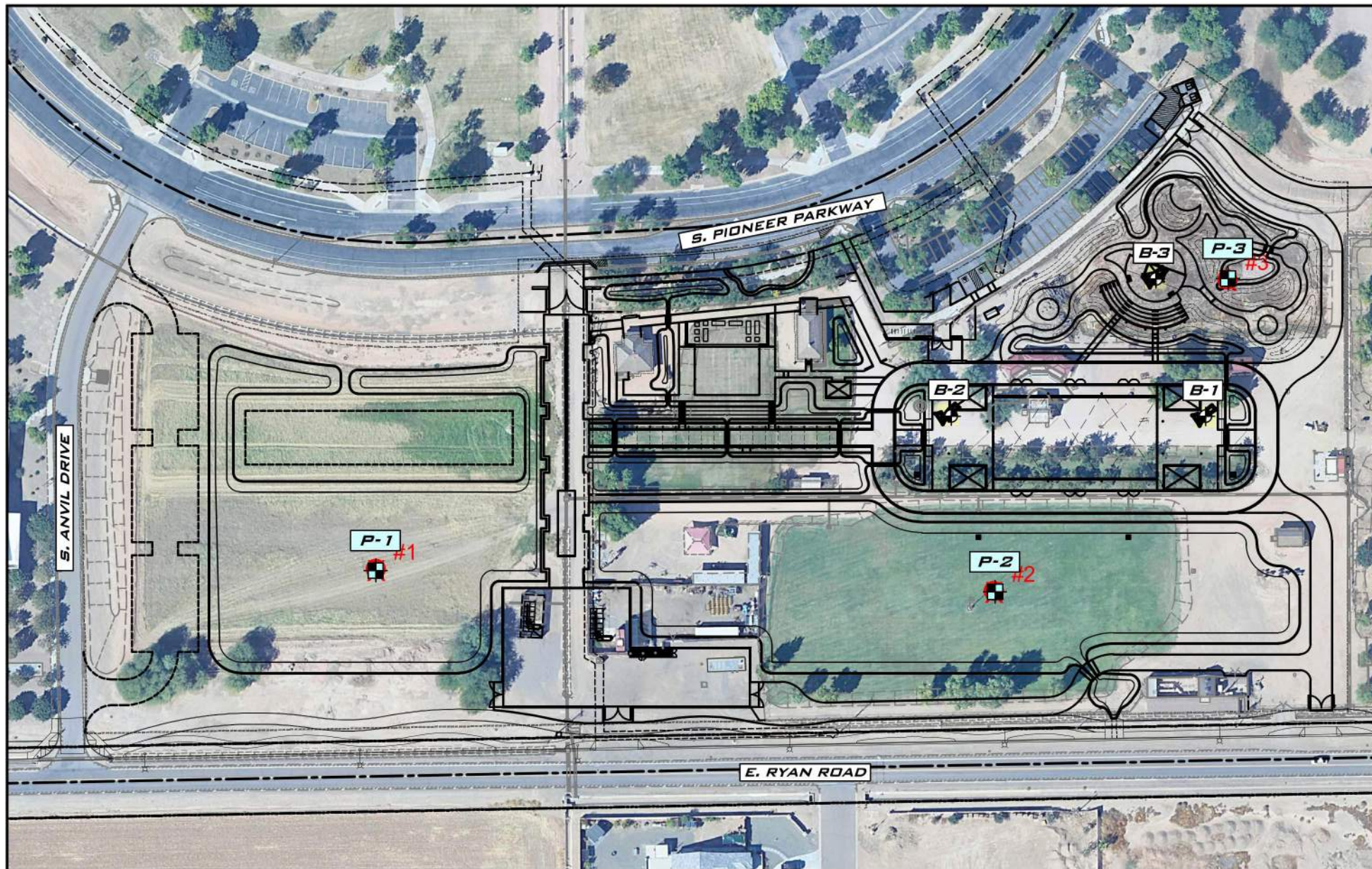
PERCOLATION TEST DATA



FIELD AND LABORATORY INVESTIGATION

On February 11, 2025, soil test borings were drilled at the approximate locations shown on the attached Soil Boring Location Plan. All exploration work was carried out under the full-time supervision of our field engineer, who recorded subsurface conditions and obtained samples for laboratory testing. The soil borings were advanced with a truck-mounted CME-75 drill rig utilizing 7-inch diameter hollow stem flight augers. Detailed information regarding the borings and samples obtained can be found on an individual Log of Test Boring prepared for each drilling location.

Laboratory testing consisted of moisture content, dry density, grain-size distribution, and plasticity (Atterberg Limits) tests for classification and pavement design parameters. Remolded swell tests were performed on samples compacted to densities and moisture contents expected during construction. Compression tests were performed on a selected ring samples to estimate settlements and determine effects of inundation. Double ring infiltration tests were conducted in the proposed retention areas. All field and laboratory data are presented in this appendix.



- ⬢ - APPROXIMATE SOIL BORING LOCATIONS
- ⬢ - APPROXIMATE PERCOLATION TEST LOCATIONS



SOIL BORING LOCATION PLAN

THE RANCH AT TUMBLEWEED PARK
NWG McQUEEN ROAD & RYAN ROAD
CHANDLER, ARIZONA

**SPEEDIE
AND ASSOCIATES**

A UES Company

SOIL LEGEND

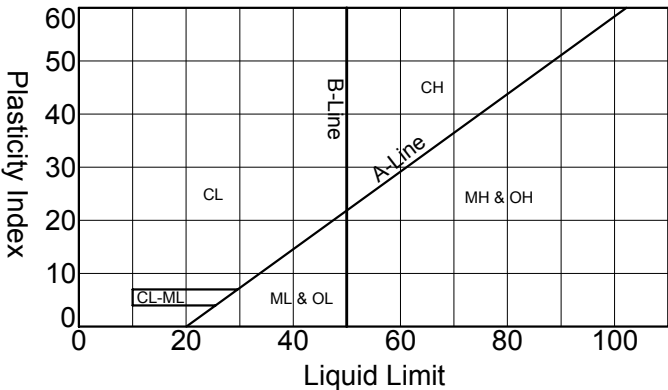
SAMPLE DESIGNATION		DESCRIPTION	
	AS	Auger Sample	A grab sample taken directly from auger flights.
	BS	Large Bulk Sample	A grab sample taken from auger spoils or from bucket of backhoe.
	S	Spoon Sample	Standard Penetration Test (ASTM D-1586) Driving a 2.0 inch outside diameter split spoon sampler into undisturbed soil for three successive 6-inch increments by means of a 140 lb. weight free falling through a distance of 30 inches. The cumulative number of blows for the final 12 inches of penetration is the Standard Penetration Resistance.
	RS	Ring Sample	Driving a 3.0 inch outside diameter spoon equipped with a series of 2.42-inch inside diameter, 1-inch long brass rings, into undisturbed soil for one 12-inch increment by the same means of the Spoon Sample. The blows required for the 12 inches of penetration are recorded.
	LS	Liner Sample	Standard Penetration Test driving a 2.0-inch outside diameter split spoon equipped with two 3-inch long, 3/8-inch inside diameter brass liners, separated by a 1-inch long spacer, into undisturbed soil by the same means of the Spoon Sample.
	ST	Shelby Tube	A 3.0-inch outside diameter thin-walled tube continuously pushed into the undisturbed soil by a rapid motion, without impact or twisting (ASTM D-1587).
	--	Continuous Penetration Resistance	Driving a 2.0-inch outside diameter "Bullnose Penetrometer" continuously into undisturbed soil by the same means of the spoon sample. The blows for each successive 12-inch increment are recorded.

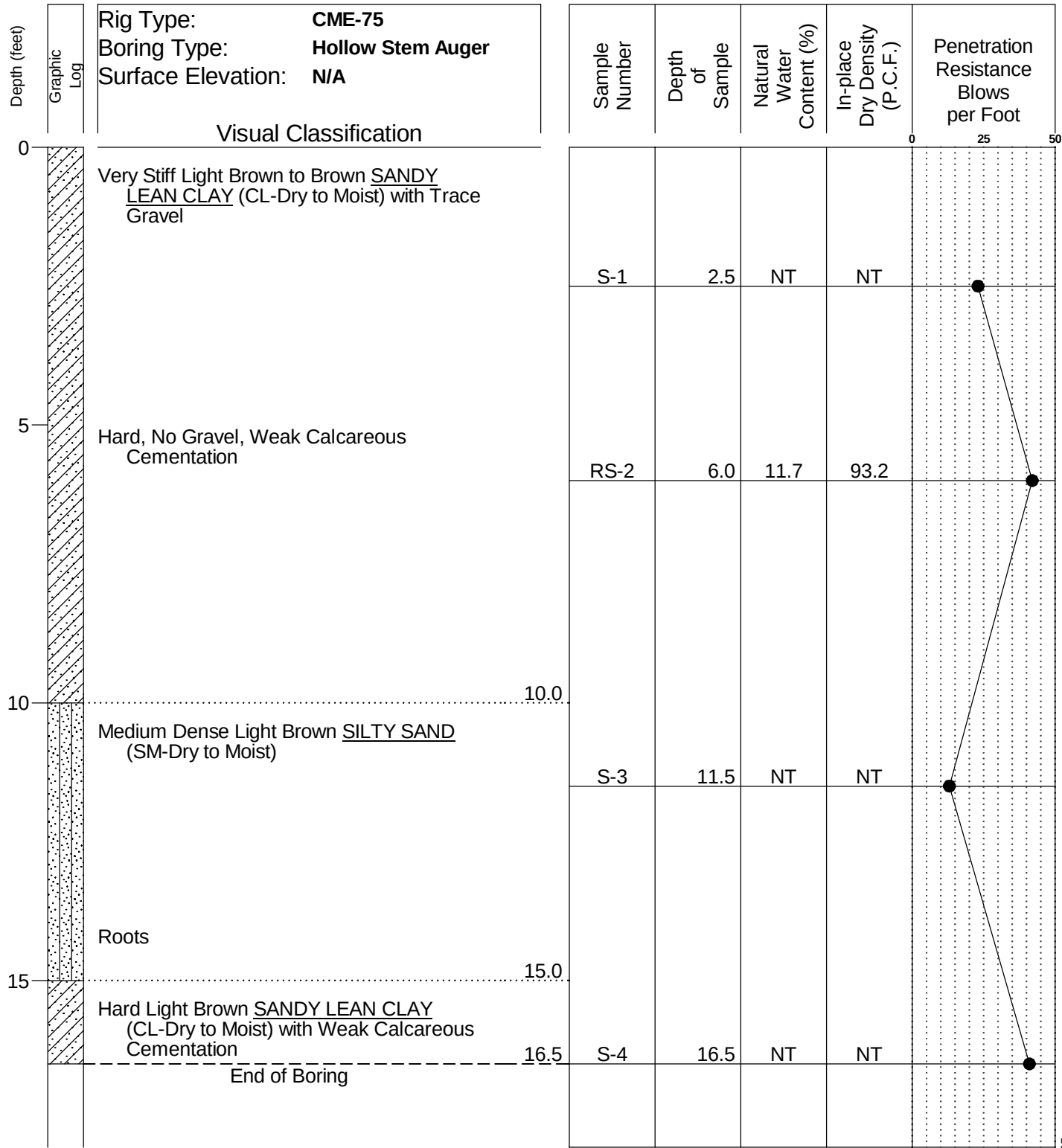
CONSISTENCY			RELATIVE DENSITY	
Clays & Silts	Blows/Foot	Strength (tons/sq ft)	Sands & Gravels	Blows/Foot
Very Soft	0 - 2	0 - 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.5	Loose	5 - 10
Firm	5 - 8	0.5 - 1.0	Medium Dense	11 - 30
Stiff	9 - 15	1 - 2	Dense	31 - 50
Very Stiff	16 - 30	2 - 4	Very Dense	> 50
Hard	> 30	> 4		

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
FINE GRAINED SOILS	SILTS AND CLAYS	CLEAN SANDS (LITTLE OR NO FINES)		SM	SILT SANDS, SAND - SILT MIXTURES
	SAND AND SANDY SOILS	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		LIQUID LIMIT LESS THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
		LIQUID LIMIT GREATER THAN 50		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
		LIQUID LIMIT GREATER THAN 50		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL OR MODIFIED SYMBOLS MAY BE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS OR TO PROVIDE A BETTER GRAPHICAL PRESENTATION OF THE SOIL

MATERIAL SIZE	PARTICLE SIZE			
	Lower Limit		Upper Limit	
	mm	Sieve Size ♦	mm	Sieve Size ♦
SANDS				
Fine	0.075	#200	0.42	#40
Medium	0.420	#40	2.00	#10
Coarse	2.000	#10	4.75	#4
GRAVELS				
Fine	4.75	#4	19	0.75" x
Coarse	19	0.75" x	75	3" x
COBBLES	75	3" x	300	12" x
BOULDERS	300	12" x	900	36" x
♦U.S. Standard		xClear Square Openings		





Boring Date: 2-11-25

Field Engineer/Technician: R. Bainum

Driller: F. Dominguez

Contractor: Resilient Drilling

Water Level		
Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 1**

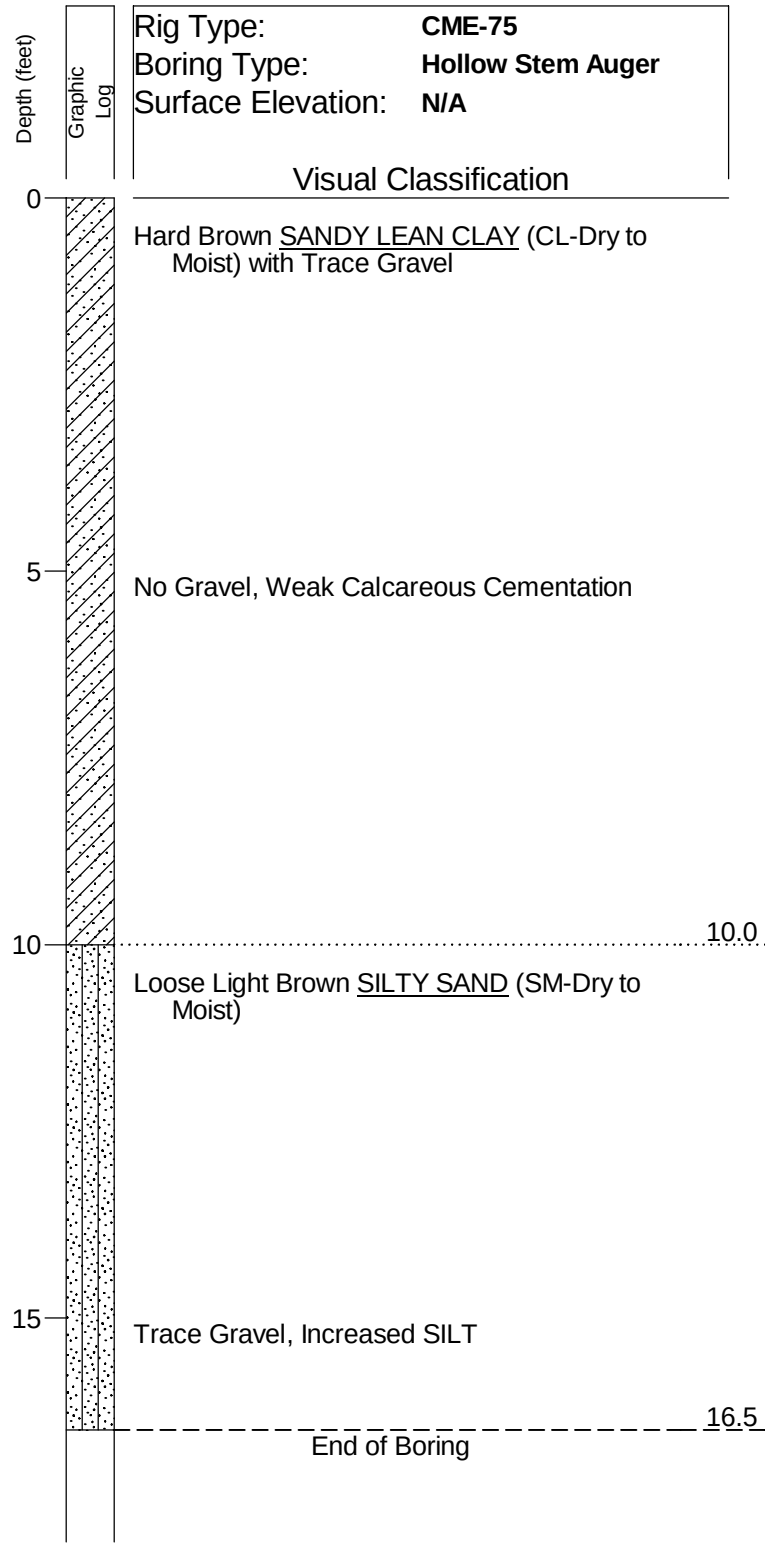
The Ranch at Tumbleweed Park

NWC McQueen Road & Ryan Road

Chandler, Arizona

Project No.: 250062SA

SPEEDIE 250062SA.GPJ GENGEO.GDT 3/4/25



Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
RS-1	2.0	8.5	95.6	
BS-2	5.0	NT	NT	
S-3	6.5	NT	NT	53/12"
S-4	11.5	NT	NT	
S-5	16.5	NT	NT	

Boring Date: 2-11-25
Field Engineer/Technician: R. Bainum
Driller: F. Dominguez
Contractor: Resilient Drilling

Water Level		
Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

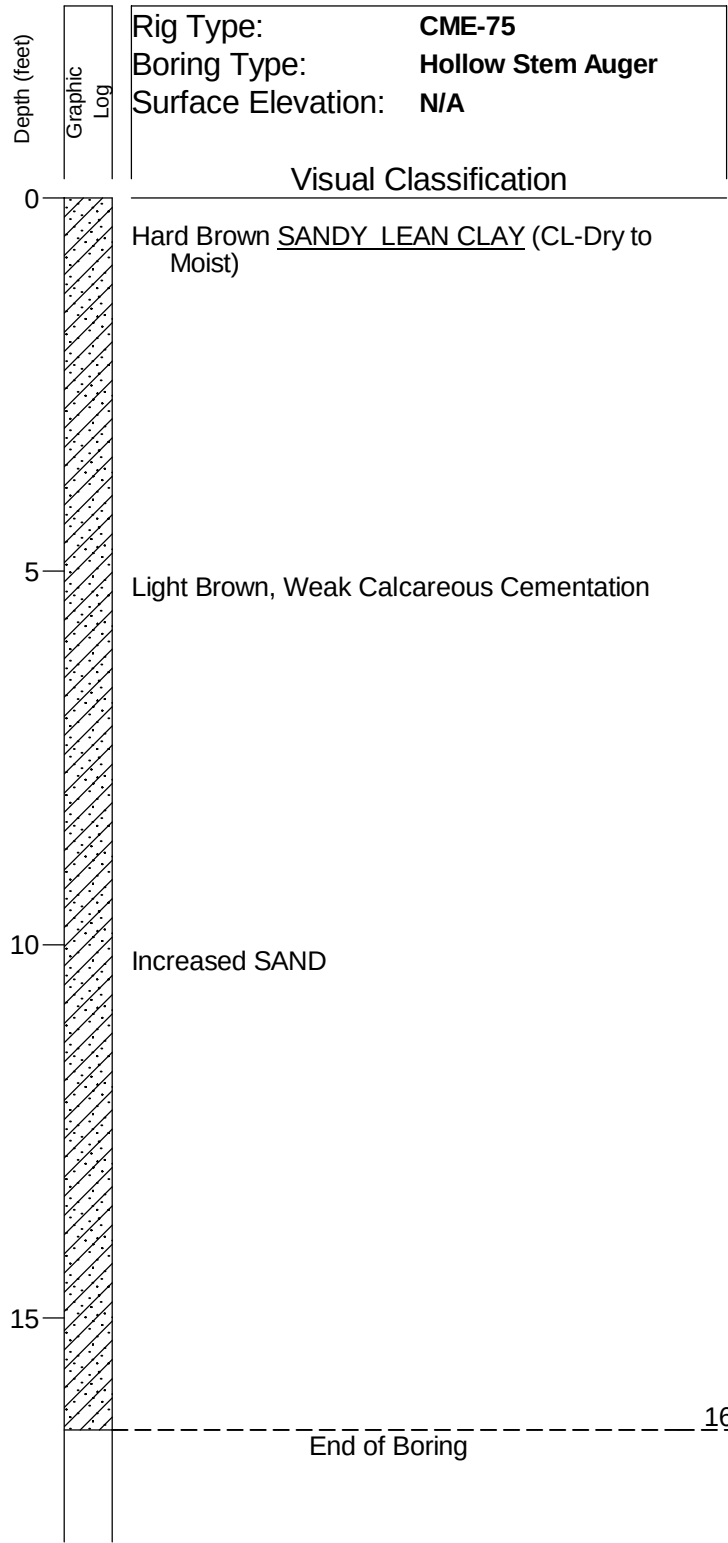
SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 2**

The Ranch at Tumbleweed Park
NWC McQueen Road & Ryan Road
Chandler, Arizona

Project No.: **250062SA**

SPEEDIE 250062SA.GPJ GENGEO.GDT 3/4/25



Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
RS-1	2.0	5.4	101.6	
S-2	6.5	NT	NT	
S-3	11.5	NT	NT	
S-4	16.5	NT	NT	

Boring Date: 2-11-25

Field Engineer/Technician: R. Bainum

Driller: F. Dominguez

Contractor: Resilient Drilling

Water Level		
Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B- 3**

The Ranch at Tumbleweed Park

NWC McQueen Road & Ryan Road

Chandler, Arizona

Project No.: 250062SA

SPEEDIE 250062SA.GPJ GENGEO.GDT 3/4/25

TABULATION OF TEST DATA

SOIL BORING or TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE INTERVAL (ft)	NATURAL WATER CONTENT (Percent of Dry Weight)	IN-PLACE DRY DENSITY (Pounds Per Cubic Foot)	PARTICLE SIZE DISTRIBUTION (Percent Finer)					ATTERBERG LIMITS			UNIFIED SOIL CLASSIFICATION	SPECIMEN DESCRIPTION
						#200 SIEVE	#40 SIEVE	#10 SIEVE	#4 SIEVE	3" SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
B- 1	RS-2	RING	5.0 - 6.0	11.7	93.2	68.2	81	97	100	100	40	20	20	CL	SANDY LEAN CLAY
B- 2	BS-2	BULK	0.0 - 5.0	NT	NT	58.3	79	88	91	100	28	15	13	CL	SANDY LEAN CLAY
B- 2	RS-1	RING	1.0 - 2.0	8.5	95.6	NT	NT	NT	NT	NT	NT	NT	NT		
B- 3	RS-1	RING	1.0 - 2.0	5.4	101.6	63.1	87	100	100	100	24	14	10	CL	SANDY LEAN CLAY

Sieve analysis results do not include material greater than 3". Refer to the actual boring logs for the possibility of cobble and boulder sized materials.

NT=Not Tested
Sheet 1 of 1

The Ranch at Tumbleweed Park
NWC McQueen Road & Ryan Road
Chandler, Arizona
Project No. 250062SA



CONSOLIDATION TEST

PROJECT: The Ranch at Tumbleweed Park

LOCATION: NWC McQueen Road & Ryan Road

BORING NO.: B- 2

SAMPLE NO.: RS-1

SAMPLE DEPTH: 1 to 2

LIQUID LIMIT:

CLASSIFICATION:

PROJECT NO.: 250062SA

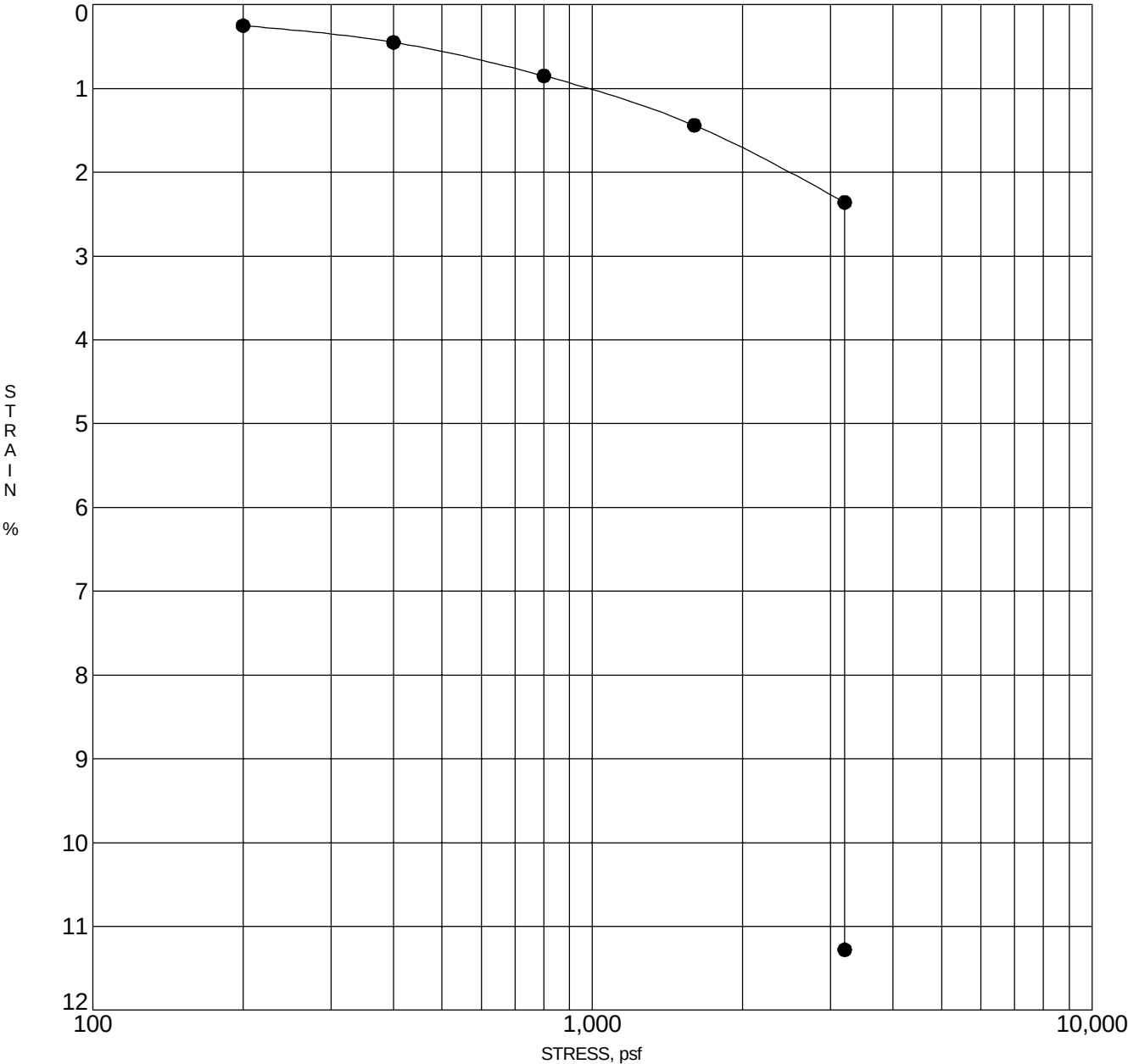
DATE: 2/11/25

LABORATORY NO.:

PLASTIC LIMIT:

PLASTICITY INDEX:

ASTM SOIL DESCRIPTION:



CONSOLIDATION TEST

PROJECT: The Ranch at Tumbleweed Park

LOCATION: NWC McQueen Road & Ryan Road

BORING NO.: B- 3

LIQUID LIMIT: 24

CLASSIFICATION: CL

PROJECT NO.: 250062SA

DATE: 2/11/25

SAMPLE NO.: RS-1

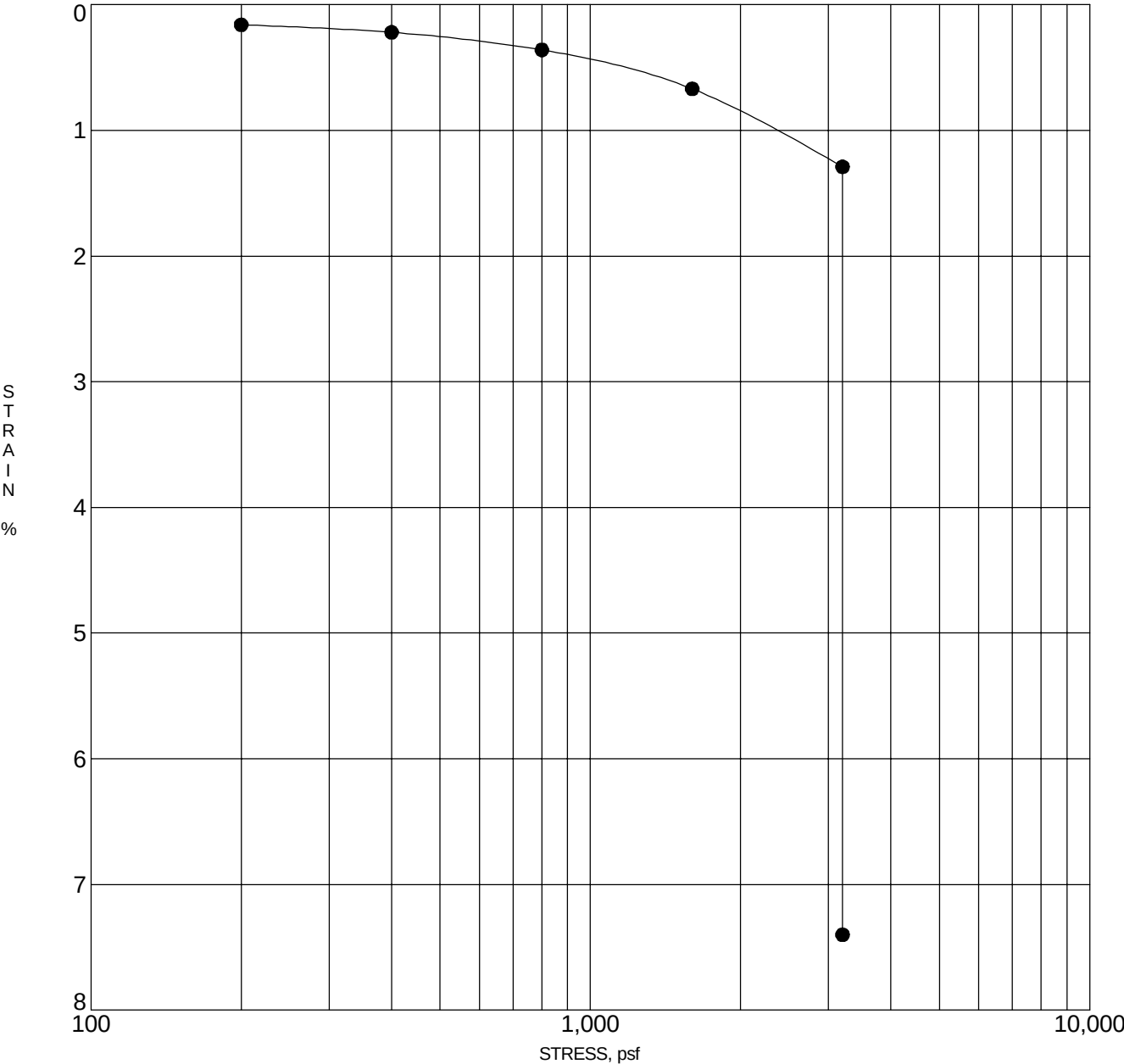
PLASTIC LIMIT: 14

ASTM SOIL DESCRIPTION: SANDY LEAN CLAY

SAMPLE DEPTH: 1 to 2

PLASTICITY INDEX: 10

LABORATORY NO.:

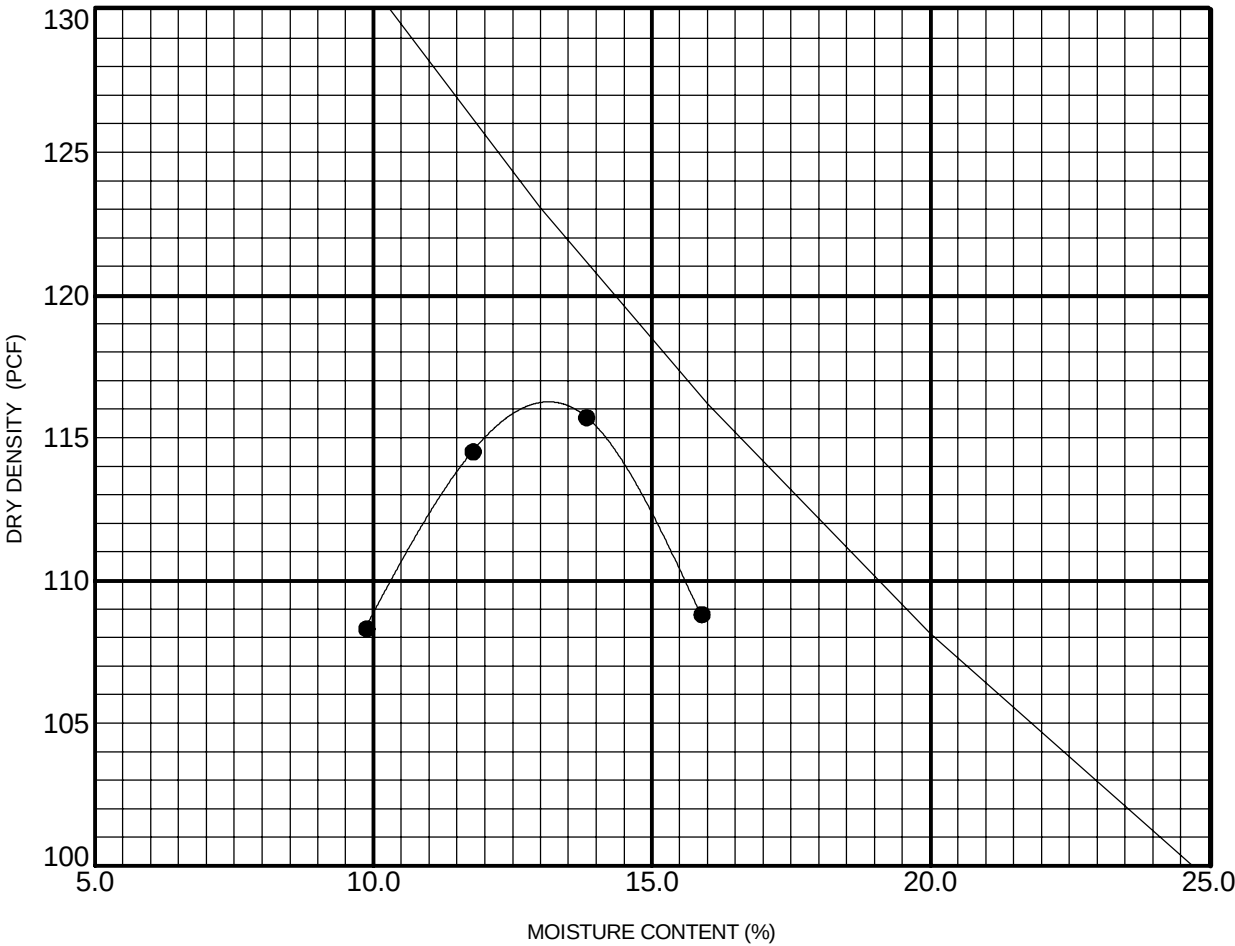


Sample inundated at end of test at 3200 psf

MOISTURE-DENSITY RELATIONS

PROJECT:	The Ranch at Tumbleweed Park			PROJECT NO.:	250062SA
LOCATION:	NWC McQueen Road & Ryan Road			DATE:	2/11/25
BORING NO.:	B- 2	SAMPLE NO.:	BS-2	SAMPLE DEPTH:	0 to 5
METHOD OF COMPACTION:	D698A			LABORATORY NO.:	
LIQUID LIMIT:	28	PLASTIC LIMIT:	15	PLASTICITY INDEX:	13
CLASSIFICATION:	CL	ASTM SOIL DESCRIPTION:	SANDY LEAN CLAY		

MAXIMUM DRY DENSITY: 116.3 PCF OPTIMUM MOISTURE CONTENT: 13.1%



SWELL TEST DATA

BORING or TEST PIT No.	SAMPLE DEPTH, ft	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)	REMOLDED DRY DENSITY (pcf)	INITIAL MOISTURE CONTENT (%)	PERCENT COMPACTION	FINAL MOISTURE CONTENT (%)	CONFINING LOAD (psf)	TOTAL SWELL (%)
---------------------------	---------------------	---------------------------------	------------------------------------	----------------------------------	------------------------------------	-----------------------	----------------------------------	----------------------------	--------------------

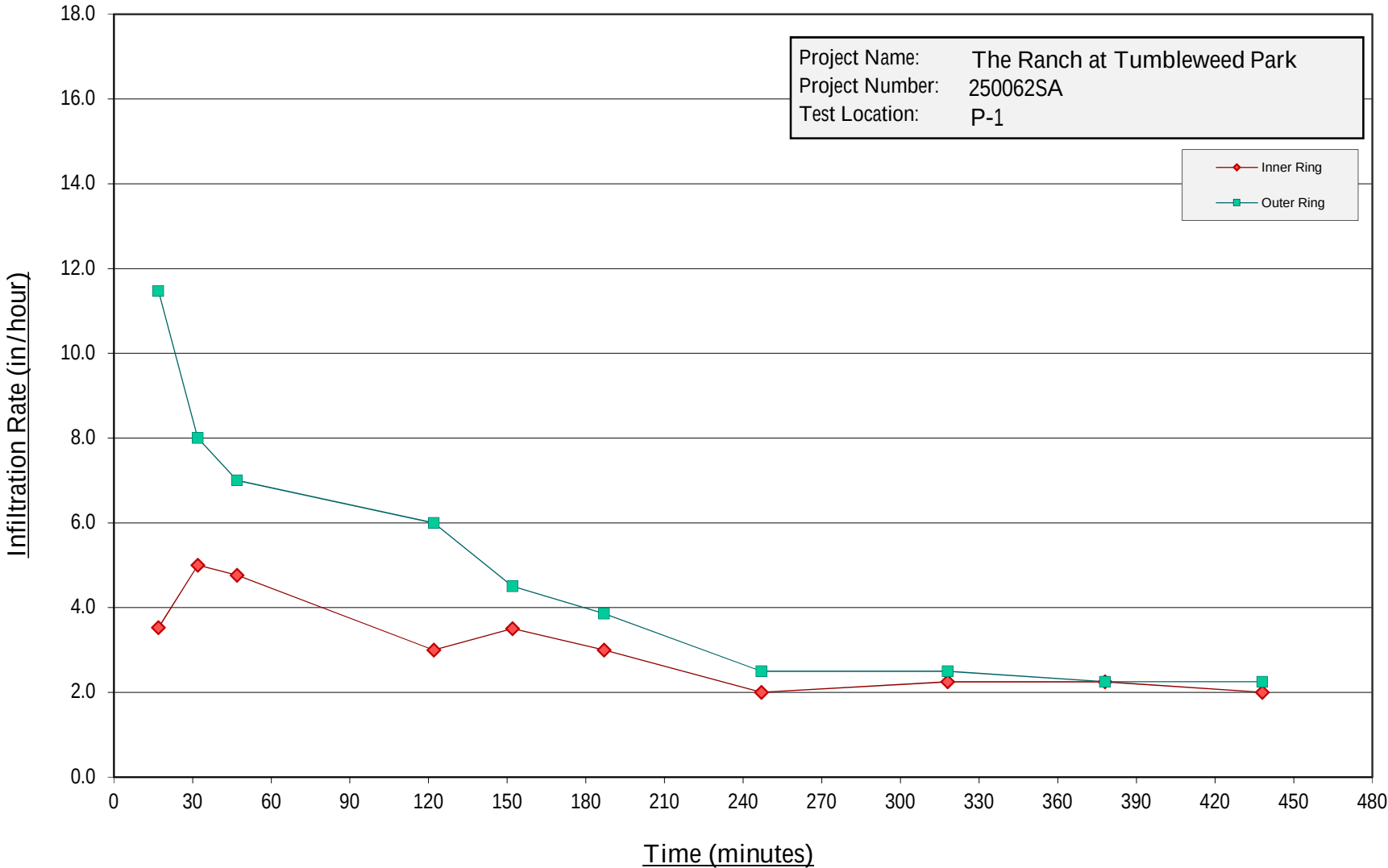
B- 2, BS-2	5.0	116.3	13.1	111.0	10.8	95.4	19.6	100	3.1
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**SPEEDIE
AND ASSOCIATES**
Geotechnical • Environmental • Materials Engineers
A UES Company

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AND ASSOCIATES**
Geotechnical • Environmental • Materials Engineers
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Infiltration vs. Time

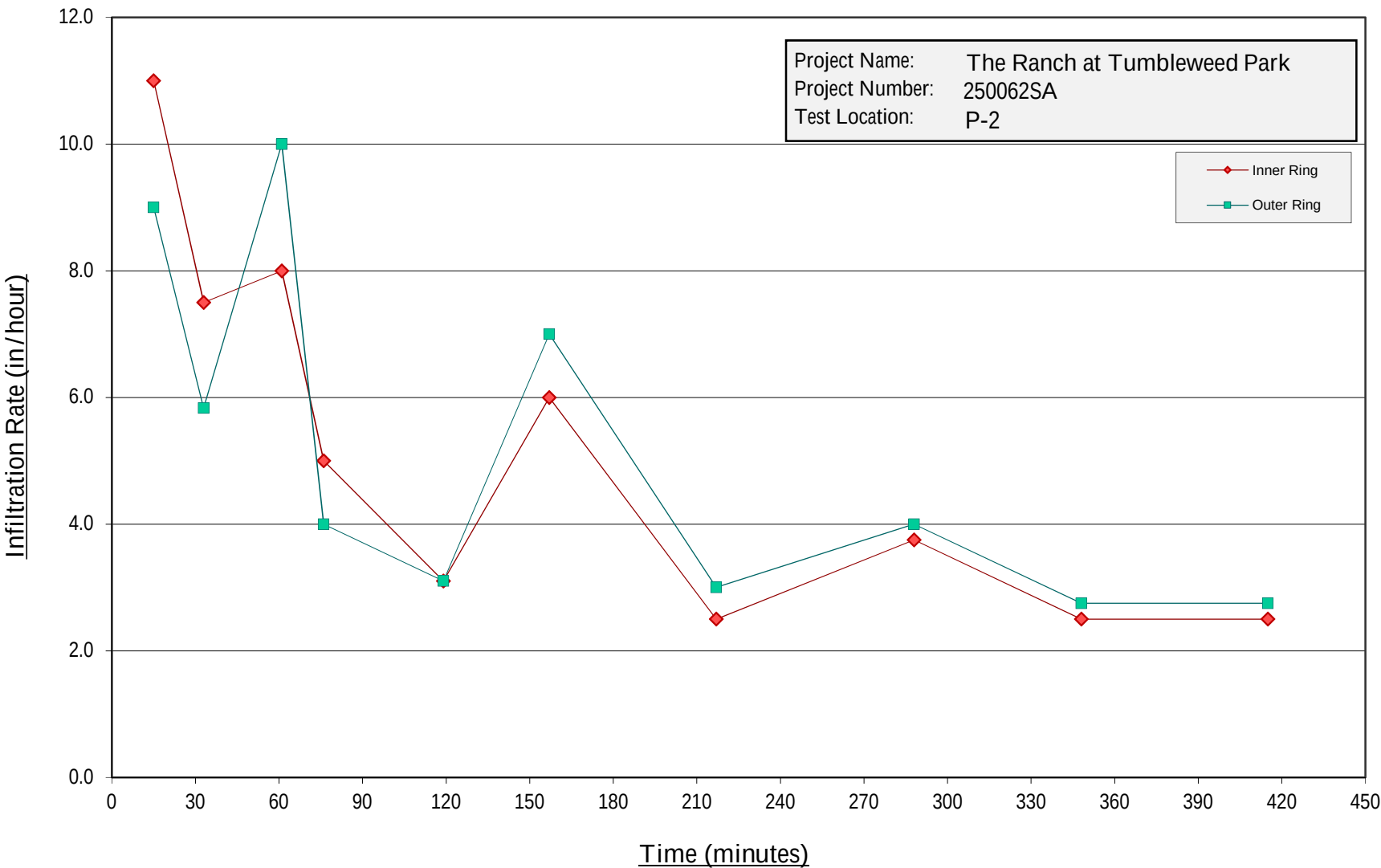
Project Name: The Ranch at Tumbleweed Park
Project Number: 250062SA
Test Location: P-1



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AND ASSOCIATES**
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A UES Company

Infiltration vs. Time



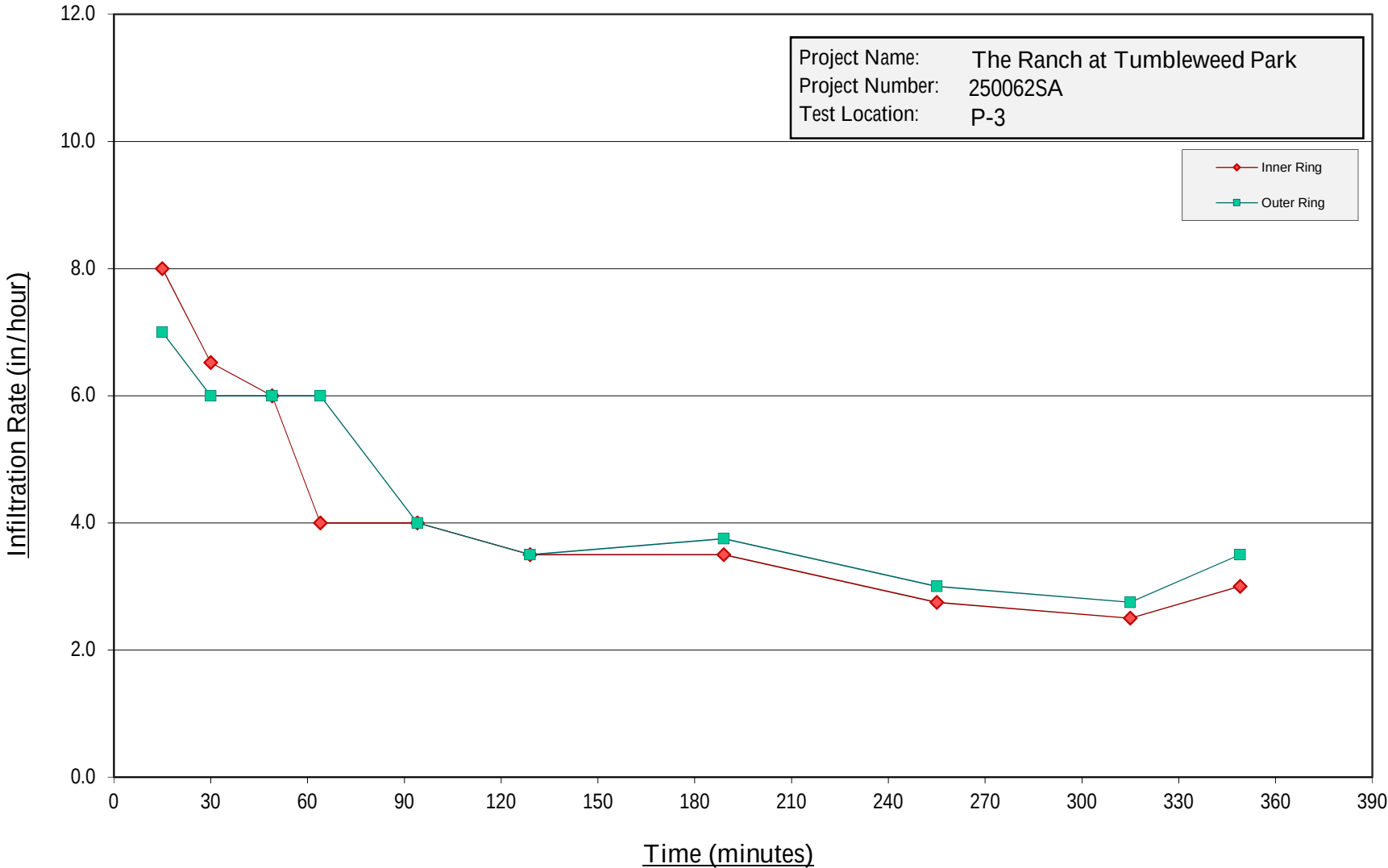
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AND ASSOCIATES**
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A UES Company

[illegible]



Infiltration vs. Time

Project Name: The Ranch at Tumbleweed Park
Project Number: 250062SA
Test Location: P-3





DOCUMENT 00 63 13

REQUEST FOR INFORMATION / INTERPRETATION

Project:	_____	R.F.I Number:	_____
	_____	From:	_____
To:	_____	Date:	_____
	_____	A/E Project Number:	_____

Specification Section:	Paragraph:	Drawing Reference:	Detail
------------------------	------------	--------------------	--------

Request:

* Requested Date/Time for Response:

Signed by:

Response:

☐ Attachments

Response From:	To:	* Date Rec'd:	* Date Ret'd:
----------------	-----	---------------	---------------

Signed by:

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ File

* Contractor shall allow up to 5 working days review and response time for RFI'S, unless review is required of multiple consultants, then the review and response period shall be 7 working days. (See Section 01 26 13.

wg2203
Bid Set . June . 2026

The Ranch at Tumbleweed Park
Request for Information /
Interpretation



SECTION 00 63 25

**SUBSTITUTION REQUEST
(After the Bidding Phase)**

Project: _____ Substitution Request Number: _____
 _____ From: _____
 To: _____ Date: _____
 _____ A/E Project Number: _____
 Re: _____ Contract For: _____

Specification Title: _____ Description: _____
 Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
 Manufacturer: _____ Address: _____ Phone: _____
 Trade Name: _____ Model No.: _____
 Installer: _____ Address: _____ Phone: _____
 History: ☐ New product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old
 Differences between proposed substitution and specified product: _____

☐ Point-by point comparative data attached – REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
 Address: _____ Owner: _____
 _____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$_____).
 Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Email: _____

Telephone: _____

Attachments: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved – Make submittals in accordance with Specification Section 01 33 00.
- ☐ Substitution approved as noted – Make submittals in accordance with Specification Section 01 33 00.
- ☐ Substitution rejected – Use specified materials.
- ☐ Substitution Request received too late – Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____



SECTION 00 70 00

GENERAL CONDITIONS

The General Conditions of the Contract for Construction, AIA Document A201-2007, hereafter referred to as General Conditions, are hereby incorporated into and made part of these Contract Documents the same as if bound herein in full.

END OF SECTION



SECTION 01 11 00

SUMMARY OF WORK

1.01 WORK COVERED BY CONTRACT DOCUMENTS

The facilities for The Ranch at Tumbleweed Park are planned to have multi-phased improvements to create a vibrant cultural destination that supports daily activity for Chandler residents as well as special events.

The improvements include the following:

Phase 1:

Site Improvements - Inclusive of tree salvage and removal, site grading, landscaping and drip irrigation, lighting, concrete sidewalks and interpretive trails, stabilized emergency access drive, entry gateway and parking adjustments, trash enclosure and parking lot improvements.

Red Shed & Amphitheater - Inclusive of relocation of Red Shed structure, concrete slab and masonry stem wall for shed, concrete patio extensions, stage and steel shade cover, new patio structures, concrete terrace seating and site wall, steel shade structure over seating. Underground utility infrastructure to Red Shed and Amphitheater.

General / Overall Site Improvements - Inclusive of demolition, removal and salvage of existing site elements and infrastructure, tree removal, site grading, flood irrigation improvements, new underground utility infrastructure, tree planting, turf installation and supplemental irrigation, relocated service yard, conex shipping container and fencing.

Phase 2:

Site Improvements – Inclusive of tree salvage and removal, site grading, landscaping and drip irrigation, lighting, concrete sidewalks, stabilized emergency access drive, bicycle loops, raised terrace garden, shade arbor structure and walk, entry platforms & steps to historic structures.

New Garage – New building constructed of a concrete slab, masonry stem wall, wood framed walls and trusses with metal roofing and reclaimed wood siding.

1.02 DEFINITIONS PERTAINING TO THE CONTRACT DOCUMENTS

- A. Furnish: To purchase and deliver.
- B. Install: To place into final position an connect.
- C. Provide: To furnish and install.
- A. “As shown”, “as approved”, “as indicated” or words of similar import mean as indicated on the drawings.
- B. “As selected”, “as approved” or words of similar import mean as selected by, as approved by, or as accepted by the Architect and Owner.
- C. “Approved equal”, “or equal” shall mean as approved and accepted by the Architect and Owner.
- D. “Shall” means mandatory.



- E. “As required” means as required by the contract documents.
- F. “As necessary” means essential to the completion of the work.
- G. “Concealed” means not visible in the finished work.
- H. “Exposed” means visible in the finished work.
- I. “Days” means calendar days.
- J. Substantial Completion: That stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

1.03 WORK BY OWNER

- A. Items noted ‘NIC’ (Not in Contract) will be furnished and installed by the Owner.

1.04 OWNER FURNISHED ITEMS

- A. Products furnished to the site and paid for by Owner shall be as noted on Drawings.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed Shop Drawings, Product Data, and Samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for Manufacturers' warranties, inspections and service.
- C. Contractor's Responsibilities:
 - 1. Contractor shall give Owner written notice stating dates when Owner-furnished items must be received at the job site to insure Project completion in accordance with established schedule.
 - 2. Review Owner-reviewed Shop Drawings, Product data, and Samples
 - 3. Receive and unload products at site; inspect for completeness or damage, jointly with Owner.
 - 4. Handle, store, assemble, install, connect and finish such products, including furnishing lubricants and fluids and procedures required to render product serviceable and operative.
 - 5. Contractor is responsible for the coordination and interface of Owner-Furnished and Installed work with Work of this Contract to provide all required mechanical and electrical rough-ins, openings, supports, dimensions, etc., as required for a complete installation.

1.05 CONTRACTOR USE OF SITE

- A. General: Contractor shall have full use of the site within Contract Limit Lines indicated for construction operations during the construction period.
- B. Use of site shall allow for:



1. Owner occupancy and usage of the adjacent buildings.
 2. Work by Other Contractors and Work by Owner.
 3. Use of site by public.
- C. Owner Operations:
1. At no time during the work shall Contractor place, or cause to be placed, materials or equipment, or other items, at a location which would impede or impair access to or from the present facilities for customers, employees or delivery personnel.
 2. Contractor shall cooperate with the Owner in providing traffic control during course of construction in order to minimize inconvenience to Owner's customers.

1.06 PERMITS, FEES AND NOTICES

- A. Plan check fees have by been paid by the Owner.
- B. The Contractor shall secure and pay for the building permit and for other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time the bids are received or negotiations concluded.
- C. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authority bearing on the performance of the Work.
- D. It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect and Owner in writing, and any necessary changes shall be accomplished by appropriate Modification.
- E. If the Contractor performs Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect and Owner, the Contractor shall assume full responsibility therefor and shall bear attributable costs.

1.07 SPECIAL SITE CONDITIONS

- A. Contractor shall make consideration of dust and debris. Means for maintaining operations shall be discussed with and approved by the Owner prior to commencing work.

1.08 APPROVED APPLICATORS

- A. Where specific instructions in the Specifications require that a particular product and/or material be applied and/or installed by an "approved applicator" it shall be the Contractor's responsibility to insure that any Subcontractor or Subcontractor used for such Work is in fact currently certified, or otherwise approved in writing, by the particular Manufacturer for this type of installation or application.

1.09 APPROVED MANUFACTURERS

- A. Each Section includes a list of Manufacturers whose equipment is acceptable as to



manufacture, subject to conformance with the Contract Documents. Careful checking must be made by the Contractor and the manufacturer or equipment supplier to verify that the equipment will meet all capacities, requirements, space allocations and is suitable to the intended purpose.

1.10 REFERENCE DATA

- A. Reference data made available to the Contractor is for the Contractor's information only, and neither the Owner nor the Architect assume any responsibility for the Contractor's conclusions.
- B. The Contractor shall establish and maintain all buildings and construction grades, lines, levels, and benchmarks. This Work shall be performed by a licensed Civil Engineer or Surveyor under the employ of the Contractor, who shall certify to the Architect that he has performed this service.
- C. The Contractor shall not remove any property line markers or monuments or data established by the Owner.

1.11 ARCHITECTURAL BARRIERS

- A. It is the desire of the Owner that the facilities and improvements constructed under this Contract meet or exceed the intent of applicable public law concerning prohibition of discrimination, and that no individual be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of this completed Project.
- B. The designers and drafters of these Documents have intended to incorporate those Owner's intentions into these Documents.
- C. It is recognized that there may be products not incorporated into these Documents that may more nearly meet the Owner's desires than those included.
- D. The Owner hereby solicits those providing elements of this Project to bid and contract for the Project as required by these Documents, but at the time of submitting Shop Drawings, or sooner when appropriate, and without causing delay in the Project, to also submit proposals for improving the accessibility of the Project to physically or mentally impaired persons.

END OF SECTION



SECTION 01 26 13

REQUESTS FOR INTERPRETATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative requirements for requests for information / interpretation.

1.02 DEFINITIONS

- A. Request For Information / Interpretation (RFI):
 - 1. A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as RFI.
 - 2. A properly prepared request for information / interpretation shall include a detailed written statement that indicates the specific Drawings or Specification in need of clarification and the nature of the clarification requested.
 - a. Drawings shall be identified by drawing number and location on the drawing sheet.
 - b. Specifications shall be identified by Section number, page and paragraph.
 - 3. Requests for Information: Request made by Contractor concerning items not indicated on drawings or contained in Project Manual that is required to properly perform the work.
 - 4. Requests for Interpretation: Request made by Contractor in accordance with Owner's Representative's third party obligations to the contract for construction.
- B. Improper RFI's:
 - 1. RFI's that are not properly prepared.
 - 2. Hand-written RFI's are not acceptable.
 - 3. Improper RFI's will be processed by the Architect after receiving corrected or clarified RFI forms. The Contractor will be notified by the Architect prior to the processing of improper RFI's.
- C. Frivolous RFI's:
 - 1. RFI's that request information that is clearly shown on the Contract Documents.
 - 2. Frivolous RFI's may be returned unanswered or may be voided. The Contractor will be notified by the Architect prior to the processing of frivolous RFI's.

1.03 CONTRACTOR'S REQUEST FOR INFORMATION

- A. RFI's shall be submitted on Document 00 63 13 included in the Project Manual.
 - 1. Forms shall be completely filled in, and; shall be fully legible after photocopying or transmission by facsimile (fax).
 - 2. RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
 - 3. Each page of attachments to RFI's shall bear the RFI number and shall be consecutively numbered in chronological order.
 - 4. Contractor may use their own form which must include, at a minimum, the information required in Document 00 63 13 or in an acceptable form as agreed upon by Architect, Contractor and Owner.
 - 5. RFI's may be submitted by E-Mail or via online project management system.
 - a. Submittal by E-Mail is the preferred method of submittal.



- b. Address for E-Mail will be distributed by the Architect at the Pre-Construction Conference.
 - c. Digitally issued RFI's shall be prepared using a standard form. Requests issued without using the standard form will not be considered a formal RFI.
 - d. An electronic version of Document 00 63 13 will be provided upon request.

- B. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.
 - 1. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect.
 - 2. RFI requesting clarification of an item required of a document known to have been prepared by a consultant to the Architect, may be sent directly to the consultant with a simultaneous copy to the Architect, if this direct communication is approved by the Architect.
 - 3. The Architect reserves the right to retract or edit responses which conflict with, or deviate, from the general design intent of the project. The Contractor will be notified by the Architect before such action is taken.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

- C. Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Architect, because of the number and frequency of RFI's submitted, the Architect may require the Contractor to abandon the process and submit future requests as either submittals, substitutions or requests for change.

- D. RFI's shall be originated by the Contractor.
 - 1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
 - 2. RFI's from subcontractors or material suppliers sent directly to the Owner's Representative, Architect or the Architect's consultants shall not be accepted and will be returned unanswered.

- E. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's which request information available in the Contract Documents will be deemed either "improper" or "frivolous" as noted above.

- F. In cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

- G. RFI's shall not be used for the following purposes:
 - 1. To request approval of submittals.
 - 2. To request approval of substitutions.
 - 3. To request changes which are known to entail additional cost or credit. (A Change Order Request form shall be used.)
 - 4. To request different methods of performing work than those drawn and specified.



- H. In the event the Contractor believes that a clarification by the Architect results in additional cost or time, Contractor shall not proceed with the work indicated by the RFI until a Change Order (or Construction Change Directive, if applicable to project) is prepared and approved. RFI's shall not automatically justify a cost increase in the work or a change in the project schedule.
 - 1. Answered RFI's shall not be construed as approval to perform extra work.
 - 2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
- I. Contractor shall prepare and maintain a log of RFI'S, and at any time requested by the Architect, Contractor shall furnish copies of the log showing outstanding RFI'S. Contractor shall note unanswered RFI's in the log.
- J. Contractor shall allow up to 5 working days review and response time for RFI'S, unless review is required of multiple consultants, then the review and response period shall be 7 working days.
 - 1. The Architect will endeavor to respond in a timely fashion to RFI's.
 - 2. RFI shall state requested date/time for response, however, this requested date/time for response is not a guarantee that the RFI will be answered by that date/time if that date/time is too expeditious.

1.05 ARCHITECT'S RESPONSE TO RFI'S

- A. Architect will respond to RFI's on one of the following forms:
 - 1. Properly prepared RFI's:
 - a. Response directly upon Request for Information / Interpretation form. Architect's Supplemental Instruction.
 - b. Request for Proposal
 - 2. Improper or Frivolous RFI's:
 - a. Notification of Processing Fee(s).
 - b. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
 - 3. Answers to properly prepared RFI's may or may not be made directly upon the RFI form as deemed appropriate by the Architect.
- B. Architect may opt to retain RFI's for discussion during regularly scheduled project meetings for inclusion of responses in meeting minutes in lieu of responding on a written form. When RFI's are resolved in this manner the Contractor shall record the decision and close the RFI. No further action will be required of the Design Professional.

1.06 CONFIRMING RFI'S

- A. The Contractor shall provide confirming RFI's or other acceptable means of tracking Field Directives and resolution, whether initiated by the Design Professional, Contractor or Owner.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION



SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS OF GENERAL CONDITIONS

- A. Comply with the requirements of the General Conditions

1.02 PRECONSTRUCTION CONFERENCE

- A. A Preconstruction Conference to discuss the Project work will be held at a time and location designated by the Architect (Design Professional), Contractor and Owner.
- B. Contractor, and representatives of major Subcontractors, shall meet with Owner and Architect. The purpose of this conference is to discuss the Project in detail, including scheduling of Work, and to answer questions. Unless followed up in writing, verbal authorizations or acknowledgement of those present are not binding.
- C. Meeting minutes will be taken by the Contractor for distribution to all attendees within 72 hours of conference.
- D. Mockups (as scheduled in Section 01 33 00), including procedures, coordination and scheduling shall be reviewed during this conference.

1.03 PROGRESS MEETINGS

- A. Weekly Progress Meetings will be held at time and location to be agreed upon by Owner, Architect and Contractor.
- B. Contractor and representatives of major Subcontractors shall meet with Owner and Architect.
- C. Contractor is responsible for notifying Subcontractors of their required attendance. These meetings will address progress of the Work and problems that may have developed since the previous meeting.
- D. Agenda for meetings shall include:
 1. Review of RFI Log.
 2. Review of Submittal Log.
 3. Review of Sketch Log.
 4. Field Report action items.
 5. Status of mockups.
 6. Project overall and look-ahead schedule including critical path items (requisitions, decision points).
 7. Permits for deferred items (including off-site / street utility work).
 8. BIM Coordination: If Contractor will be maintaining an on-site BIM model, then an up-to-date version shall be available for review and discussion at project meetings.



- E. Unless followed up in writing, verbal authorizations or acknowledgements by those present are not binding.
- F. Meeting minutes will be taken by the Contractor for distribution to all attendees within 72 hours of each meeting.

END OF SECTION



SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL

1.01 CONSTRUCTION SCHEDULE

- A. To be provided in accordance with the General Conditions. In addition to the requirements of the General Conditions:
 - 1. Submit 3 copies of the Construction Schedule, broken down by Trade or Material, to the Architect for information 15 days after date of agreement. Schedule shall show proposed starting and completion dates for each Trade and activity for the Work. Submit 1 paper copy and electronic copy of updated schedule at each Pay Request field review to the Architect.
- B. Provide submittal schedule indicating anticipated product and shop drawing submittal dates along with critical dates by which approvals must be provided. Schedule shall make accommodation for full review times and at least one resubmittal.
- C. Submit completed material delivery schedule to the Architect no later than 20 calendar days prior to start of construction. Identify material critical to the progress of the Project and those for which long lead time in procurement is anticipated. Indicate projected dates for submittal, order and delivery of such material.

1.02 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. General:
 - 1. Comply with the requirements of the General Conditions.
 - 2. Provide digital copies of shop drawings and product data in PDF format, including original submittal and any subsequent submittal. Unless authorized by previous approval by Architect, PDF files shall be original documents. Scanned copies shall not be accepted.
- B. Shop Drawings:
 - 1. Following Contractor's review and approval, submit to the Architect each drawing for review in PDF format.
 - 2. The Architect will review the Drawings and affix a stamp to the PDF document indicating the findings of the review, and will return same to the Contractor.
 - 3. Comments, if any, will be noted directly on the PDF document.
 - 4. The Contractor shall distribute the appropriate number of copies to the various Trades and to Contractor's job personnel as required.
 - 5. If the PDF document is indicated to be corrected and resubmitted, correct and resubmit as outlined above.
 - 6. Fire Alarm System/Fire Sprinklers System Shop Drawings shall be submitted to the state and local Fire Marshal and obtain approval prior to installation. Fire Marshal inspection, test and approval of completed installations shall be obtained prior to acceptance of the systems and Substantial Completion of the Project.
- C. Product Data: Following Contractor's review and approval, submit to the Architect copies of Manufacturer's catalogs and brochures as required by the Specifications in PDF format. Resubmit corrected copies for approval in accordance with original submittal.
- D. Samples:



1. Following Contractor's review and approval, submit to the Architect samples of materials in quantities and sizes as required by the Specifications.
 2. Submittals required other than for selection of color, texture, fabric or finish shall be given to the Architect at a time determined by the Contractor, which will allow for resubmittal and which will not cause and delay in the Work.
 3. Corrected samples shall be resubmitted for approval as per the original submittal.
- E. Color Selection: Within 30 days after selection by Architect and acceptance by the Owner, submit to the Architect for approval, samples and appropriate information required for the selection of colors, textures, fabric and finishes for the entire Project. Final selection of color, textures, fabrics or finishes will not be made until all applicable and related submittals have been provided. If the Contractor fails to provide the required samples and related information within the time period, the Architect shall have the option of selecting colors, textures, fabric, finishes or specific materials from those specified or approved and the Contractor shall be obligated to provide the material selected by the Architect.
- F. UL Assemblies:
1. Contractor shall submit 1 electronic copy of each UL Listed fire rated assembly that is to be used for the project for approval by the Architect, including; but not limited to:
 - a. Fire rated wall and ceiling construction, including shaft wall construction.
 - b. Fire rated roof construction.
 - c. Spray applied fire resistive materials.
 - d. Fire rated penetrations (including dampers) through fire rated wall, ceiling and roof construction, including pipe, duct and expansion joint assemblies.
 - e. Fire rated openings, glazing and frames (interior and exterior doors and windows).
 - f. Other fire rated assemblies as noted on Drawings or as specified in the specifications.
 2. Electronic copies shall be compiled into CD containing all information with directory identifying each UL assembly.
- G. Submit Shop Drawings and Samples for only those items specifically mentioned in the Specifications. Contractor shall be responsible for obtaining Shop Drawings required for the progress of the Work, even though such Shop Drawings may not require the Architect's review.
- H. Partial Submittals: Submittals which are partial or contain only a portion of the data required to describe the item or installation will be rejected, unless such partial submittal is coordinated with the Architect prior to submittal, and final approval of all such items will be withheld pending receipt of all required information.
- I. Deviations: All deviations from the Contract Documents shall be clearly identified in the submittal. Submittal shall include only items included in the specifications or which have been approved in advance by the Architect. Submittals containing items which have not been approved in advance by the Architect will be rejected.
- J. Environmentally Sensitive Materials (Green Products):
1. Specifications are based upon the use of environmentally sensitive materials.
 2. In some cases, manufacturer's standard products may contain materials that do not comply with specified requirements for the usage of environmentally sensitive materials and compliance with the specified requirements may not be possible.
 3. Contractor shall submit product data for products that are proposed for use that do not comply with specified requirements for the usage of environmentally sensitive materials.
 4. Architect and Owner reserve the right to disapprove the submittal (and subsequent



usage) for products that are proposed for use that do not comply with specified requirements for the usage of environmentally sensitive materials.

1.03 QUALITY CONTROL SUBMITTALS

A. Field Samples:

1. Contractor shall provide field samples for all finishes (interior and exterior) that will remain exposed to view in the final work. RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
 - a. Field samples shall be constructed of actual materials to be used in the final work, including actual mix for concrete and other such materials.
 - b. Include testing for exterior components as specified in the various sections.
 - c. Field samples shall not be incorporated into the final work.
2. Size(s) of field samples shall be sufficient to show the characteristics of the finish.
3. Approved field samples will serve as standard for approval of building construction.
4. Construct in location where directed.
5. Bracing and supports shall be adequate to support field samples throughout construction period.
6. Modify field samples as directed by Architect to satisfy appearance and performance requirements.
7. Obtain approval of field samples before commencing construction of exposed exterior work.
8. Upon completion of Project and when directed by Architect, remove field samples from site and dispose of in a legal manner consistent with the waste management requirements.

B. Mockups: Provide stand alone mockups (not provided in place) for composite assemblies as required to indicate connection and interface of materials and system.

1. Contractor shall provide mockups as required based on specific project requirements, as agreed upon with Owner & Architect, for all specialty finishes, such as those noted below, including but not limited to:
 - a. Cast-in-Place Concrete
 - b. Hardscape & Paving Finishes
 - c. Landscape Groundcover & Top Dressing
 - d. Concrete Masonry Units
 - e. Wood framing w/ Weather Restrictive Barrier & Wood Siding
 - f. Metal Roofing
 - g. Aluminum Frames
2. In particular, mockups shall be required for site-finished materials whether or not specified or listed herein.
3. Sizes of mockups shall be as directed by Architect and shall be sufficient to show the characteristics of the finish.
4. Location of mockups to be determined by agreement between Owner, Architect and Contractor.

C. Manufacturer's Instructions: Where Specifications require Work to be furnished, installed or performed in accordance with a specified product Manufacturer's instructions, distribute copies of such instructions to concerned parties.



PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION



SECTION 01 45 00 QUALITY CONTROL

PART 1 GENERAL

1.01 TESTING LABORATORY SERVICES

- A. The Contractor will select independent testing or inspection agencies to perform specified testing and inspections.
- B. Owner will employ and pay for the services of an independent testing laboratory to perform specified testing.
- C. Contractor shall furnish samples for such tests and deliver them to the testing agency as directed by the Architect.
- D. The testing laboratory shall distribute copies of reports as follows:
 - 1. 1 electronic copy to the Owner
 - 2. 1 electronic copy to the Architect
 - 3. 1 electronic copy to the Structural Engineer
 - 4. 2 copies to the Contractor
- E. Costs for retesting required due to Contractor's failure to comply with specified requirements shall be paid for by the Contractor.
- F. The following list is intended as a guide to the Contractor to aid in the determining testing requirements for the project, however, the requirements specified in the technical sections shall take precedence over this list and this list is not to be interpreted as being complete.
 - 1. 03 30 00 - Cast-In-Place Concrete: Test cylinders, slump test(s), floor flatness, calcium chloride moisture testing.
 - 2. 04 05 15 - Mortar and Masonry Grout: Test of grout mix
 - 3. 05 12 00 - Structural Steel Framing: Welded connection tests, inspection of high strength bolts and as indicated on structural drawings.
 - 4. 05 31 00 - Steel Decking: Deck testing/inspection when required.
 - 5. 07 92 00 - Joint Sealers: Field adhesion testing and stain testing.

1.02 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Minimum standards of workmanship from the Arizona Registrar of Contractors shall not be used in determining the acceptability of work unless no other level of quality is specified.
- B. The Contractor shall have the option to use qualified, internal personnel to perform field inspections and testing for certain scopes of work within Divisions 7 and 8 as approved by the Owner and the Architect. Laboratory testing required by the specifications shall be provided by an independent 3rd party.
- C. Where Specifications require that a particular product be installed and/or applied by an Applicator approved by the Manufacturer, it is the Contractor's responsibility to ensure that Subcontractor employed for such Work is approved. Such Subcontractor(s) shall provide evidence of being approved when requested by the Architect.
- D. Work shall be executed by mechanics skilled in the Work required. Conform to the methods, standards and accepted practices of the Trade or Trades involved.

END OF SECTION



SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.02 TEMPORARY UTILITIES

- A. Owner/City will provide the following:
 - 1. Electrical power and metering, consisting of a connection to existing facilities.
 - 2. Water supply, consisting of a connection to existing facilities.
- B. Existing facilities may not be used.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to the field office at the time of project mobilization.
- B. Telecommunications services shall include:
 - 1. A Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Internet Connections: Minimum of one; DSL modem or faster.
 - 3. Email: Account/address reserved for project use.

1.04 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in a clean and sanitary condition.



1.05 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of the site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot (1.8 m) high fence around the construction site; equip with vehicular and pedestrian gates with locks.
- C. Provide visual screen attached to fence.

1.07 SECURITY

- A. Provide security and facilities to protect Work, and Owner/City operations from unauthorized entry, vandalism, or theft.

1.08 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner/City.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.09 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in a clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.10 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on Drawings.



- B. Erect on-site at the location indicated.

1.11 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 8 persons.
- C. Locate offices a minimum distance of 30 feet (10 m) from existing and new structures.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
- C. Clean and repair damage caused by the installation or use of temporary workers.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to a specified condition.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

- 3.01 COMPLY WITH NFPA 241, "SAFEGUARDING CONSTRUCTION, ALTERATION AND DEMOLITION OPERATIONS."

END OF SECTION



SECTION 01 57 13

TEMPORARY EROSION CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide in accordance with Civil Drawings and Specifications as provided in the infrastructure package / civil drawings.

PART 2 PRODUCTS

2.01 MATERIALS

- A. In accordance with Civil Drawings and Specifications as provided in the infrastructure package / civil drawings.

PART 3 EXECUTION

3.01 EXECUTION

- A. In accordance with Civil Drawings and Specifications as provided in the infrastructure package / civil drawings.

END OF SECTION



SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cutting, fitting and patching, including attendant excavation and backfill required to complete Work, and for:
 - 1. Making several parts fit together properly.
 - 2. Uncovering portions of Work to provide for installation of ill-timed Work.
 - 3. Removing and replacing defective and non-conforming Work.
 - 4. Removing samples of installed Work required for testing, as directed by Architect.
 - 5. Providing routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

1.02 SUBMITTALS

- A. In advance of executing any cutting or alterations, submit written request to Architect and Owner requesting consent to proceed with cutting which affects:
- B. Include in request:
 - 1. Identification of Project.
 - 2. Description of affected Work.
 - 3. Necessity for cutting, alteration or excavation.
 - 4. Effect of Work of Owner or other trades, or structural or weatherproof integrity of Project.
 - 5. Description of proposed Work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades which will execute Work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 6. Alternatives to cutting and patching.
 - 7. Cost proposal, when applicable.
 - 8. Written permission of trades whose Work will be affected.
- C. Submit advanced written notice to Architect designating reasonable time Work will be uncovered to provide for observation.

1.03 PAYMENT FOR COSTS

- A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of Architect and Engineer to be paid by Contractor.
- B. Cost of Work done on written instructions of Architect, other than defective or nonconforming Work, will be paid by Owner on approval of written Change Order. Provide written cost proposals prior to proceeding with cutting and patching proposed by Architect.



PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide for replacement of Work removed. Comply with Contract Documents for type of Work standards and Specification requirements for each specific product involved.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling. After uncovering Work, inspect conditions affecting installation of new products and verify procedures with Architect.
- B. Report unsatisfactory or questionable conditions in writing to Architect. Do not proceed with Work until further instructions are received.

3.02 PREPARATION

- A. Provide shoring, bracing and supports as required to maintain structural integrity of Work.
- B. Provide devices and methods to protect other portions of Work from damage, including elements which may be exposed by cutting and patching Work. Maintain excavations free from water.

3.03 ERECTION, INSTALLATION AND APPLICATION

- A. Performance:
 - 1. Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.
 - 2. Execute cutting and demolition by methods which prevent damage to other Work to provide proper surfaces to receive installation of repairs and new Work.
 - 3. Execute excavating and backfilling by methods which prevent damage to other Work and settlement as specified in Section 31 01 00.
- B. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants and waterproofing.
 - 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes as shown on Drawings and as specified.
- D. Fit Work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Conform to fire code requirements for penetrations and maintain integrity of fire walls and ceilings.
- E. Restore Work which has been cut or removed. Install new products to provide completed



Work in accordance with requirements of Contract Documents and as required to match surrounding areas and surfaces.

- F. Refinish entire surfaces as necessary to provide an even, matching finish as follows:
1. Painted Walls or Ceilings: To nearest intersection with another finish or corner.
 2. Where Applied Finishes Occur (i.e wallcovering, tile, wood paneling): To nearest intersection of finish without damage to adjacent material. Where match of pattern, grain, texture, or similar finish cannot be made, refinish area to intersection with other finish or corner.
 3. Manufactured or Shop Fabricated Materials: Replace entire affected surface or material.

END OF SECTION



SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 FINAL CLEANING

- A. Perform the following special cleaning for trades at completion of Work. Employ experienced workmen or professional cleaners for the final cleaning:
 - 1. Remove marks, stains, fingerprints, soil and dirt from paint, stain and wall covering.
 - 2. Remove spots, soil, paint and mastic from tile work and wash same.
 - 3. Clean fixtures, equipment and piping; remove stains, paint, dirt and dust.
 - 4. Remove temporary floor protections; clean and polish floors.
 - 5. Clean concrete walks and slabs of plaster or cement droppings, paint and other objectionable materials to present a neat, clean appearance.
 - 6. Clean exterior and interior metal surfaces, including doors and windows and their frames.
 - 7. Remove oil, stains, dust, dirt, paint and the like from items required to have a polished finish; polish and leave without fingermarks or other blemishes.
 - 8. Wash glass inside and outside.
- B. Cleaning materials and procedures shall be non-toxic. Provide alternative materials to more toxic commercial cleaning agents, including; but not limited to: vinegar, citrus, borax, cornstarch, and baking soda.
 - 1. Abrasive cleaners: Substitute half lemon dipped in borax.
 - 2. Ammonia: Substitute vinegar, salt, and water mixture; or backing soda and water.
 - 3. Disinfectants: Substitute half cup borax in a gallon of water.
 - 4. Drain Cleaners: Substitute one-fourth cup baking soda and one-fourth cup vinegar in boiling water.
 - 5. Upholstery cleaners: Substitute dry cornstarch.
- C. Make building(s) ready for occupancy in every respect. Lay heavy building paper (rosin paper or kraft paper ONLY, asphaltic based papers are NOT acceptable) in main circulation areas to protect the floors until final inspection and acceptance.
- D. Existing improvements, inside or outside the property which are disturbed, damaged or destroyed by the Work under the Contract shall be restored to the condition in which they originally were, or to the satisfaction of the Architect.

1.02 PROJECT RECORD DOCUMENTS

- A. As the work progresses, the Contractor shall maintain a complete and accurate record of changes or deviations from the Contract Documents and Shop Drawings, indicating the Work as actually installed. Record information in the appropriate locations on a record set of prints of the Drawings and Shop Drawings and a copy of the Specifications which are maintained solely for the purpose of this documentation. Keep this record set of Contract Documents and Shop Drawings at the project site for review by the Owner and Architect. Information contained in the record documents shall include, but not be limited to:
 - 1. Modifications made by Addenda, Change Orders, Construction Change Directives and Architect's Supplemental Instructions which shall be transferred to the record documents.
 - 2. Location of site underground pipes, conduits, ducts, cables and similar work, dimensioned horizontally to permanent points of reference and located vertically



3. by indicating depth of burial. Dimensions shall be accurate within +6 inches.
 3. Location of building plumbing piping, sprinkler piping, control valves, heating and air conditioning equipment, mechanical piping, ductwork, major conduit runs, power, control and alarm wiring, etc., dimensioned horizontally to permanent points of reference. Dimensions shall be accurate within 6 inches. By notation, describe the vertical location of the item such as "below slab," "above ceiling," etc.
 4. Modifications made to accommodate field conditions.
 5. Location and function of mechanical and electrical control devices and shut-off valves.
 6. Revise Drawings and panel schedules to show final circuiting of electrical fixtures and equipment.
- B. Contractor shall maintain a digital PDF record set of drawings, of the complete original bidding documents, at Contractor's expense. Seals and signatures of Registrants shall be completely removed and/or permanently obscured. Contractor shall document changes in the Contract Documents, secured with prior approval of the Architect.
- C. Upon Substantial Completion of the Work, deliver the complete set of Record Documents, Shop Drawings and annotated Specifications to the Architect for approval.
- D. As Built Drawings: Comply with the requirements of the General Conditions.
- E. Owner's Manual: Prior to final payment, submit one (1) hard-back, loose-leaf binder containing the following required submittals and any others required in other Sections, suitably typed, indexed and labeled for ready reference:
1. Subcontractors, major suppliers list with companies names, addresses and telephone numbers.
 2. Warranties and certifications.
 3. Affidavit from general and subcontractors on use of asbestos free materials.
 4. Maintenance/operation instructions and parts list (other than Divisions 15 and 16).
 5. List of Extra Materials supplied to Owner, signed by Owner's representative.
 6. Other items required by the Specifications.
 7. Submittals shall also be scanned into a digital format (e.g. .pdf) and shall be provided on electronic media (CD, flashdrive, etc.) acceptable to Owner.

1.03 OPERATION AND MAINTENANCE DATA

- A. Initial Submittal: Submit one electronic (e.g. .pdf) draft copy of Operation and Maintenance Manuals for systems and equipment, including electrical and control items, and parts lists, a minimum of 14 days prior to requesting inspection for Substantial Completion, or scheduled Substantial Completion Date, whichever is earlier. Furnish separate copy for each Division.
1. Architect will review Manuals for general scope and content and return one copy of draft manuals with required action.
- B. Operating instructions shall include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts, tests, instruction books, suppliers phone numbers and addresses and individual equipment guarantees. Parts lists shall be complete in every respect, showing parts and part numbers for ready reference.
- C. Maintenance instructions shall include a written list of required and suggested maintenance for mechanical, plumbing, electrical or other equipment or features in the project. Each item shall contain a brief description of the maintenance required as well as the recommended time frame or period for the maintenance. Include lists of filter sizes for air



handling equipment, indicated "washable" or "disposable" and for which unit the filter is for. Shut off valves, etc., must be clearly marked on as-constructed drawings.

- D. Provide DVD format media of all operating and maintenance instructions, or where available, provide manufacturer's own operations and maintenance videotapes or DVD's of each specific equipment item or system.
- E. Assemble maintenance manual and operating instructions in hard back loose leaf binders. Suitably label and index material for ready reference.
- F. Upon substantial completion of the Project Work, submit one copy of the Operation and Maintenance Manual and Parts Lists to the Architect for approval. Upon receipt of Notice of Approval, deliver the additional copy to the Owner. Include CD and/or DVD disks and/or hard drive of materials in electronic format.

1.04 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Deliver spare parts, tools, extra stocks of material and similar physical items required by individual specification sections to the Owner with a copy of the transmittal to the Architect. Obtain signed receipts from the Owner for all items.
- B. Change over construction locks to permanent keying system. Deliver required number of keys to the Owner with a copy of the transmittal to the Architect. Obtain receipts from the Owner for delivered items.

1.06 ELECTRONIC COPIES OF IMAGE DOCUMENTS

- A. Upon completion provide CD or DVD disk(s) or Hard Drive containing image copies in JPEG, PDF or other appropriate format and to scale of all record and maintenance documents.

1.07 WARRANTIES

- A. Provide duplicate, notarized copies of documents required by the General Conditions.
- B. Submit warranties required by individual specification Sections in duplicate, assembled in durable binders with a Table of Contents.
- C. The date of commencement of warranties shall be the date of Substantial Completion except as may be modified by AIA Document G-704, Certificate of Substantial Completion, or by other written agreement with the Owner.

END OF SECTION



SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Demolition necessary or required so that the new construction, alterations, remodeling and related work can be performed and completed in accordance with the Contract Documents.
 - 1. Remove debris from demolition site and dispose of in a legal manner.
 - 2. Other existing equipment and fixtures will be salvaged as specified in this Section and as indicated on Drawings.
 - 3. Exterior wall construction shall be neatly cut and new openings shall have additional structural support as required.

1.02 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00:
 - 1. Copies of permits and notices authorizing building demolition as may be required by law, including permits to transport and dispose of debris.
 - 2. Shop Drawings: Drawings of temporary structural support locations and calculations sealed by a Structural Engineer registered in the State of Arizona.
 - 3. Demolition Plan: The scope of the demolition plan should be carefully reviewed and coordinated with Environmental Health and Safety to ascertain the existence of any hazardous materials requiring special attention.
 - 4. Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
- B. Submit project record documents which accurately record actual locations of capped utilities, and concealed obstructions in accordance with Sections 01 77 00.

1.03 QUALITY ASSURANCE

- A. Demolition Firm Qualifications:
 - 1. Specializing in performing the Work required by this Section.
 - 2. Minimum 5 years documented experience.
 - 3. Utilizing workers experienced in disconnecting and capping utilities, if applicable.
- B. Regulatory Requirements
 - 1. Conform to applicable code(s) for demolition of structures, safety of adjacent structures, dust control, runoff control and disposal.
 - 2. Obtain required permits from authorities.
 - 3. Conform to applicable regulatory procedures if hazardous or contaminated materials are discovered.
 - 4. Test soils around buried tanks (if discovered) for contamination.

1.04 PROJECT CONDITIONS



- A. The existing building which is to be remodeled may have lead containing paint and asbestos containing building materials (ACBM) which shall be abated under the work of this contract on a selective case by case basis required in selective demolition areas only, if discovered during construction.
- B. Asbestos and Lead Sampling / Abatement:
 - 1. Contractor shall be responsible for asbestos and lead sampling and testing as work progresses and if discovered during construction.
 - 2. The Contractor's work schedule shall take into consideration any additional time required for sampling, testing and potential abatement.
 - 3. Quantities of asbestos and lead materials to be abated shall be as required by actual conditions as determined by sampling and testing.
- C. The Contractor for this project shall coordinate work activities to ensure worker safety in those locations where asbestos and lead abatement work is in progress.
- D. Contractor shall be required to deal with Lead and ACBM on a case by case basis in selective demolition areas only as required by Construction Documents, or if discovered during construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Carefully remove items to be recycled as specified and as noted on drawings.
 - 1. Demolished materials and equipment shall be stockpiled in an area designated by the Owner, in a manner that the Owner may determine those items which have salvage value to the Owner.
 - 2. Those materials which are not salvaged by the Owner shall become the possession of the Contractor and shall be immediately removed from the site.
- B. The demolition plan shall identify materials/equipment, etc., which are to be reused and/or salvaged by Contractor. There may be items that Owner removed from the site prior to Contractor beginning demolition work. Contractor shall verify with Architect.
- C. The Owner will be responsible for removal and transportation of all items that they wish to salvage prior to Contractor access to building. Once the Owner is satisfied that they have salvaged everything that they want, the Owner will provide approval to Contractor to start the demolition work. It can be assumed by the Contractor that upon receiving approval from the Owner to start demolition work that the Owner has removed all items intended for salvage within the space.
- D. Fluorescent light fixture tubes and certain light fixture ballasts must be separately disposed of in accordance with applicable environmental regulations. Consequently, the removal and disposal of existing fluorescent light fixtures shall include the following:
 - 1. Fluorescent tubes shall be removed and packaged by the Contractor in cartons supplied by the fluorescent tube recycler for disposal.
 - 2. Fixture ballasts not clearly marked as containing "No PCB's" shall be removed by the Contractor and after short clipping all wires place them in a metal drum



supplied to the jobsite by an appropriate PCB disposal company who will remove the drum for disposal offsite at no additional cost to Owner.

- E. Asbestos mitigation, if required, shall be provided by a Contractor that is properly licensed and certified.
- F. For renovation of building elements with existing lead paint or other materials requiring abatement: If possible, complete removal and replacement of building elements may be less expensive and time consuming than the abatement of existing building elements containing lead paint or other materials that typically require abatement.
- G. Unless specifically scheduled for salvage or reuse, demolished materials shall become the possession of the Contractor and shall be immediately removed from the site.
- H. Carefully remove materials (in whole or in part as required) that are scheduled for reuse. Store and protect for reinstallation the materials as indicated on Drawings.
 - 1. Concrete: Crushed and graded concrete may be used as aggregate, sub-base material, or fill. Neutralize alkalinity if planting above.
 - 2. Land-Clearing Wood: May be chipped or shredded for use as ground cover, mulch, compost, pulp, or process fuel.
 - 3. Asphalt Material: Grind existing asphalt paving for reuse.
 - 4. Wood: Sort by type and size for salvage. Wood unsuitable for salvage may be chipped or shredded for use as ground cover, mulch, compost, pulp, or process fuel; do not chip or shred stained, painted, or treated wood.
 - 5. Metal: Salvage metals for recycling.
- I. Fill materials at excavations: As specified in Section 31 01 00.
- J. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tables, and other items of interest or value to the Owner that may be uncovered during demolition remain the property of the Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and notify the Architect in writing of discrepancies before proceeding with the work.
- B. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.

3.02 PREPARATION

- A. Demolition work shall be performed without disruption to adjacent occupied areas, i.e., off hours work. Only when the anticipated demolition work will not present a disruption to the user or occupant can the assumption be made that it can be conducted at any time.



- B. Utilities:
 - 1. Shut-off's must be coordinated with the Owner and receive a work plan approval before commencing daily work.
 - 2. Notify affected utility companies before starting work and comply with their requirements.
 - a. Mark location of utilities.
 - b. Identify, disconnect, remove and cap designated utilities within demolition areas.
 - 3. Electrical services discontinued with the demolition effort shall be properly "tagged out."
- C. Provide, erect, and maintain temporary barriers and security devices where required and as indicated on drawings.
- D. Protect existing landscaping materials, appurtenances, and structures which are not to be demolished.
- E. Protect bench marks and existing work from damage or displacement.
- F. Prevent movement or settlement of adjacent structures.
- G. Obtain written permission from Owner when demolition equipment will traverse, infringe upon or limit access to adjacent property outside the limits of construction for this project.
- H. Protection of existing building exterior:
 - 1. Erect weatherproof closures for exterior openings.
 - 2. Maintain exit requirements.
 - 3. Protect from weather openings cut in existing roof for new work, or where existing roofing is removed to allow new construction to join existing.
 - 4. Install temporary deck of exterior grade plywood and wood skids, or other material approved by Architect, for material and personnel traffic over existing roofing, to protect existing roof and surrounding surfaces from damage. Repair damage caused to the roof and other items.
- I. Protection of existing building interior:
 - 1. Provide dustproof partitions as specified herein as required to maintain building operations by Owner.
 - 2. Maintain exit requirements.
 - 3. Protect existing finishes, equipment and surfaces from damage due to construction or transporting materials through existing areas which will not require remodeling.
 - 4. Install temporary plywood to protect existing finishes and surrounding surfaces from damage. Repair damage caused to existing finishes and other items.
 - 5. Protect floors and others surface along hauling routes, and in or near demolition area from damage, wear and staining.
- J. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during constructions work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete
 - 1. Protect existing historic materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 - 2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by the Architect.



3.03 GENERAL DEMOLITION

- A. Demolition work shall be coordinated with Owner and receive a work plan approval before commencing daily work.
 - 1. Work plan must include work to be performed, tools to be used, date and times of work and anticipated disruptions to building occupants.
 - 2. Carry out demolition work to cause as little inconvenience to any adjacent occupied building or site areas as possible and with minimum interference to public or private accesses.
- B. Maintain protected egress and access at all times.
- C. Perform the removal, cutting, drilling, etc., of existing work with extreme care, and using small tools in order not to jeopardize the structural integrity of the building.
- D. Shore existing construction whenever existing supports are removed to allow the installation of new work.
- E. Cease operations immediately if adjacent structures or exterior envelope of building appear to be in danger. Notify authority having jurisdiction and Architect. Do not resume operations until directed by Architect.
- F. Rebuild existing work which must be removed to allow the installation of new work as indicated on the Drawings.
- G. Sawcut and remove existing concrete floor slab as required for new plumbing. Sawcut and remove existing masonry wall construction as required for new window and door openings. Perform cutting of existing concrete and masonry with saws and core drills. Do not use jack-hammers. Existing vapor barriers (if occurs) under existing floor slab and within wall construction shall be cut in a manner that will allow for lapping of new vapor barriers. Replacement of concrete slab shall be in accordance with Section 03 30 00. Masonry repairs shall be in accordance with Section 04 22 00.
- H. Use methods for removing debris as necessary to limit dust to lowest practicable level. "Smoke eater" dust collection systems shall be used as required to ensure that existing building occupants are not exposed to dust.
- I. Material Disposal: As follows.
 - 1. Remove materials from site and dispose of in accordance with the Waste Management Plan.
 - 2. No materials are to be sold on, or adjacent to, the site. Signs advertising the sale of materials shall not be allowed.
 - 3. Burning of materials on site is not permitted.
 - 4. Break concrete and masonry into sections less than 3 feet in any dimension, or as required by Recycling/Reuse Center.
 - 5. Remove from site, contaminated, vermin infested, or dangerous materials encountered and dispose of by safe means so as not to endanger health of workers and public.
 - 6. Debris from the demolition shall not be allowed to accumulate within the building or on the site.

3.04 SCHEDULES

- A. Relics, antiques, and similar objects shall remain the property of Owner. Obtain direction



regarding method of removal. Items shall be as noted on Drawings.

- B. Items to be removed, stored, and protected for re-installation shall be as noted on Drawings or as specified.
- C. Items to be removed and be retained by Owner; shall be as noted on Drawings.
- D. Items to be protected shall be as noted on Drawings.

END OF SECTION



SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Formwork for cast-in-place concrete, including, but not limited to:
 - 1. Shoring, Bracing and Anchorage, including openings for other Work
 - 2. Form Accessories
 - 3. Form Stripping.

1.02 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Drawings showing dimensions, materials, bracing, tie-hole layouts for exposed tie holes, and arrangement of joints and reveals for concrete exposed to view in the final work.
- B. Product Data: Provide data on accessory materials and installation requirements.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347R - Guide to Formwork for Concrete.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to site to prevent deterioration and damage.
- B. Deliver void forms and installation instructions in Manufacturer's packaging.
- C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.06 COORDINATION

- A. Coordinate this Section with other Sections of Work which require attachment of components to formwork.
- B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.



PART 2 PRODUCTS

2.02 FORM MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true and smooth concrete surfaces. Furnish in largest practical sizes to minimize number of joints. For exposed wall, coordinate form layout and form-tie spacing per Drawings and Section 03 33 00 – Architectural Concrete.
 - 1. Metal or other approved panel materials
 - 2. Medium Density Overlay: Exterior grade plywood panels suitable for concrete forms, single use only, Class 1 or better, mill-release agent treated and sealed.

2.03 FORMWORK ACCESSORIES

- A. Form Ties: Removable or snap-off type, free of defects that could leave holes larger than one inch in concrete surface. Fiberglass grip form ties shall not be allowed.
- B. Form Release Agent: Colorless, which will not stain concrete, or impair natural bonding or color characteristics of coating intended for use on concrete.
 - 1. General Requirements:
 - a. Vegetable-based, do not use petroleum-based agents. Paraffin and waxes shall not be used when a concrete finish is required.
 - b. 100 percent biodegradable, zero VOC.
 - 2. Acceptable Products and Manufacturers:
 - a. Enviroform as manufactured by Conspec® Marketing and Mfg. Co., Inc., Kansas City, KS (800) 348-7351, www.conspecmkt.com
 - b. Bio-Form as manufactured by Leahy-Wolf Company, Franklin Park, IL (888) 873-5327
 - c. Greenplus Form Release Agent ES as manufactured by M.J. Doud, Inc., Ennis, MT (888) 682-6040.
 - d. Soy Form Away as manufactured by Natural Soy, LLC, Watkins, IA (888) 655-0039, www.soysovl.com.
- C. Corners: Provide as indicated on Drawings. Where chamfered corners are indicated on Drawings, provide chamfer using wood strip type or vinyl bead; ½ inch by ½ inch size; maximum possible lengths.
- D. Flashing Reglets: Galvanized steel 22 gauge thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.



3.02 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil in pour cavity prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping.
- D. Consider the joint placement on formwork that will result in exposed concrete. Joint placement on formwork in exposed concrete shall be in accordance with Architect's directions. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval from Architect before framing openings in structural members which are not indicated on Drawings.
- F. Formwork for concrete elements installed over or adjacent to waterproofing membranes shall not be anchored through membrane. Use sandbags or other devices to hold formwork in place over or adjacent to waterproofing membranes.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with Manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate Work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors, and other inserts.
- D. Install accessories in accordance with Manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.



- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

- A. Clean and remove foreign matter within forms as erection proceeds.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

3.08 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that Work is in accordance with formwork design, and that support, fastenings, wedges, ties and items are secure.
- B. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Forms shall be removed in accordance with the requirements of the General Structural Notes.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Forms for vertical elements such as walls, columns, and pilasters shall not be removed or disturbed for at least 7 days from the date of last pouring.
- E. Forms for slabs, girders, beams and the like and retaining walls shall not be removed or disturbed for at least 14 days from date of last pouring. It may be required that such forms be left in place longer than the above specified period. The length of time they shall remain in place will depend on the system of forming and shoring, and the length of time shall in accordance with the requirements of the General Structural Notes.
- F. Formwork for stem walls and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage.
- G. Cure exposed concrete in accordance with 03 30 00 whenever the formwork is removed during the curing period.



3.10 REMOVAL STRENGTH

- A. When formwork removal is based on the concrete reaching its specified 28 day strength (or a specified percentage thereof), the concrete shall be presumed to have strength when either of the following conditions has been met:
 - 1. When test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the concrete represented, have reached the required strength.
 - 2. When the concrete has been cured for the same length of time as the age, at test, of laboratory cured cylinders which reach the required strength. The length of time concrete has been cured in the field shall be determined by the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50 degrees F. and the concrete has been damp or thoroughly sealed from evaporation and loss of moisture.

END OF SECTION



SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 QUALITY ASSURANCE

- A. Comply with ACI-301, Chapter 5, except where more exacting requirements are specified.
- B. Comply with requirements in AWS-D12.1, except where more exacting requirements are specified in the Contract Documents.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Drawings showing bending and placing of reinforcing. Include diagrammatic elevations of walls at a scale sufficiently large to show clearly the position and erection marks of marginal bars and their dowels and splices and bar arrangement for more than one layer of reinforcing steel in concrete sections.
- B. Certificates: Submit certified mill test reports for review prior to fabrication.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Shipping: Deliver reinforcement to the Project site bundled, tagged and marked to facilitate sorting and placing. Tags shall indicate bar sizes, lengths, grade and other information corresponding to markings shown on placement diagrams.
- B. Storage and Protection: Store reinforcement at the site off the ground and in a manner to prevent damage to the materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforcing Steel: New billet-steel, deformed bars conforming to ASTM A615, Grade 60, with a minimum yield of 60,000 psi for all reinforcing except:
 - 1. No. 2 bars: ASTM A615, Grade 40, with a minimum yield of 40,000 psi.
 - 2. Welded Wire Fabric: ASTM A185 using bright steel wire meeting the requirements of ASTM A82. Gauges and dimensions as noted on the Drawings. Provide flat sheets.
 - 3. Welded bars: ASTM A706.
 - 4. Welded anchors: ASTM A-108, Grade 60. See AWS specifications for welding without preheat.
 - 5. All reinforcing bars shall be deformed except #2 bars and wire mesh.
- B. Welded Wire Fabric: ASTM A185 using bright steel wire meeting the requirements of ASTM A82. Gauges and dimensions as noted on the Structural Drawings.
- C. Chairs: Galvanized steel or plastic tipped.
- D. Tie Wire: ASTM A82, 16 gauge or heavier, black annealed.



- E. Welding Rods: E-70 Series for A615 Grade 40 (ASTM A615M, Grade 300) reinforcing, and E-90 Series for A706 reinforcing; low hydrogen conforming to AWS A-5.1.

2.02 FABRICATION

- A. Shop fabricate bars as far as is practical. Bend bars cold. Make bends for stirrups and ties around pins having diameters at least 2 times the thickness of the bars; for other bars 1 inch diameter and smaller, 6 times the thickness; for larger bars 8 times the thickness.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Determine weldability of reinforcing steel by laboratory chemical analysis of steel. Only steel conforming to chemical requirements specified in AWS D12.1 may be welded.

3.02 PLACING REINFORCEMENT

A. General:

1. Place in accordance with ACI 318 and as shown.
2. Accurately place reinforcement and securely tie at intersections with 16 gauge black annealed wire.
3. Maintain reinforcing in proper position by chairs, bar supports or other approved devices.
4. Bars in footings shall be supported on precast concrete blocks.
5. The bending or field cutting of bars around openings or sleeves will not be permitted.
6. Reinforcing steel in beams and slabs shall not be placed until after concrete in walls and columns has been poured.

- B. Bars shall lap in accordance with General Structural Notes.

- C. Concrete protection of reinforcing shall be in accordance with General Structural Notes.

- D. Clear distance between bars shall be not less than 1-1/2 times the maximum size of coarse aggregate unless noted otherwise.

- E. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits or embedded items. If bars are moved more than one bar diameter or enough to exceed code tolerances, resulting arrangement of bars shall be subject to review of Architect.

- F. Bars with kinks or bends not indicated shall not be used. Reinforcement shall not be bent or be straightened in a manner that will weaken the material, or be bent after being partially embedded in hardened concrete.

G. Wire mesh in slabs:

1. Lap welded wire fabric at least 1-1/2 meshes plus end extension of wires but not less than 12 inches in structural slabs.
2. Lap fabric at least 1/2 mesh plus end extension of wires but not less than 6 inches in slabs on ground.
3. Extend mesh across supporting beams and walls.



3.03 CLEANING

- A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of off premises. Leave Work in clean condition.

END OF SECTION



SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Cast-in-place concrete including, but not limited to, the following:
 - 1. Building foundations and slabs on grade.
 - 2. Site structures including, but not limited to, site lighting supports, electrical and mechanical equipment support pads, and other site furnishing (benches) and equipment requiring cast-in-place concrete items.
 - 3. Cast-in-place concrete floor, wall and roof structures.
 - a. Interior above grade floor construction to have structural slab over metal deck.
 - b. Exterior above grade floor construction to have structural slab over metal deck with waterproofing and traffic slab.
 - 4. Poured in place concrete stair
- B. Related Sections:
 - 1. Section 03 10 00 – Concrete Forming
 - 2. Section 03 20 00 – Concrete Reinforcement

1.02 SUBMITTALS

- A. Mix Design: Submit mix design for each class of concrete to the Architect for review. Review of mix designs by Architect and/or Engineer shall in no way relieve the Contractor of responsibility for the performance of the concrete.
- B. Product Data: Submit Manufacturer's Specifications and performance data for accessory products.
- C. Shop Drawings: Submit shop drawing showing proposed location of construction joints, expansion/contraction joints and control joints and obtain approval of same from Architect prior to construction.
- D. Samples: Submit 4 inch long samples of expansion/contraction joint and control joint.
- E. Test Reports: Report test results of relative humidity and pH testing in chart form listing test dates and time, depth of test holes, in-situ temperature and in-situ relative humidity, as well as pH levels of concrete slab surface. List test hole locations on chart and show same on 8 ½ x 11 site map (when such map is made available to testing agency). Deliver results in duplicate for distribution to Architect and General Contractor.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 2. Manufacturer certified according to NRMCA's "Certification of Ready Mixed



Concrete Production Facilities.”

- B. Standards:
 - 1. Standard for measuring, mixing, transporting and placing of concrete shall be ACI-301 and ACI-304.
 - 2. Standard for measuring, mixing and delivery of ready mixed shall be ASTM C94, except that time in mixer after water has been added at batch plant is limited to 1-1/2 hours.
 - 3. Job-mixed concrete shall be subject to Architect's review of design, mixing and handling procedures.
- C. Field Samples:
 - 1. Provide on-site sample(s) of each type of exposed flatwork concrete finish showing texture and color before proceeding with finish to be used on this Project.
 - 2. Sample(s) shall be minimum 8'-0" square and have at least one longitudinal and one transverse joint.
 - 3. Construct sample panels in ample time to allow for finishing and curing before requesting Architect to review.
 - 4. Construct where directed by Architect and prepare successive sample panels as required until finish acceptable to Architect is produced.
 - 5. Since sample panels will constitute a basis of acceptance or rejection of the completed Work, do not remove sample panels until authorized in writing by the Architect. Dispose of sample panels in a legal manner when authorized.
- D. Pre-Installation Conference:
 - 1. Contractor shall conduct a meeting at Project site to review proposed mix designs and discuss required methods and procedures to achieve required concrete construction.
 - 2. Contractor shall distribute meeting agenda to all attendees a minimum of 7 days prior to the scheduled date meeting.
 - 3. Attendees: Responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
 - a. Contractor's superintendent.
 - b. Laboratory responsible for concrete design mix.
 - c. Laboratory responsible for field quality control.
 - d. Concrete subcontractor.
 - e. Ready-mix concrete producer.
 - f. Admixture manufacturer(s).
 - g. Concrete placement equipment manufacturer(s).
 - 4. Meeting minutes will be taken by the Contractor for distribution to all attendees within 5 days of meeting. Contractor shall also distribute copy of meeting minutes to Owner, Structural Engineer, and Architect.
 - 5. Minutes shall include statement by concrete subcontractor indicating proposed mix design, placement, finishing and curing procedures can produce the concrete quality required by these specifications.

1.04 PROJECT CONDITIONS

- A. Rain protection: Do not place concrete during rain unless adequate protection has been provided.
- B. Cold weather protection: Comply with ACI-306R.
- C. Hot weather protection: Comply with ACI-305R.



PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ASTM C150, Type II, alkali content not to exceed 0.6 percent. Use one brand and type of cement throughout Project unless otherwise specified.
- B. Aggregate - Structural Concrete: Clean, coarse aggregate and gravel, free from foreign matter, conforming to ASTM C33. Aggregate shall be graded from coarse to fine in accordance with ASTM C33, Size 67.
- C. Admixtures:
 - 1. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures. Provide one of the following:
 - a. AEA-92 and Air 40, Euclid Chemical Co. www.euclidchemical.com
 - b. Sika AER, Sika Corp. www.sikaconstruction.com
 - c. Master Builders MB-VR or MB-AE, BASF Admixtures www.basf-admixtures.com
 - 2. Water-Reducing Admixture: ASTM C494, Type A, and containing not more than 0.05 percent chloride ions. Provide one of the following:
 - a. Eucon NW or Eucon WR 91, Euclid Chemical Co.
 - b. Master Builders Pozzoloth 322N, BASF Admixtures
 - c. Plastocrete 160, Sika Chemical Corp.
 - 3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or Type G and containing not more than 0.05 percent chloride ions. Provide one of the following:
 - a. Eucon 37/Eucon 1037, or Plastol Series, Euclid Chemical Co.
 - b. Daracem 100 or ADVA Flow, W.R. Grace & Co.
 - c. Master Builders Rheobuild 1000 or Glenium 3030, BASF Admixtures.
 - 4. High-Range, Water-Reducing, and Retarding (Superplasticizer): ASTM C 494, Type G. Provide one of the following:
 - a. Eucon 537, Euclid Chemical Company
 - b. Daracem 100, W.R. Grace & Co.
 - c. Master Builders Rheobuild 916, BASF Admixtures
 - 5. Non-Chloride, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Provide one of the following:
 - a. Accelguard 80, 90 or NCA, Euclid Chemical Co.
 - 6. Water-Reducing, Retarding Admixture: ASTM C494, Type D, and contain not more than 0.05 percent chloride ions. Provide one of the following:
 - a. Eucon NR or Eucon Retarder 100, Euclid Chemical Co.
 - b. Master Builders Pozzoloth Retarder, BASF Admixtures.
 - c. Plastiment, Sika Chemical Co.
 - 7. Fly ash admixture: In accordance with Section 03 05 05.
 - 8. Use set-retarding admixtures during hot weather only when approved by Architect.
 - 9. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.
- D. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III, Performance



Level 1 meeting physical property requirements of General Structural Notes.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fiberstrand 100, Euclid Chemical Co.
 - b. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.
 - c. Forta, Forta Corp.
 - d. Grace Fibers, W.R. Grace & Co.

E. Water: Potable.

F. Coloring Agent:

1. ASTM C979.
2. As manufactured by Frank Davis Company or L.M. Scofield Company or Solomon Grind-Chem Service, Inc. . Provide colors as selected by Architect.
3. Color weight shall not exceed 10% of the weight of the cement.
4. Colors:
 - a. As indicated on Drawings or as selected by Architect.
 - b. If no color is identified, Contractor shall confirm with Architect that standard gray concrete is to be provided.

2.02 ACCESSORIES

A. Waterstops: Volclay Waterstop-RX 101T installed in all applicable vertical and horizontal concrete construction cold pour joints and around applicable penetrations. Refer to Waterstop-RX Product Manual for further installation procedures and guidelines.

B. Bonding Agents and Repair Products:

1. Interior Only (PVA): L&M Construction Chemicals EVERWELD www.lmcc.com; EucoWeld, Euclid Chemical Company www.euclidchemical.com; US Spec Bondcoat PVA www.usspec.com; or Larsens' Weld Crete www.larsenproducts.com
2. Interior Only for Bonding Existing Concrete to Fresh Concrete (Epoxy): Sikadur 32, Hi-Mod, Sika www.sikausa.com; Euco 452 Series, Euclid Chemical Company www.euclidchemical.com; Maxi-Bond 2500, US Spec www.usspec.com; or Rezi-Weld, W.R. Meadows www.wrmeadows.com.
3. Exterior and Interior Bonding Admixture (acrylic latex): SBR Latex or Flexcon Euclid Chemical Company www.euclidchemical.com; Intralok, W.R. Meadows www.wrmeadows.com; Acylcoat, US Spec www.usspec.com; or Dayton Bond J40, Dayton Superior www.daytonsuperior.com.
4. Polymer Repair Compounds: Polymer and microsilica modified cementitious based compounds.
 - a. Horizontal Locations:
 - 1) Sikatop 121 or 122, Sika Chemical www.sikausa.com
 - 2) Thin Top Supreme, Concrete Top Supreme, Euclid Chemical Company www.euclidchemical.com
 - 3) TP Mortar, US Spec www.usspec.com
 - b. Vertical or Overhead Locations:
 - 1) Sikatop 123, Sika Chemical
 - 2) V/O Patch, US Spec
 - 3) Verticoat, Verticoat Supreme, Concrete Top Supreme, Euclid Chemical Company
5. Underlayment Topping: Free-flowing, self-leveling, pumpable cementitious base compound.
 - a. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - 1) Ardex K-15, Ardex Inc.



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- 2) Flo-Top or Super Flo-Top, Euclid Chemical Company
 - 3) Self-Leveling Underlayment, US Spec
 - 4) Underlayment 110, BASF
 6. Repair Topping: Latex modified, sandless cementitious mortar topping with bond strength meeting or exceeding requirements of ASTM C1059.
 - a. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - 1) Thin Top Supreme, Euclid Chemical Company
 - 2) TP Mortar, US Spec
 - 3) As approved by Architect.
- C. Non-Shrink Grout:
1. Premixed or prepackaged, non-metallic, non-gaseous, bleed free compound; non-shrink when tested in accordance with ASTM C 1107, Grade B at a fluid (flow cone) consistency of 20 to 30 seconds.
 2. Attain minimum compressive strength of 7,000 psi in 28 days at above fluid consistency.
 3. Fluid grouts: Remain workable, flow through flow cone after 20 minutes with slight agitation, in temperatures from 40 to 70 degrees F.
 - a. Acceptable manufacturer and products: Suregrip High Performance, Dayton Superior, www.daytonsuperior.com; Sikagrout 212, Sika www.sikausa.com, Master Builders (Masterflow 713) www.masterbuilders.com, W.R. Meadows No. 588 Grout www.wrmeadows.com, L&M Construction Chemicals (DURAGROUT) www.lmcc.com, US Spec "GP Grout" www.usspec.com, and Euclid N-S Grout www.euclidchemical.com.
 4. High Flow Fluid Grouts: High flow grout shall achieve 95 percent contact when placed under an 18 inch x 36 inch base plate, remain workable, and flow through cone after 60 minutes in temperature from 70 to 90 degrees F.
 - a. Acceptable manufacturers and products: Hi-Flo Grout, Euclid Chemical Company www.euclidchemical.com; US Spec "MP Grout" www.usspec.com; or Chemrex Masterflow 928, BASF www.chemrex.com
- D. Epoxy Anchoring Adhesive: 2-component, high modulus, 100 percent solids epoxy gel adhesive complying with ASTM C881.
1. Acceptable manufacturer's and products: Dayton Superior, Sure-Anchor Epoxy J-50 www.daytonsuperiorchemical.com; W.R. Meadows Rezi-Weld 1000 State www.wrmeadows.com; Sika, Sikadur 31, Hi-Mod Gel www.sikausa.com; Simpson Set-XP www.strongtie.com
- E. Formed Construction Joint: Standard design plastikey, tongue and groove key joint; 3-1/2inch vertical dimension for 4 inch slabs. For use only in slabs not exposed to vehicular traffic.
- F. Preformed Expansion Joint Filler: ASTM D1751.
- G. Liquid Curing and Sealing Compound: Not applicable.
- H. Sealer: VOC compliant, acrylic copolymer type. Penetrating sealers on exposed interior concrete floors shall be compatible with Waxie "Floorstar" products.
1. Interior: ASTM C1315, Class B. Provide one of the following:
 - a. VOCOMP-30, W. R. Meadows.
 - b. Euclid Super Aqua Cure VOX, Euclid Chemical Company.
 - c. Dress & Seal WB #30, L&M Construction Chemicals.



- d. J-19, Dayton Superior.
- 2. Exterior: ASTM C1315, Class A. Provide one of the following:
 - a. Euclid Super Diamond Clear VOX, Euclid Chemical Company.
 - b. Lumiseal WB, L&M Construction Chemicals.
 - c. VOCOMP-30, W. R. Meadows.
 - d. Radiance UV-25, US Spec.
- I. Light-Duty Dust-Proofing:
 - 1. Magnesium fluosilicate: Burk-O-Lith, L&M Construction Chemicals FluoHard, Sonneborn Lapidolith, Euclid Surfhard, Dayton-Superior J-15 Day Chem Hardener or W.R. Meadows Penolith.
 - 2. Sodium silicate: L&M Construction Chemicals Chem Hard, W.R. Meadows Dustgard or Cure-Hard, Dayton-Superior J-13, Sonneborn Sonosil, Euclid Eucosil, or US Spec Permasil..
- J. Leveling Agent: Sonneborn Sonoflow, Euclid Flo-Top, Ardex K-15, L&M Construction Chemicals Levelx, US Spec "Self-Leveling Underlayment, or Dayton-Superior Levelayer 1 are acceptable products.
- K. Vapor Barrier/Retarder: To be provided or as required and coordinated with Architect or as indicated on Drawings.
- L. Concrete Accessories: Gateway Engineering Company, Dayton-Superior Corporation, or Burke Concrete Accessories.
- M. Evaporation Retarder:
 - 1. Type: Monomolecular film, compatible with subsequent coatings and floor finishes.
 - 2. Acceptable Manufacturer and Products: L&M Construction Chemicals (E-Con), Master Builders (Confilm), Sika (Sika Film), W.R. Meadows (Evapre), US Spec (Monofilm ER), or Dayton Superior (Surefilm J-74). U.S. Spec "Top-Etch."

2.03 MIXES

- A. Design of Mixes: All mix designs shall be prepared in accordance with ACI 318-05, "Building Code Requirements for Structural Concrete", Section 5.3, "Proportioning on the Basis of Field Experience or Trial Mixtures".
- B. Selection of proportions for normal weight concrete: ACI 301.
- C. Mix and deliver ready-mixed concrete in accordance with requirements of ASTM C94, Option A.
 - 1. Not more than 90 minutes shall elapse from time water is introduced into the concrete mixture until completion of placement.
 - 2. Do not add water to mix that has stiffened to increase its workability.
 - 3. At no time shall concrete mix exceed a bulb thermometer reading of 90 degrees F. or over.
 - 4. Use ice or other method as reviewed by Architect, to keep concrete below 90 degrees F. temperature.
- D. All concrete must contain the specified water-reducing admixture or the specified high-range water-reducing admixture (superplasticizer). All thin concrete slabs, less than 8 inches in thickness placed at air temperatures below 50 degrees F shall contain the specified non-corrosive, non-chloride accelerator. All concrete slabs placed at air temperatures above 90 degrees F may require the use of a water reducing retarding



admixtures.

- E. All concrete required to be air entrained shall contain an approved air entraining admixture. All pumped concrete, concrete for industrial slabs, architectural concrete, self-consolidating concrete, concrete required to be watertight or concrete with a water/cement ratio below 0.50 shall contain the specified high-range water-reducing admixture (superplasticizer).
- F. Durability Requirements - Water/Cementitious Ratio:
 - 1. All concrete subject to freezing and thawing shall have a maximum water/cementitious ratio of 0.50 (4000 psi at 28 days or more).
 - 2. All concrete subjected to deicers, sulfates, and/or required to be watertight shall have a maximum water/cementitious ratio of 0.45 (4500 psi at 28 days or more).
 - 3. All reinforced concrete subjected to brackish water, salt spray or deicers shall have a maximum water/cementitious ratio of 0.40 (5000 psi at 28 days or more).
 - 4. Water-cement ratio for concrete used for interior slab on grade construction: 0.40 to 0.45.
- G. Air Entraining Admixture: All concrete exposed to freezing and thawing and/or required to be watertight shall have an air content of 4.5 to 7.5 percent in accordance with ACI 212.3R. All interior, slabs subject to vehicular abrasion, shall have a maximum air content of 3 percent.
- H. Compressive strength (28 day): As shown on Drawings.
- I. Slump (For consolidation by vibration): As shown on Drawings.
- J. Mix coloring agent for integrally colored concrete in strict compliance with the Manufacturer's printed instructions
- K. Fiber Reinforcement: Add at manufacturer's recommended rate but not less than 1.5 lb/cu. Yd. Provide fiber reinforcement for cast-in-place concrete floor slab construction on grade and above grade.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prior to placing concrete:
 - 1. Clean equipment involved.
 - 2. Remove debris and foreign material from the forms.
 - 3. Remove concrete laitance from reinforcing steel.
 - 4. Wet wood forms and masonry units in contact with concrete.
- B. No wood other than built-in bucks or nailing blocks will be permitted to remain permanently inside the forms.
- C. Coordinate the necessary Trades as required to provide the sleeves, bolts, anchors, holes, etc., to be built in.

3.02 PLACING OF CONCRETE

- A. Concrete Work shall be performed in accordance with ACI-301 except as amended by this



Section.

- B. Convey concrete from the mixer to place of final deposit by methods which will prevent segregation of aggregate or loss of material. Place concrete at such a rate that concrete is at all times plastic and to insure a practically continuous flow of concrete. Concrete not in place 1-1/2 hours after water has been added at batch plant may be rejected by Architect.
- C. Place concrete as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Do not deposit concrete that has partially hardened or been retempered.
- D. Do not place concrete during rain unless adequate protection has been provided.
- E. Thoroughly compact concrete by suitable means during the placing, and work around the reinforcement and embedded items into the corners of the forms.
 - 1. Use vibrators to aid in the placement of the concrete, operated by experienced personnel.
 - 2. Keep at least one spare operating vibrator on the job at all times during the concrete operations.
- F. Self-Consolidation concrete does not require vibration.
- G. Set reinforcing dowels connecting new concrete construction to existing with epoxy anchoring adhesive as indicated on Structural Drawings.
- H. Column penetrations through slabs shall be initially blocked out in a diamond shape and infilled afterwards.

3.03 CONSTRUCTION JOINTS, EXPANSION/CONTRACTION JOINTS AND CONTROL JOINTS

- A. Construction Joints: Provide as required to facilitate construction in accordance with reviewed shop drawings.
- B. Waterstops: Provide waterstops at joint between below grade utility vault connection to existing tunnel running below building. Install waterstops to form a continuous diaphragm in each joint. Make provisions to support and protect waterstops during the progress of the work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions. Protect waterstop material from damage where it protrudes from any joints.
- C. Expansion and Contraction Joints: Place expansion and contraction joints where required to ensure that undesirable thermal and shrinkage cracking of slabs is minimized.
 - 1. See Drawings for locations of expansion and contraction joints in slabs-on-grade and in topping pours.
 - 2. If drawings do not indicate locations, verify with Architect prior to placement of slabs-on-grade and topping pours.
 - 3. Utilize early entry saw-cutting techniques using specialized equipment and procedures in accordance with the manufacturer of the saw-cutting equipment to saw-cut all joints in interior and exterior slabs within 2 hours of final finishing of the floor slabs while the concrete is still in its early green state.
 - a. Acceptable Equipment: Soff-Cut International, Inc., Corona, CA 1-800-776-3328 www.soffcut.com
 - 4. At exterior slabs-on-grade provide a 1/2 inch wide expansion joint wherever slabs abut vertical construction elements whether indicated or not.



- D. Additional reinforcing may be required at some construction, expansion/contraction and control joints, and shall be supplied and installed at no additional cost.
- E. Reinforcing shall be continuous through construction joints of reinforced slabs, unless otherwise indicated on Drawings. Placement schedule shall be submitted for approval.
- F. No concrete pour shall be longer than 100 feet or more than 4,000 square feet in area, unless early entry saw-cutting techniques are utilized for placement of joints in the slab while the concrete is still in a green state and prior to the slab developing expansion/contraction cracking at random location. Provide shear keys as detailed.
- G. Provide support of formed construction joint materials by means that does not puncture or otherwise damage under floor vapor retarder at interior floor slabs on grade.

3.04 CONCRETE FINISHES – GENERAL

- A. Concrete Finish:
 - 1. Exposed floor:
 - a. Ground Concrete (where indicated on Drawings): In accordance with Section 03 35 36 - Polished Concrete Floor Finish.
 - b. Other locations: Hard steel trowel finish in compliance with Class 5 requirements per Table 3.14.2(a) of ACI 301 without topping.
 - 2. Under carpet, thin set ceramic tile, and resilient flooring: Steel trowel finish. Floors shall conform to ASTM F710-11 – Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 - 3. External concrete ramps: As indicated on Hardscape Drawings.
 - 4. Driveways and parking lots: Stiff broom finish.
 - 5. Stair treads and all other paving: Light broom finish.
 - 6. Hardscape to have finish(es) as indicated on hardscape drawings.
- B. Concrete Walls (exposed to view in final work): In accordance with Section 03 33 00 – Architectural Concrete.

3.05 FINISHING VERTICAL (FORMED) SURFACES

- A. Formed surface finishes:
 - 1. Pits, tunnels, mechanical rooms and concealed surfaces: Remove fins, patch tie holes.
 - 2. Interior exposed surfaces and exterior exposed surfaces: To be provided with Architectural Finish in accordance with Section 03 30 00. No patching or additional finishing shall be provided except as specifically directed by Architect.
 - 3. Exposed elements: Removal all scale. Make ready and provide preparation as required for acceptance of finish primer, paint, and/or seal.

3.06 FINISHING HORIZONTAL SURFACES

- A. Rake concrete into place, screed and compact with a light tamp, except do not tamp topping and slabs not on grade. Screed with sawing motion and float surface to bring fines to the top.
- B. Mix and apply evaporation retarder in accordance with manufacturer's printed instructions immediately after floating. In extreme drying conditions, apply additional material as



needed. Apply lightly on hard to trowel floor areas.

- C. When concrete has hardened sufficiently so that excess fines will not be brought to the surface, trowel slab with a steel trowel to a smooth surface free of pinholes and other imperfections. A mechanical trowel with rotating steel blades, approved by Architect, may be used for this operation.
- D. After the surface has hardened sufficiently to ring under a trowel, trowel again with a steel trowel to a hard, burnished surface free of blemishes. A mechanical rotating trowel will not be permitted for this operation.
- E. Concrete slabs scheduled to receive ceramic tile or similar finishes shall have a screeded finish but true and even to plane with no sharp projections or ridges.
- F. Use a small radius edger (1/4 inch maximum) on edges of exposed Work. Use a deep cut sawcutting to provide scoring for control joints as indicated unless otherwise noted or directed.
- G. Exterior flatwork:
 - 1. Confirm with Infrastructure Project Team for flatwork outside of 5'-0" of building.
 - 2. Finish in accordance with Hardscape Drawings, including exposed aggregate finish.
- H. Finished floors to meet 1/4 inch in 10 feet tolerance unless noted otherwise. Floors scheduled to receive thin-set tile applications shall meet 1/8 inch in 10'-0" tolerance.

3.07 SLABS

- A. Sawcutting of joints shall be reviewed and approved with Architect prior to performing work. Saw cut control joint pattern indicated on Drawings. Use 3/16 inch thick blade, cutting 1/4 of depth of slab thickness.
- B. Slabs shall be depressed (dished) 1/2" deep around all floor drains for a minimum radius of 4'-0".
- C. For slabs on grade, slope to drains 1/4 inch per foot nominal across entire room or area to be drained.

3.08 SPECIAL FINISHES

- A. General:
 - 1. Obtain cement and aggregates from a single source for specialty concrete finishes to provide uniformity in appearance and color.
 - 2. Place concrete at a maximum slump of 5 inches. Rake concrete into place, screed and float. Do not tamp.
- B. Integral Colored Concrete
 - 1. Provide cement, aggregate, and pigment as required to produce consistent colors matching approved mock-up using the materials specified.
 - 2. Plant-Mixed Concrete: Schedule delivery of concrete to provide consistent mix times from batching until discharge.
 - 3. Concrete Paving: Schedule placement to minimize exposure to wind and hot sun before curing process is initiated. Avoid placing concrete if rain, snow or frost is



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- forecast within 24 hours. Protect fresh concrete from moisture and freezing.
- 4. Formed Surfaces
 - a. Stripping: Leave forms in place as long as practical. Remove forms when concrete has reached a consistent age to maintain uniformity of curing conditions throughout Project.
 - b. Sandblasted Finish (if noted on drawings): Allow concrete to cure to sufficient strength that it will not be damaged by blasting but not less than seven days.
- 5. Floors and Paving
 - a. Broomed Finish: Do not dampen brooms.
 - b. Trowel Finish: Do not over-trowel or start troweling late.
- 6. Patching Concrete: Coordinate areas to be patched with Architect. Do not proceed with patching without Architect's approval. If patching is approved by Architect, conform to the following requirements:
 - a. Fill holes and defects in concrete surface within 48 hours of form removal.
 - b. Use the same patching materials and techniques that were approved on mock-up.
 - c. Make patches with a stiff mortar made with materials from the same sources as the concrete. Adjust mortar mix proportions so dry patch matches dry adjacent concrete. Add white cement to mortar mix if necessary to lighten it.
- 7. Curing
 - a. Maintain concrete between 65 and 85 F degrees during curing.
 - b. Cure concrete as specified elsewhere herein.
- 8. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of unpigmented concrete, are acceptable.

C. Ground concrete floor finish: In accordance with Section 03 35 36.

D. Protection: Protect specially finished concrete slabs from damage, by covering with a one inch layer of clear, dry sand. Provide planking whenever scaffolding or wheeled equipment may be required to be erected over slabs. Damage to slabs prior to acceptance of the Work will be cause for rejection of slabs and replacement will be required.

3.09 REPAIR OF SURFACE DEFECTS

- A. Modify or replace concrete not conforming to required lines, detail and elevations.
- B. Repair or replace concrete not properly placed, resulting in excessive honeycombing and other defects. Do not patch, repair or replace exposed architectural concrete except upon express direction of Architect.
- C. After forms are removed, fill tie rod holes, correct honeycomb spots, remove fins and clean and finish damaged surfaces. Wipe off excess mortar and rub to match adjoining surfaces.
- D. When excessive honeycombing is revealed, remove the defective material immediately after stripping forms to a depth of 3/4 inch to 1 inch. Cut edge of area perpendicular to surface to avoid feathered edges. Saturate with water for several inches beyond cutout and brush-in a grout consisting of equal parts Portland cement and sand. Follow immediately with the patching mortar. Leave the patch slightly higher than the surrounding surface. After an hour or two, finish flush with the adjoining surface. Wipe and rub patch to match adjoining surfaces. Keep patches moist for 7 days.
- E. Patching mortar shall consist of the same materials and proportions as the original concrete



except that the coarse aggregate shall be omitted. When color match is required, adjust mixture to produce a finished color to match the adjoining concrete surfaces.

- F. Cracks caused by expansion, shrinkage and the like that occur in natural color concrete up through final acceptance of building shall be carefully patched with floorstone, epoxy grouting mortar or other method acceptable to the Architect.

3.10 CURING

- A. Protect freshly deposited concrete from premature drying and maintain without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
- B. Curing Timing and Method:
 - 1. Cure concrete surfaces receiving finish materials, including, but not limited to; cementitious toppings, paint, and flooring, immediately after finishing operations.
 - 2. Keep concrete continuously moist for at least 7 days using a sheet membrane conforming to ASTM C171.
- C. Prevent rapid drying of the concrete at the end of the curing period.
- D. During the curing period, protect the concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibrations. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods.

3.11 UNDERLAYMENT OR REPAIR TOPPING

- A. Apply underlayment or repair topping to correct unsatisfactory floor surface due to undue settlement or failure to meet tolerance requirements.
- B. Slab surface preparation and placing procedures shall be approved by the underlayment and/or repair topping manufacturer and Architect prior to start of installation.
- B. Installation: Install underlayment and/or repair topping materials in accordance with Manufacturer's published instructions and recommendations.

3.12 FLOOR SEALER

- A. At areas indicated on Drawings, provide 2 coats of sealer.
- B. Sealer or finish should be applied immediately upon completion of curing in order to protect floors during construction and then cleaned and reapplied prior to final acceptance.
- C. Prior to application of sealer, floors shall be cleaned with a "side by side" machine, wet vacuum and rinsed. Surface must be clean, dry and free of loose dirt, oil, wax, parting compounds and other foreign matter.
- C. Apply each coat in accordance with Manufacturer's printed instructions.



3.13 FLOOR HARDENER

- A. Where indicated on Drawings, provide one coat of hardener, unless otherwise recommended by manufacturer.
- B. Surface must be clean, dry and free of loose dirt, oil, wax, sealers, parting compounds, and other foreign matter.
- D. Apply each coat in strict accordance with Manufacturer's instructions.

3.14 FIELD QUALITY CONTROL

- A. Tests: Inspection and testing of concrete mix will be performed by a testing laboratory in accordance with Section 01 45 00.
 - 1. Provide free access to Work and cooperate with appointed firm.
 - 2. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
 - 3. Four concrete test cylinders shall be taken for every 100 or less cubic yards of concrete placed. One cylinder shall be tested after 7 days for information. Test two cylinders after 28 days. Hold one cylinder for additional information, as required.
 - 4. Take one additional test cylinder during cold weather concreting, and cure on job site under same conditions as concrete it represents.
 - 5. Take one slump test for each set of test cylinders taken.
 - 6. Concrete which does not meet the compressive strength requirement at 28 days will be rejected and removed from the Project, and disposed of in a legal manner.
- B. Concrete In-Situ Relative Humidity and pH Testing: Provide testing in accordance with ASTM F2170-11– Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes and as follows.
 - 1. Provide in-situ concrete relative humidity and surface pH testing to all concrete specified to be covered with floor coverings or resinous coatings, including concrete placed below, on and above grade.
 - 2. Testing shall take place after allowing concrete to dry for a minimum of 28 days. Testing is to be scheduled no less than 1 and no more than 6 weeks prior to scheduled flooring installation.
 - 3. Equipment:
 - a. Provide Digital “Reader” and calibrated relative humidity sensors
 - 1) Factory-calibrated “Smart Sensors” using Touch-n-Sense™ technology.
 - 2) NIST-traceable factory calibration
 - 3) Rapid RH® relative humidity and temperature sensor kit as manufactured by Wagner Meters (800) 634-9961, or equal.
 - b. Wide range pH paper, and distilled or de-ionized water.
 - 1) pH test paper as manufactured by Micro Essential Laboratory, or equal.
 - 4. Conduct relative humidity and pH testing after HVAC system has been in continuous use for 36 hours with a minimum ambient temperature of 72 degrees F. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature is NOT acceptable.
 - 5. Quantification of Relative Humidity at 40% of Concrete Thickness
 - a. The test site shall be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These



- temperature and humidity levels should be maintained for 48 hours prior and during test period. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
- b. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet, and 1 per each additional 1,000 square feet.
 - c. Determine the thickness of the concrete slab, typically from construction documents.
 - d. Utilizing a rotary-hammer drill, drill test holes to a depth equal to 40% of the concrete thickness, i.e., 2" deep for a 5" thick slab, or 1.6" deep for a 4" thick slab.
 - 1) Elevated structural slab (not poured in pans) should be tested at a depth equal to 20% of its thickness.
 - 2) Hole diameter shall not exceed outside diameter of the probe by more than 0.04".
 - 3) Drilling operation must be dry.
 - e. Vacuum and brush all concrete dust from test hole.
 - f. Insert a relative humidity probe (sensor) to the full depth of test hole. Place cap over probe.
 - g. Permit test holes with probes to acclimate, or equilibrate for 72 hours prior to taking relative humidity readings.
 - h. Remove the cap, insert the cylindrical reading device, and obtain reading from the in-situ probe.
 - i. Read and record temperature and relative humidity in each test hole.
6. Quantifying pH level:
- a. At or near the relative humidity test site perform pH test.
 - 1) Place several drops of water onto the concrete surface to form a puddle approximately one inch in diameter.
 - 2) Allow the water to set for approximately 60 seconds
 - 3) Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading
 - b. Record and report results.
7. Document test results and provide copy to Architect with a marked up floor finish plan showing test results.
8. Provide a written clarification on status of HVAC system before and during the test and the length of time the ambient air temperature was maintained before the tests.

3.15 PROTECTION

- A. Protect finished surfaces from stains or abrasions. Protect surfaces or edges by leaving forms in place or by providing temporary covers. Protect concrete from rain, flowing water or mechanical injury.
- B. Protect floor slabs from the droppings of plaster, paint, dirt, and other marring by covering with acceptable floor protection covering, well lapped and sealed. Polyethylene plastic sheet may create condensation and/or alkali staining of concrete surface and its use shall be carefully considered.
 1. Method used to hold protective sheets and coverings in place where slabs comprise the finished surface shall not leave permanent discoloration. Duct tape (and other similar adhesive tapes) shall not be used to hold coverings in place on floor slabs that will remain exposed in the final work.



2. Where concrete slabs are scheduled to be the finished floor surface, or where slab is treated with a special concrete finish serving as the finished floor surface, provide a continuous covering of 1/2 inch particle board, joints tightly butted and cut to sizes tight to wall construction, over entire floor area with Owner approved acceptable floor protection sheeting.
 - a. Particle board (wood and agrifiber products) must contain no added urea-formaldehyde resins.
 - b. Maintain covering (protective sheeting and particleboard) in good condition until danger of damage is past.

3.16 CLEANING

- A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION



SECTION 04 05 15

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SUMMARY

- A. Mortar and masonry grout for CMU wall construction.

1.02 SUBMITTALS

- A. Mix Designs: Submit mix designs and samples to the Architect for review prior to delivering materials to the site or commencing the Work.
 - 1. Mortar Mix Design: Furnish in accordance with ASTM C270.
 - 2. Grout Mix Design: Furnished by either the grout supplier or an independent testing laboratory. Submit comprehensive strength data with mix design submittals when pozzolans are used.
- B. Product Data: If alternative mortar materials are to be provided, submit current instructions stating the actual quantities and mixing instructions for alternative mortar materials to conform to specified requirements.
 - 1. Submit test report data substantiating compliance with specified performance requirements.
 - 2. Submit current ICC Evaluation Report.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Cementitious materials shall be stored off the ground, under cover and shall be kept dry.
- B. Preblended Mortar Mix Delivery System: The use of dry preblended mortar silos and bulk bags shall be acceptable. Bulk bags and silos shall be sealed to prohibit contamination of the ingredients and to keep the materials dry until mixed.

1.04 PROJECT/SITE CONDITIONS

- A. Physical Requirements for Proper Installation or Application:
 - 1. Hot Weather Requirements: Wet mortar board before loading and cover mortar to retard drying when not being used.
 - 2. Cold Weather Requirements: In accordance with "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" by IMIAC; provide adequate equipment for heating the mortar and grout materials, when air temperature is below 40 degrees F.. Temperatures of the separate materials, including water, shall not exceed 140 degrees F. when placed in the mixer. When air temperature is below 32 degrees F., maintain mortar temperature on boards above freezing.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mortar:
 - 1. Cement: Type II Portland cement conforming to ASTM C150.



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2. Aggregate: Clean, sharp and well graded and free from injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter, conforming to ASTM C144, except that no less than 3 percent nor more than 10 percent shall pass a No. 100 sieve.
3. Hydrated Lime: ASTM C207, Type S.
4. Water: Clean and potable.
5. Admixtures:
 - a. Chemical: The use of accelerator admixtures, water reducing plasticizers and other chemical admixtures shall not be allowed.
 - b. Mineral: In accordance with Section 03 05 05
 - c. Water-Repellent Admixture: In accordance with Section 04 05 26.
 - d. Alternative Plasticizer: Pozzolanic formulation consisting of a combination of hydroxy aluminum silicates and diatomite:
 - 1) Alternative Plasticizer Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
 - 2) Mortar mix design shall be in accordance with ICC Evaluation Report, in accordance with the mortar type specified elsewhere in this specification.
 - 3) Provide alternative plasticizer in accordance with manufacturer's printed instructions, including specific mixing instruction.
 - 4) No other admixtures shall be used in conjunction with the alternative plasticizer unless approved in writing by the alternative plasticizer manufacturer.
 - 5) Packing and Shipping: Mortar admixture(s) shall be delivered to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.

- B. Grout:
 1. Cement: Type II Portland cement conforming to ASTM C150.
 2. Aggregate: ASTM C404 and as follows:
 - a. Sand: Size No. 1 for fine aggregate.
 - b. Pea Gravel: Size No. 8 for coarse aggregate.
 3. Water: Clean and potable.

2.02 MIXES

- A. Mortar: ASTM C 270, Type S.
 1. Measurement: Accurately measure materials by ASTM C270 by the Proportions Method per Table 1.
 2. Mix cementitious materials and aggregates 3 to 5 minutes in a mechanical mixer. Small amounts of mortar may be mixed by hand. Adjust consistency of the mortar depending on the absorptive quality of the units being laid, and to the satisfaction of the mason.
 3. If mortar begins to stiffen, it may be retempered by adding water within a basin formed by the mortar, and remixing.
 4. Use within 2-1/2 hours of initial mixing and no mortar shall be used after it has begun to set or after it has become harsh or non-plastic.
 5. Water-Repellent Admixture: In accordance with Section 04 05 26. Provide for those areas where mortar is exposed to the exterior.
 6. Preblended Mortar Mix: Provide mortar as specified herein, except that dry ingredients may be preblended and bulk packaged for delivery to a jobsite silo (which loads into batch mixer) or bagged for hand loading into mixer. Moisture shall be extracted from sands. Digital printouts displaying the proportions of each batch shall be submitted to the Architect upon request. Mixing shall be accomplished by mechanical mixer in accordance with instructions provided by



Preblended Mortar Mix Distributor.

- B. Grout:
 - 1. Job-Site Mixed: In accordance with ASTM C476.
 - 2. Transit-Mixed:
 - a. Designed by the supplier or an independent testing laboratory with a minimum compressive strength of 2000 psi (140MPa) in 28 days, unless higher strength is required by the Structural Drawings and Notes.
 - b. Slump: Not to exceed 8 inches, unless otherwise noted on Drawings.
 - c. Use within 1-1/2 hours of initial mixing and use no grout after it has begun to set or after it has become harsh or non-plastic.
 - d. Course grout may be used in cavity walls with a horizontal dimension of 2 inches or more, and in hollow cell construction 4 inches or more in both horizontal directions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation of mortar and grout shall be as specified under Section 04 22 00 – Concrete Unit Masonry.
- B. Temperature: Mortar and grout shall have a temperature between 50 degrees F. and 90 degrees F. while being used.
- C. Grout may be poured by hand bucket, concrete hopper or through a grout pump. Grout spaces shall not be wet down prior to pouring grout.

3.02 FIELD QUALITY CONTROL

- A. General: Tests and inspections as necessary to verify quality and strength of mortar and grout. Laboratory tests shall conform to applicable ASTM standards and tests.
- B. Tests:
 - 1. Frequency: As determined by the Architect based upon total time for construction of masonry with not less than two tests per each level of masonry construction, foundation to roof or floors.
 - 2. Testing Laboratory: Inspection and testing of concrete mix will be performed by a testing laboratory in accordance with Section 01 45 00. The testing laboratory, in addition to meeting requirements of ASTM E329, must be an approved laboratory competent to perform cement physical testing.
 - 3. Distribution of Results of Tests: Within 24 hours of results of tests, copies of the results shall be submitted to the Architect, Contractor, masonry contractor, and the grout supplier if applicable.
- C. Mortar:
 - 1. Proportion Specification (ASTM C270): Field quality control shall be performed by inspection only. In case of dispute, the mortar proportions must be tested in accordance with the Property Specification of ASTM C270.
 - 2. For determining hardened mortar properties, prepare 3 test specimens for each test age and property. A strength test shall be the average of the strengths of the specimens tested at the age specified. Specimens shall be tested at 7 and 28 days.



- D. Grout:
 - 1. Testing per ASTM C1019.
 - 2. Three test specimens shall constitute one sample. A strength test shall be the average of the strengths of the specimen tested at the age specified.
 - 3. Specimens shall be tested at 7 and 28 days.
 - 4. The compression strength will be considered satisfactory if the average of three consecutive tests of the grout is equal to or greater than the specified strength and no individual strength test falls below the specified strength by more than 500 psi.

3.03 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION



SECTION 04 05 23

MASONRY ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Furnishing the following items for installation under Section 04 22 00:
 - 1. Ties.
 - 2. Anchors.
 - 3. Control joints.
 - 4. Through wall flashings.
 - 5. Weep holes.

1.02 SUBMITTALS

- A. Product Data: Submit Manufacturer's brochures depicting each of the masonry accessories which will be used prior to delivering materials to the site or commencing the Work in this Section.

1.03 QUALITY ASSURANCE

- A. Comply with Arizona Masonry Guild Standard 108-95 - Standard Practices

1.04 DELIVERY, STORAGE AND HANDLING

- A. Storage and Protection: Store metal items at the site off the ground and in a manner to prevent damage to the materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following Manufacturers, subject to compliance with Specification requirements.
 - 1. Dur-O-Wall Inc. www.dur-o-wall.com
 - 2. Heckmann Building Products, Inc. www.heckmannbuildingprods.com
 - 3. Hohmann and Barnard, Inc. www.h-b.com

2.02 MATERIALS

- A. Steel Wire: ASTM A82, diameter as specified for accessory.
- B. Flat and Corrugated Sheet Steel: ASTM A653 or ASTM A568.
- C. Bar Anchor Material: ASTM A36.
- D. Galvanized Finish: ASTM A641, Class 1, mill galvanized for interior walls, or ASTM A153, Class B-2, hot dip galvanized for exterior walls.
- F. Reinforcing Steel: As specified in Section 03 20 00.



2.03 ACCESSORIES

- A. General: Anchors and ties shall be steel with zinc coated finish or shall be of other non-corrosive metal.
- B. Ties:
 - 1. Adjustable Wall Ties (Facing over CMU):
 - a. 3/16 inch diameter steel wire of approved shape, machine fabricated.
 - b. Provide 2 piece "rectangular" strut compression and tension, eye and pin tie as required by Code.
 - 2. Veneer Anchors (Facing over Framing):
 - a. 3/16 inch diameter steel wire of approved shape, machine fabricated, designed to be screw fastened.
 - b. Provide 2 piece "Rectangular" or "Triangular" strut, compression and tension, eye and pin tie.
 - c. Screws shall have a copolymer corrosion resistant coating or be Type 304 stainless steel, suitable for attachment of veneer anchors, length as required.
- C. Joint Reinforcing: In accordance with requirements of IBC, Chapter 21 and the Structural Drawings.
- D. Anchors:
 - 1. Dovetail Anchor: 16 gage flat sheet steel, one inch wide, 5-1/2 inch length, designed for use with embedded slot or inserts.
 - 2. Bar Anchors: Machine made corrosion protected metal with cross section area not less than .25 square inch with ends turned up 2 inches, not less than 16 inches long for 8 inch walls nor less than 24 inches long for 12 inch walls.
- E. Control Joints:
 - 1. Rubber: Extruded, solid section, ASTM D2000 2AA-805 with a durometer hardness of 70 or 80 when tested per ASTM D2240.
 - 2. Polyvinyl Chloride (PVC): ASTM D2287, Type PVC 654-4 with a durometer hardness of 85 (+5) when tested per ASTM D2240, minimum tensile strength of 1750 psi with minimum 300 percent elongation per ASTM D638, and cold crack brittleness of 50 degrees F per ASTM D746.
 - 3. Sizes and Profiles: As indicated on Drawings.
- F. Joint Filler: Closed cell neoprene rubber conforming to ASTM D1056, Grade 2A1, oversized 50 percent, self expanding, 2-3/4 or 3 inch width by maximum length.
- G. Through-Wall Flashing:
 - 1. Granular surfaced Self-adhering, flexible flashing consisting of pliable and highly adhesive rubberized asphalt compound overall 60 mil thickness; protected from contamination from dust or dirt by a silicone-coated release sheet, to be removed immediately before installation.
 - 2. Vycor Basik as manufactured by W.R. Grace & Co. - Conn., Cambridge, MA (800) 558-7066.
 - 3. Provide wall flashing accessories (surface conditioner, termination mastic) as required to provide a complete installation.
- H. Weep Holes: Round plastic tubing, 3/8 inch diameter.



PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Installation of masonry accessories shall be as specified under each of the following Sections [and in accordance with AMG Standard 108.
 - 1. Section 04 22 00 – Concrete Masonry Units
- B. Control Joints: Provide control joints as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.
- C. Through Wall Flashing:
 - 1. Provide through-wall flashings as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.
 - 2. Specified flashing and accessories are not designed for use as a finished surface or for use in areas where they will be exposed to sunlight. Prevent contact with products containing fresh coal tar or coal tar pitch. Prevent contact with sealant products containing polysulfide polymers due to incompatibility.
 - 3. Remove deleterious materials from surfaces to be flashed.
 - 4. Apply surface conditioner by spray, brush or roller at the rate recommended by manufacturer to dirty or dusty surfaces or surfaces having an irregular or rough texture before installing flashing membrane.
 - 5. Remove silicone-coated release paper and position flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller or blunt object, such as the backside of a utility knife. Fully adhere flashing to substrate to prevent water from migrating under flashing.
 - 6. Overlap adjacent pieces 2 inches and roll overlaps with a steel hand roller or a blunt object. Fully seal overlaps to prevent water leakage through laps. Trim bottom edge 1/2 inch back from exposed face of the building.
 - 7. At heads and sill where flashing is indicated to be placed, turn up ends a minimum of 2 inches and make careful folds to form a pan, with the pan seams sealed with compatible mastic acceptable to flashing manufacturer.
 - 8. Apply a bead or trowel coat of compatible mastic acceptable to flashing manufacturer along top edge, seams, cuts and penetrations. Seal penetrations through flashing with compatible mastic acceptable to flashing manufacturer.
- D. Weep Holes: Provide weep holes as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.

3.02 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION



SECTION 04 05 26

CMU INTEGRAL WATER REPELLENT

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

- A. Performance Requirements: Water repellent admixture shall be provided in both the masonry units and mortar used in all above grade exterior CMU wall construction, including parapets, and shall constitute a complete integral water repellent system for exterior above grade walls meeting the following requirements:
 - 1. Admixture shall leave the finished surfaces water repellent and shall not alter the natural texture or color of the masonry units.
 - 2. Admixture shall provide wind driven rain resistance equivalent to Class E Rating as measured by ASTM E514-74.
 - 3. Bond strength as determined by ASTM E72 shall not be reduced by the use of the water repellent admixture.

1.02 SUBMITTALS

- A. Integrally Water Repellent Concrete Masonry Unit Samples: Unit manufacturer shall submit 4 samples of the masonry units to be used in the structure which will be reviewed by the Architect for both aesthetics and effectiveness.
- B. Product Data: Indicate methods of fabrication and installation for the following materials:
 - 1. Submit current instructions stating the actual quantities of water repellent material required to meet the guarantee requirements.
 - 2. Submit test report data substantiating compliance with specified performance requirements.
 - 3. Detail Drawings (Water Repellent Units): Submit manufacturer's flashing and weep hole diagrams.
- C. Submit warranties for integral water repellent concrete masonry wall system as specified herein and in accordance with Section 01 77 00.
- D. Unit manufacturer shall submit copy of current Certificate of Qualification issued by water repellent manufacturer.

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Water Repellent Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
 - 2. Masonry Unit Fabricator/Manufacturer: Trained, approved and accepted by the manufacturer.
- B. Mock-Ups: In accordance with Sections 04 22 00 and as follows:
 - 1. Admixture shall be used in materials used to construct the masonry sample wall mock-up located at the job site.
 - 2. The purpose of this sample will be to observe color uniformity and intensity in the mortar, methods used to incorporate admixture into mortar, and workmanship techniques.



- C. Regulatory Requirements: Use of water repellent admixtures shall be in strict accordance with applicable Federal, State and local requirements, including, but not limited to, environmental regulations.
- D. Preconstruction Meeting:
 - 1. Prior to fabrication or installation of components of the masonry wall system, a jobsite meeting shall be conducted with the Architect, Contractor, masonry subcontractor, installers of related work, the integral water repellent manufacturer's representative, the CMU fabricator representative, and other involved entities.
 - 2. The purpose of this meeting is to ensure that individuals involved in the erection of masonry understand the procedures of erection to achieve a water-repellent masonry assembly system.
- E. Pre-Installation Conference: A representative of the water repellent manufacturer shall be present prior to and at the beginning of wall construction to review the work with the Architect and the Contractor.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Mortar admixture shall be delivered to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.
- B. Do not store in areas where temperature will fall below 20 degrees F.

1.05 WARRANTY

- A. Water Repellent Manufacturer: Water-repellent shall be warranted by Admixture manufacturer to be free of defects and to meet manufacturer's published physical and chemical properties.
- B. CMU producer shall warrant that Integral Polymeric CMU Water-repellent has been provided at appropriate dosage rate in all units shipped to this project for use in exterior walls.
- C. Masonry Installer shall warrant that only CMUs and mortar containing Integral Polymeric CMU Water-repellent have been placed in exterior walls and that admixture was included in the mortar mix in accordance with water repellent manufacturer's printed instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Water-Repellent Admixture: The following shall be included in exterior masonry units.
 - 1. Liquid polymeric admixture(s) formulated for mixing with mortar mix and formulated for mixing with concrete during production of concrete masonry units to cross link and provide resistance to water penetration to achieve a Class E Rating when tested in accordance with ASTM E514.
 - 2. Admixture shall not reduce flexural and compressive strength of mortar when tested in accordance with ASTM C1072 and C780.
 - 3. Concrete Masonry Unit Manufacturer: Acceptable to integral water repellent manufacturer and qualified by integral water repellent manufacturer to comply with ASTM E514 for water permeance testing.
 - 4. Acceptable Products and Manufacturers:
 - a. Dry Block Mortar Admixture as manufactured by W.R. Grace & Co. -



- Conn., Cambridge, MA (800) 558-7066. www.grace.com
- b. Eucon Blocktite Mortar Admixture as manufactured by The Euclid Chemical Company, Cleveland, Ohio (800) 321-7628
www.euclidchemical.com
- c. Rheopel® Plus Admixture as manufactured by Master Builders, Cleveland, OH (800) 628-9990 www.masterbuilders.com
- d. RainBloc Water Repellent Masonry Unit Admixture manufactured by ACM Chemistries, Inc. <http://www.acmchem.com/>
- e. Or equal under the Substitution requirements of Section 01 60 00.

PART 3 EXECUTION

3.01 ERECTION, INSTALLATION, APPLICATION

- A. In accordance with Section 04 22 00 and manufacturer's recommendations.

END OF SECTION



SECTION 04 22 00

CONCRETE MASONRY UNITS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: CMU construction for stem walls
- B. Related Sections:
 - 1. Section 04 05 15 - Mortar and Masonry Grout
 - 2. Section 04 05 26 - CMU Integral Water Repellent

1.02 QUALITY ASSURANCE

- A. Standards: Comply with the requirements of ACI 530.1/ASCE 6 "Specifications for Masonry Structures", except as otherwise indicated.
- B. Regulatory Requirements: Masonry materials and workmanship shall meet requirements of building codes which are applicable to jurisdiction in which Project is located.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Transport and handle masonry units in such a manner as to prevent chipping and breakage.
- B. Deliver and store materials in dry, protected areas.
- C. Keep free of stain or other damage.
- D. Locate storage piles, pallets, stacks or bins to avoid or protect material from heavy or unnecessary traffic.
- E. Replace damaged material at no cost to Owner.

1.04 PROJECT/SITE CONDITIONS

- A. Hot Weather Requirements:
 - 1. When ambient air temperature exceeds 100 degrees F., or when ambient air temperature exceeds 90 degrees F. and wind velocity is greater than 8 mph, Masonry Contractor shall implement hot weather protection procedures as submitted to Architect.
 - 2. Do not spread mortar beds more than 4 feet ahead of placing block units.
 - 3. Place block units within one minute of spreading mortar.
- B. Cold Weather Requirements:
 - 1. Fully protect concrete masonry units against freezing by a weather-tight covering which shall also prevent accumulation of ice.
 - 2. Do not lay concrete masonry units when temperature of surrounding atmosphere is below 40 degrees F. or is likely to fall below 40 degrees F. in the 24 hour period after laying, unless adequate protection is provided.
- C. Field Measurements:
 - 1. Verify measurements shown on Drawings by taking field measurements.
 - 2. Proper fit and attachment of concrete masonry units is required.



1.05 SCHEDULING AND SEQUENCING

- A. Coordination: Coordinate with other Trades whose Work relates to concrete masonry unit installation for placing required blocking, backing, furring, conduits and other items.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General Requirements for Concrete Masonry Units:
 - 1. Concrete masonry units shall meet ASTM C90 requirements. Linear shrinkage of units of units shall not exceed 0.065 percent.
 - 2. Units shall be in the same condition in wall as they were upon delivery.
 - 3. Manufacturers and Products for Exterior Wall Construction: As specified in Section.
 - 4. Sizes, Texture and Color:
 - a. Exterior Wall Construction:
 - 1) Sizes: As indicated on Drawings
 - 2) Integral color:
 - a) Provide color for integral colored CMU as selected by Architect from manufacturer's standard and as noted on Drawings.
 - b) Consistent for all units provided for exposed walls. Range of texture and color shall be within that shown by samples reviewed by Architect.
 - 5. Surface of units shall be clean and free from dirt when laid in walls.
 - 6. Provide special block sizes and shapes required or as shown on Drawings.
 - 7. Water-Repellent Admixture: In accordance with Section 04 05 26. Concrete masonry units used to construct exterior building walls shall contain the recommended amount of integral water repellent admixture, as per manufacturer's certification program.
- B. Hollow CMU Classifications: The following requirements shall apply to all shapes, colors, textures and sizes of CMU provided.
 - 1. Lightweight units: Weighing less than 105 lbs. per cubic foot and manufactured from volcanic scoria aggregate per ASTM C331.
 - 2. Medium weight units: Weighing 105 lbs. per cubic foot to less than 125 lbs. per cubic foot and manufactured from a combination of volcanic scoria aggregate conforming to ASTM C331 and sand conforming to ASTM C33.
 - 3. Normal weight units: Weighing 125 lbs. per cubic foot or more and manufactured with sand conforming to ASTM C33.
- C. Accessory Units: Provide units as required for window sills and jambs, doors, control joints, bond beams, lintels, pilaster, caps and other locations as indicated on Drawings with a minimum of block cutting. Accessory units shall match adjacent unit color and texture unless noted otherwise.

2.02 ACCESSORIES

- A. Joint Reinforcing: In accordance with requirements of IBC 2012, Chapter 21.
- B. Reinforcing Steel: As specified under Section 03 20 00.
- C. Control Joints:



1. Rubber: Extruded, solid section, ASTM D2000 2AA-805 with a durometer hardness of 70 or 80 when tested per ASTM D2240.
 2. Polyvinyl Chloride (PVC): ASTM D2287, Type PVC 654-4 with a durometer hardness of 85 (+5) when tested per ASTM D2240, minimum tensile strength of 1750 psi with minimum 300 percent elongation per ASTM D638, and cold crack brittleness of 50 degrees F per ASTM D746.
 3. Sizes and Profiles: As indicated on Drawings.
- D. Mortar and Grout: As specified under Section 04 05 15. . Provide water repellent admixture in accordance with Section 04 05 26.
- E. Nailing Strips: See Section 06 10 53 – Rough Carpentry.
- F. Sheet Metal Flashings: See Section 07 62 00. Furnish shapes in accordance with project requirements and NCMA TEK 19-2A, 19-4A and 19-5A.
- G. Steel Lintels: As indicated or scheduled on Structural Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Installer shall examine supporting structure and conditions under which unit masonry is to be installed, and notify Contractor, in writing, conditions detrimental to proper and timely completion of Work. Do not proceed with the installation of unit masonry Work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Do not use units with chips, cracks, or other defects which might be visible in the finished Work unless otherwise acceptable to the Architect.
- C. Do not build on frozen Work; remove and replace unit masonry Work damaged by frost or freezing.
- D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower freezing point of mortar by use of admixtures or anti-freeze agents, and do not use calcium chloride in mortar or grout.

3.02 PREPARATION

- A. Protection: Protect sills, ledges, offsets and other projections from dropping of mortar and grout.

3.03 ERECTION, INSTALLATION, APPLICATION

- A. General Requirements for Concrete Masonry Walls:
 1. Lay units in uniform and true courses, level and plumb to height indicated on Drawings.
 2. Lay concrete unit masonry in such a way that cracks are not formed at time unit is placed in wall.
 3. Units shall not be wetted before being used and shall be laid dry.
 4. Adjusting Units:
 - a. Units shall be adjusted to be level, plumb and straightened into final position in wall while mortar is still soft and plastic enough to ensure a good bond.
 - b. Avoid over-plumbing and pounding of corners and jambs to fit stretcher



- units after they are set in position.
 - c. If position of unit is shifted after mortar has stiffened, or bond is broken or cracks are formed, re-lay unit in new mortar.
 - 5. Bearings on Walls: Provide 3 courses of solid units or grouted hollow masonry units below steel bearing plates or beams bearing on walls. Extend bearings each side of contact with load as required to properly transfer loads into wall.
 - 6. Openings: Provide openings in masonry walls where required or indicated. Steel lintels shall be provided unless otherwise noted.
- B. Bonding:
 - 1. Bond pattern shall be running bond unless otherwise indicated on the drawings.
 - 2. Bond shall be plumb throughout face of wall.
- C. Bearing Wall Intersections:
 - 1. Intersecting block bearing walls shall not be tied together in a masonry bond, except at corners.
 - 2. One wall shall terminate at face of other wall with a control joint at intersection.
 - 3. Tie intersecting wall together with a metal tie bar, 1/4 inch x 1-1/4 inches x 2'-4" long with a 2 inch right angle bend at each end of bar, spaced vertically at 2 feet on center.
 - 4. Bends at ends of tie bars shall be embedded in grouted cells.
 - 5. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
 - 6. Provide sealing of control joint as specified in Section 07 92 00.
- D. Non-Bearing Wall Intersections:
 - 1. Tie non-bearing wall together with strips of metal lath or galvanized 1/4 inch mesh hardware cloth placed across joint between 2 walls placed in alternate horizontal block courses.
 - 2. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
 - 3. Provide sealing of control joint as specified in Section 07 92 00.
- E. Joining of Work:
 - 1. Where fresh masonry joins partially set masonry the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond.
 - 2. Remove loose concrete block and mortar.
 - 3. Stop-off a horizontal run of masonry by racking back 1/2 brick length in each course and, if grout is used, stopping the grout 4 inches back of the rack.
 - 4. Toothing will not be permitted, except upon written approval of the Architect.
- F. Mortar Joints:
 - 1. Joints shall be straight, clean and a uniform 3/8 inch thickness.
 - 2. Joints shall be tooled flush at:
 - a. Below grade and planter surfaces to receive dampproofing or waterproofing,
 - b. Interior or exterior surfaces to receive ceramic tile, stucco, plaster or other finishes requiring flush joints that are to be concealed.
 - 3. Solidly fill joints from face of unit to depth of face shell, except where specified otherwise.
 - 4. Full bedding to be provided for first course on foundation and wherever maximum strength is required.
 - 5. Butter vertical head joints well and shove these joints tight so that mortar bonds well to both units.
 - 6. Full coverage to be provided on bed of face shells and webs surrounding cells to



- be filled.
 7. Bee-holes or other open joints shall be filled and tooled with mortar while mortar is still fresh.
- G. Control Joints:
1. Provide control joints, as detailed, at vertical masonry walls where such walls exceed 32 feet in length. In long length of walls, provide joints at approximately 24 feet on center or as detailed. Confirm location with Architect.
 2. Control joints shall be continuous full height of walls.
 3. At bond beams, control joints shall separate both block and grout; however, steel reinforcing shall be continuous.
 4. Horizontal wire reinforcing shall not run through control joint.
 5. Control joints shall not occur at wall corners, intersections, ends, within 24 inches of concentrated points of bearing or jambs or over openings unless specifically noted and detailed in structural drawings..
 6. Control joint materials shall be held back from finished surface as required to allow for sealant and back-up materials.
- H. Horizontal Joint Reinforcing:
1. Place horizontal joint reinforcing every 16 inches vertically throughout wall construction.
 2. Continuously reinforce first bed joint immediately above and below openings. Provide reinforcing in second bed joint above and below openings which extends 2 feet beyond each side of opening.
 3. Lap reinforcement a minimum of 6 inches at splices.
 4. Cut and bend reinforcing at corners.
- I. Vertical Reinforcing and Bond Beam Reinforcing:
1. Place in accordance with requirements of Drawings.
 2. Vertical Reinforcement: Provide continuous reinforcing full height of wall at wall ends, corners, intersections, jambs of openings and each side of control joints. Vertical reinforcing shall match and lap dowels which are at top of foundation walls and precast concrete beams.
 3. Bond Beams: Provide horizontal reinforcing of 2 bars in minimum 8 inch deep grouted continuous bond beam at roof and elevated floor lines.
 4. Parapets: Provide horizontal reinforcing of 1 bar in minimum 8 inch deep grouted continuous bond beam at top of parapets.
 5. Bond Beam and Parapet Reinforcing at Vertical Control Joints: Place bars continuous through control joint and wrap mastic tape around bars for 18 inches each side of control joint.
 6. Bond Beam and Parapet Reinforcing at Corners and Wall Intersections: Provide bent bars to match reinforcing at corners and wall intersections.
 7. Lap splices in reinforcing as noted in structural drawings but not less than 48 bar diameters for all bars.
 8. Use spacers to position reinforcing steel in center of grout at center of wall as required by code.
- J. Grouting:
1. Reinforcing steel is to be in place and inspected before grouting starts.
 2. Vertical cells to be filled shall have vertical alignment to maintain a continuous cell area.
 3. Keep cell to be grouted free from mortar.
 4. Fill cells solidly with grout in lifts not to exceed 4 feet.
 5. Grout may be poured by hand bucket, concrete hopper or through a grout pump.
 6. Do not wet down grout space prior to pouring of grout.
 7. Stop pours 1-1/2 inches below top of cell to form a key at pour points.



8. Grout shall be consolidated by mechanical vibration during placing before loss of plasticity in a manner to fill grout space. Grout pours greater than 12 inches shall be reconsolidated by mechanical vibration to minimize voids due to water loss. Grout pours 12 inches or less in height shall be mechanically vibrated, or rodded.
 9. Grout barrier below bond beams shall be continuous wire lath or other approved material.
 10. Grout beams over openings and bond beams in a continuous operation.
 11. Solidly grout in place bolts, anchors and other items within wall construction.
 12. Fully grout jambs and head of metal door frames connected to masonry. Filling of frames shall be done as each 2 feet of masonry is laid.
 13. Use extreme care to prevent grout or mortar from staining face of the masonry.
 14. Immediately remove grout or mortar which is visible on face of masonry.
- K. Provisions for Other Trades and Built-in Items:
1. Build in items required and indicated, including; but not limited to, reinforcing steel, anchors, flashings, sleeves, frames, structural steel, loose lintels, anchor bolts, nailing blocks, door and window frames and miscellaneous iron.
 2. Enclosures for pipes, stacks, ducts and conduits:
 - a. Construct slots, chases, cavities, and similar spaces as required.
 - b. Where masonry is to enclose conduit or piping, bring it to proper level indicated and as directed.
 - c. Cover no pipe, conduit chases or enclosures until advised that Work has been inspected and approved.
- L. Tolerances:
1. External corners and other conspicuous lines and levels: +/- 1/2 inch in any 10'-0" section.
 2. Line of sealant filled movement joints (allowable deviation from specified or indicated): +/- 1/2 inch in any 10'-0" section.
 3. Actual cross sectional dimension of columns and walls (allowable deviation from specified or indicated): - 3/8 inch, + 3/4 inch.
 4. Adjacent unit faces in plane (allowable deviation from specified or indicated): +/- 3/16 inch.
 5. Mortar bed joint thickness (allowable deviation from specified or indicated): -1/8 inch, +1/4 inch.
 6. Mortar head joint thickness (allowable deviation from specified or indicated): - 1/4 inch, + 3/8 inch.
 7. Vertical alignment of the centerline of corresponding head joints in alternate courses when using other than stack bond (allowable deviation from specified or indicated): +/- 5/8 inch.
 8. Vertical alignment of the centerline of all head joints in a total wall height not to exceed 30'-0" when using other than stack bond (allowable deviation from specified or indicated): +/- 2 inches.
 9. Vertical alignment of the centerline of all head joints in total wall height not to exceed 30'-0" when using stack bond: (allowable deviation from specified or indicated): +/- one inch.
- M. Joint and Crack Control: In accordance with NCMA TEK 10-1.
- N. Flashing: In accordance with NCMA TEK 19-2A, 19-4A and 19-5A.and 19-4.
- O. Weep holes shall be provided above lintels and vertical obstructions as per manufacturer's flashing and weep hole diagrams.



3.04 FIELD QUALITY CONTROL

- A. Masonry Tests: Inspection and testing of masonry will be performed by a testing laboratory in accordance with Section 01 45 00.
 - 1. Provide free access to Work and cooperate with appointed firm.
 - 2. A set of 3 masonry prisms shall be built and tested in accordance with ASTM C1314 (formerly E447) Method B for each 5,000 square feet of wall area, but not less than one set of 3 masonry prisms for the Project.

3.05 CLEANING

- A. Remove scaffolding and equipment used in Work.
- B. Clean up debris, refuse and surplus material and remove from premises.

3.08 PROTECTION

- A. Carefully cover tops of walls left incomplete at conclusion of day's Work with tarpaulins or other approved covering.
- B. In hot and dry weather, protect masonry against too rapid drying.
- C. Protect finished Work against freezing for a period of not less than 48 hours by means of enclosures, artificial heat, or such other protective methods as may be required.

END OF SECTION



SECTION 05 10 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Structural steel framing including, but not limited to:
 - 1. Columns
 - 2. Beams
 - 3. Lintels
 - 4. Anchor Bolts
 - 5. Bearing Plates,
 - 6. Miscellaneous Structural steel items.

1.02 SUBMITTALS

- A. Shop Drawings: Submit shop and erection Drawings clearly showing each piece required for fabrication and erection. Drawings shall include material grade, camber, holes and other pertinent data. Indicate welds by standard AWS symbols showing size, length, and type of each weld.
- B. Test Reports: Submit reports for welded connection tests.
- C. Submit anchor setting drawings clearly showing location of all anchor bolts and embedded plates to be anchored in concrete and masonry construction. Provide templates for anchor bolts.

1.03 QUALITY ASSURANCE

- A. Welding:
 - 1. Performed by certified welders in compliance with AWS D.1 Structural Welding Code.
 - 2. Welders shall be duly qualified within the last 12 months in the position in which they are to weld and the qualifications and Specifications for workmanship shall comply with the AWS requirements "AWS Structural Welding Code - Steel."
- B. Certifications:
 - 1. Prior to fabrication or shipment of material to the job site, furnish certification of the Manufacturer of the structural steel that material furnished meets or exceeds requirements of ASTM standards specified or noted on Drawings, for each type of material.
 - 2. Prior to site welding operation, submit welders' written certifications and qualifications.
 - 3. Furnish certification that prime paint to be applied to members to receive spray applied fireproofing has been tested is approved by fireproofing manufacturer for the application.]
- C. Tolerances: All steel exposed to view shall be architectural steel, and tolerances as a minimum shall comply with section 10 of AISC code of standard practice.



1.04 DELIVERY, STORAGE AND HANDLING

- A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted.
- B. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Structural Steel: ASTM A572 or A992, except angles, channels and plates shall be ASTM A36 (Fy = 36ksi).
- B. Steel Pipe Columns: ASTM A53 Grade B or ASTM A501 (Fy = 36,000 psi).
- C. Steel Tube Columns: ASTM A500, Grade B.
- D. Bolts:
 - 1. Machine Bolts: ASTM A307, unless otherwise indicated.
 - 2. High Strength Bolts: ASTM A325.
- E. Welded Anchors and Shear Connectors: ICC approved, as manufactured by KSM or Nelson.
- F. Welding Rods: AWS A5.0, E70 series, low hydrogen type.

2.02 FABRICATION

- A. Workmanship and details of construction (except as otherwise indicated or specified) shall be in conformity with applicable articles of the latest AISC Manual, Parts 1 through 4; AISC Specifications; except Section A7 (Design Documents) and Chapter N (Plastic Design); and the applicable building codes. Sections 3.1, 3.4 and 4.2 of AISC code of Standard Practice are specifically excluded from this work.
 - 1. Sections shall be of dimensions, weight and design as indicated, assembled complete at the shop, with base plates and other detailed materials attached.
 - 2. Furnish 1/4 inch thick leveling plates at columns where base plates are shop fabricated to columns.
 - 3. Make connections as indicated or detailed, on the Drawings and the reviewed shop and erection Drawings.
 - 4. Exposed steel shall have smooth, clean surfaces with no identifying trade marks, names etc., exposed to view.
 - 5. Leave in condition for finish painting.
- B. Bolted connections shall be as detailed or shall conform to AISC standard bolted connections with maximum number of 3/4-inch diameter bolts. See Framed Beam Connections Tables II, III, or IV of AISC Manual of Steel Construction.



- C. No slotted holes permitted at steel connections unless shown on Drawings or approved by Structural Engineer.
- D. Where bolt holes in steel members are enlarged to more than 1/16 inch diameter oversize, provide 3/16 inch x 2-1/2 inch x 2-1/2 inch plate washers to steel members with 3/16 inch fillet weld all around.
- E. Loose Steel Lintels: Provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions, as shown. Weld adjoining members together to form a single unit. Provide not less than 4 inch bearing at each side of openings, unless otherwise shown.
- F. Loose Bearing Plates: Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

2.03 SHOP FABRICATION FOR USE OF HIGH STRENGTH BOLTS

- A. Joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of loose mill scale, burrs, or any foreign material (including paint). Field paint these areas with the specific shop paint after erection and completion.
- B. Joints using high strength bolts shall be inspected by a representative of an independent testing laboratory acceptable to the Owner's Representative.
 - 1. Inspection shall be accomplished by the use of a properly calibrated torque wrench.
 - 2. Calibration shall be by the procedure specified in the Specifications for structural joints using ASTM A325 or A490 bolts, under Section 9, inspections (pp. 6-276) Ninth Edition, AISC Manual of Steel Construction.
 - 3. Check a minimum of 20 percent of the bolts in each connection.
 - 4. If one or more of the bolts checked in any connection is below the minimum tension, check all of the bolts in that connection.
 - 5. Bolts which cannot be properly tensioned will be rejected.
- C. Check calibrated wrenches individually for accuracy at least once daily for actual conditions of application.
- D. The Inspector shall check to insure that bolt threads are eliminated from the shear planes. Submit copies of the torque reading for each connection directly to the Architect in the form of a report, along with the minimum torque values required to reach the specified tensions and the calibration procedures.
- E. The use of load indicator washers or twist-off spline type of fastener requires specific prior approval of the Architect.

2.04 SHOP WELDING

- A. Make welds by the electric-arc process.
- B. Grind exposed welds smooth.
- C. Where weld size is not indicated, it shall develop full strength of member and connection.



2.05 PAINTING - SHOP COAT

- A. Items of steel and iron Work indicated or specified to be encased in concrete shall not be painted.
- B. Primer and paint should only be applied to items of steel and iron work indicated on drawings as receiving.
- C. Primer applied to members to receive spray fireproofing shall have been tested and certified as acceptable for application and shall be approved by fireproofing manufacturer.
- D. Clean steel Work by wire brushing, or by other means selected by the fabricator, of loose mill scale, loose rust, accessible weld slag, or flux deposit, dirt and other matter. Remove oil and grease deposits by solvent.
- E. After cleaning, give steel Work one coat of metal primer. Apply primer thoroughly and evenly to dry surfaces by brush, spray, roller coating, flow coating or dipping at the selection of the fabricator.
- F. Apply primer at a rate of 350 sq. ft. per gallon to provide a wet film of 4.5 mils.
- G. Paint erection marks on painted surfaces. Touch-up surfaces where welding, grinding of welds, joints, etc. are done in the field.
- H. The paint shall be thoroughly dry before the members are handled or loaded.

2.06 SOURCE QUALITY CONTROL

- A. Tests: Where a welded splice is fabricated in beams or columns other than those detailed, fabricator shall have splice connection tested using one of the following methods: magnetic particle, radiographic, or ultrasonic. Testing shall be conducted by an independent testing laboratory and a report submitted to the Architect. The costs of this testing shall be borne by the fabricator.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify anchor bolt locations, grouting and elevation of base and setting plates, and other material set by other Trades before commencing Work.
 - 2. Notify Architect of Work set by others which does not comply with specified tolerances. Do not erect material upon such Work until it has been satisfactorily corrected.
 - 3. Start of Work implies acceptance of Work of other Trades affecting structural frame erection.

3.02 ERECTION

- A. Erect Work to the proper lines and levels, plumb and true, and in correct relation to other Work maintain this condition to completion.
- B. Connections:
 - 1. Machine Bolting:
 - a. Fair-up holes with pins to align holes before bolting.
 - b. Ream unfair holes to obtain alignment or drill new holes.



- c. Enlargement of holes with drift pins or burning of new holes is not permitted.
 - d. Draw bolts up tight after members are aligned and leveled, and set or deform threads to prevent loosening.
 - 2. Welding:
 - a. Weld by shielding arc method per AWS standard code for arc and gas welding in building construction.
 - b. Submit certification that welders have passed AWS code qualification tests.
 - c. Refer to Shop Drawings for weld size and dimensions.
 - d. Close joints exposed to weathering with continuous 1/8 inch weather welds.
 - e. Grind smooth exposed welds, but grinding shall not reduce weld strength or required cross section.
 - f. Protect finish material from damage due to welding.
 - g. Remove unsatisfactory welds by chipping or arc air method.
 - 3. Connect members temporarily and align completely before making permanent connections.
 - a. Temporary conditions shall consist of bolts in no less than 1/3 of the holes and in no case less than 3 bolts in any single connection.
 - b. Surfaces in contact shall be thoroughly clean when assembled.
 - c. Provide necessary temporary bracing and guying to align the structure properly for permanent connections, and safely resist erection, dead load and wind stress.
 - d. Take particular care to have the Work plumb and level (maximum slope ratio tolerance 1 to 500 for interior members, 0 to 1000 for exterior members) before making permanent connections.
 - e. Remove bracing and guys only after permanent alignment and assembly and structure is capable of completely sustaining design and temporary construction loads.
 - C. Exposed Steel:
 - 1. Verify the condition of exposed steel after erection.
 - 2. Exert particular care to provide a neat, accurate installation with members straight and true, corners and edges square, sharp and free from burrs and irregularities, adjacent members perfectly matched and no bolts or rivets exposed.
 - 3. Remove erection bolts and seats and plug weld and grind holes smooth.
 - 4. Remove all shop marks from exposed steel after erection.
 - 5. Reference construction documents for exposed steel finish – natural rust finish indicates no shop or field applied primer(s) or paint(s).
 - D. Touch-up Painting:
 - 1. Remove temporary guys, bracing and bracing clips, and grind flush remaining burrs, before painting. Remove welding slag, spatter, rust and burnt paint and wire brush clean welds before touch-up.
 - 2. Touch-up Painting: Touch-up welds, abrasions, bolted connections, and other areas where shop prime paint has been removed or is damaged with specified prime paint or galvanizing repair paint.
- 3.03 CLEANING
- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises.
 - B. Leave Work ready to receive fireproofing when applicable.

END OF SECTION



SECTION 05 31 00

STEEL DECKING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Roof deck.

1.02 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Increase S and I properties for simple or two span continuous to achieve equivalent load capacity. Minimum allowable diaphragm shear furnished, per ICC report, shall be as noted on GSN.
 - 2. Sections and properties shall meet AISC Specifications.

1.03 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
 - 1. Submit shop and erection Drawings showing layout, material and fastening methods and each piece to be erected.
 - 2. Note deck welding pattern and physical properties of decking.
 - 3. Include types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Report: Submit ICC report showing diaphragm shear test.

1.03 QUALITY ASSURANCE

- A. Welding: Performed by certified welders in compliance with AWS D.1.3 requirements and procedures for manual shielded metal arc welding.
- B. Certifications:
 - 1. Prior to fabrication or shipment of material to the job site, furnish certification of the manufacturer of the steel decking that material furnished meets or exceeds requirements of ASTM standards specified or noted on Drawings, for each type of material.
 - 2. Prior to site welding operation, submit welders' written certifications and qualifications.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle metal decking in manner which will prevent damage or deformation.
- B. Stack decking stored at the site before erection on platforms or pallets, and suitably protect from the weather.
- C. Exercise special care so as not to damage or overload the decking during the construction



period.

- D. Do not use metal decking for storage or as a working platform until the sheets have been welded in position.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following Manufacturers, except as approved by Architect, subject to conformance with Specification requirements:
 1. Consolidated Systems, Inc. www.csisteel.com
 2. Metal Deck, Inc.
 3. United Steel Deck, Inc. www.njb-united.com/usd.htm
 4. Verco Manufacturing, Inc. www.vercodeck.com
 5. Vulcraft Division, Nucor Corp. www.vulcraft.com/sc
 6. Wheeling Corrugating Division www.wheelingcorrugating.com

2.02 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 1. Material: [Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel \(SS\), Grade 33, G60 zinc coating.](#)
 2. Deck Profile: As indicated.
 3. Profile Depth: As indicated.
 4. Design Uncoated-Steel Thickness: As indicated.

2.03 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Punch-lok connections.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- G. Galvanizing Repair Paint: ASTM A 780.



PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Erector shall examine subsurfaces to receive Work and report detrimental conditions, in writing, with a copy to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Before proceeding, verify that required inspections of existing conditions have been completed.

3.02 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
- H. Roof Sump Pans and Sump Plates:
 - 1. Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck.
 - 2. Space welds or mechanical fasteners not more than 12 inches apart with at least one weld or fastener at each corner.
 - 3. Install reinforcing channels or zebs in ribs to span between supports and weld or mechanically fasten.
- I. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
- J. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- K. Pour Stops and Girder Fillers: Weld steel-sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- L. Floor-Deck Closures: Weld steel-sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.



3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.04 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.05 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION



SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Metal fabrications, including items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other Sections of these Specifications. Types of metal items include, but are not limited to, the following:
 - 1. Carpenter's ironwork (anchor bolts, tie down straps, etc.).
 - 2. Steel pipe guards.
 - 3. Steel pipe bollards.
 - 4. Ladders at roof access and elevator pit.
 - 5. Miscellaneous framing and supports (including lintels, storefront wall supports and fume hood mechanical and ductwork).
 - 6. Miscellaneous steel trim.
 - 7. Enclosure gates and hardware.
 - 8. Exterior canopies and awnings.
 - 9. Fabricated steel accents and ornamentation.
 - 10. Steel Pipe & Wire Mesh Site Fencing
 - 11. Other items as indicated.

1.02 SYSTEM DESCRIPTION

- A. Structural design requirements of anchorages and tie-back above roof: Anchorage shall be capable of sustaining a minimum ultimate load of 5,000 lbs., in any direction the load may be applied, without fracture or failure.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Drawings for the fabrication and erection of assemblies of items which are not completely shown by the Manufacturer's data sheets.
 - 1. Include plans and elevations at not less than 1 inch to 1'-0" scale, and include details of sections and connections at not less than 3 inches to 1'-0" scale.
 - 2. Show anchorage and accessory items.

1.04 QUALITY ASSURANCE

- A. Standards: Comply with the following, except as otherwise shown and specified:
 - 1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
 - 2. AISI "Specifications for the Design of Cold-Formed Steel Structural Members."
 - 3. AWS "Structural Welding Code-Steel."
 - 4. ASTM A6 "General Requirements for Rolled Steel Plates Shapes, Sheet Piping and Bars for Structural Use."
- B. Qualifications: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

1.04 DELIVERY, STORAGE AND HANDLING

- A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the



ground is not permitted.

- B. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

1.05 PROJECT/SITE CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication, where possible, to ensure proper fitting of the Work. Allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the Work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wide Flange Steel Sections: ASTM A572 or A992 (Fy = 50 ksi).
- B. Steel Shapes, Plates, Rod, Bars and Bar-size Shapes: ASTM A36.
- C. Steel Tubing (Cold-formed Welded and Seamless): ASTM A500, Grade b (Fy = 42 ksi).
- D. Steel Tubing (Hot Formed Welded and Seamless): ASTM A501, (Fy = 36ksi).
- E. Cold-Finished Carbon Steel Bars: ASTM A108, Grade as selected by fabricator.
- F. Perforated Steel Sheet: Perforated steel sheet as manufactured by by ATAS International, Inc. www.atas.com, McNichols Co. www.mcnichols.com, or McMaster Carr www.mcmaster.com.
 - 1. Gauge: As indicated on Drawings.
 - 2. Type: As indicated on Drawings.
- G. Cold-drawn Steel Tubing: ASTM A512, sunk drawn, butt welded, cold-finished and stress-relieved.
- H. Steel Pipe: ASTM A53, type as selected; Grade A. Natural finish unless galvanizing is required. Standard weight, Schedule 40, unless otherwise shown or specified.
- I. Anchors:
 - 1. Masonry Anchorage Devices: Expansion shield, FS FF-S-325.
 - 2. Toggle bolts: Tumble-wing type, FS FF-B-588; type, class and style as required.
 - 3. Chemical Type Anchors: 2-component chemically curing anchors for concrete or masonry construction, capsule or injection type, designed to accept manufacturer's galvanized anchor rod.
- J. Fasteners: Provide zinc-coated fasteners with galvanizing complying with ASTM A153 for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.
 - 1. Bolts and nuts: ASTM A307, Grade A, regular hexagon head.
 - 2. Bolts, hexagon and square: ANSI B-18.2.1.
 - 3. Bolts, round head: ANSI B-18.5.
 - 4. Lag bolts: Square head type.
 - 5. Wood screws: ANSI B-18.6.1, flat head carbon steel.
 - 6. Plain washers: ASTM F844 helical spring type carbon steel.
- K. Gratings: In accordance with Section 05 53 00 – Metal Gratings



- L. Galvanizing: ASTM A123 for steel plates, bars and strips.
- M. Metal Primer: VOC compliant.
 - 1. Primer and paint should only be applied to items of steel and iron work indicated on drawings as receiving.
 - 2. Exterior exposed metal fabrications shall have a spray applied epoxy-polymide type primer, compatible with finish paint coat(s) as described in 09 91 00.
 - 3. Interior exposed metal fabrications shall have spray applied epoxy-polymide type primer paint with finish paint as described in 09 91 00.
- N. Slotted Channel Framing (Unistrut):
 - 1. Channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications:
 - a. A 1011 SS Grade 33
 - b. A 653 Grade 33
 - 2. Fittings shall be fabricated from steel that meets/exceeds the physical requirements of ASTM A1011 SS Grade 33 and conforms to one of the following ASTM specifications:
 - a. A1011 SS Grade 33
 - b. A 575
 - c. A 576
 - d. A 36
 - e. A 635
 - 3. Finishes
 - a. Factory Painted
 - 1) Channel: Rust inhibiting thermoset acrylic enamel paint applied by electro- deposition after cleaning and phosphating, and thoroughly baked.
 - 2) Fittings: Polyester powder coat after cleaning and phosphating, and thoroughly baked.
 - 3) Color shall be FHWA Highway Green, Color Tolerance Chart, PR Color No. 4
 - 4) Hardness = 2H
 - 5) Performance
 - a) Salt Spray per ASTM B117
 - i. Scribed: Exceed 400 hours
 - ii. Unscribed: Exceed 600 hours
 - b) Nominal chalking at 1,000 hours per weatherometer G-23 test
 - c) No checking at 1,000 hours per weatherometer G-23 test
 - b. Electro-Galvanized per ASTM B 633 Type III SC 1
 - c. Pre-Galvanized per ASTM A653
 - 1) Zinc coated by hot-dipped process prior to roll forming at the steel mill
 - 2) Zinc coating thickness shall be G90 (0.75 mil = 0.45 oz./ sq. ft. surface area)
 - d. Hot-Dipped Galvanized per ASTM A123 or A153
 - 1) Zinc coated after all manufacturing operations are complete
 - 2) Zinc coating thickness shall be G65 (2.6 mils = 1.50 oz./ sq. ft. surface area)

2.02 ACCESSORIES

- A. Inserts and Anchorages: Furnish inserts and anchoring devices to be set in concrete or built into masonry for installation of Miscellaneous Metal Work. Provide setting Drawings,



templates, instructions and directions for installation of anchorage devices.

- B. Concrete Fill (for concrete filled pipe bollards): Comply with requirements of Section 03 30 00 for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi.

2.03 FABRICATION

- A. General: For fabrication of Miscellaneous Metal Work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding or by welding and grinding, prior to cleaning, treating and application of surface finishes, including zinc coatings.
- B. Shop Assembly: Preassemble items in shop, when possible, to minimize field splicing and assembly of units at the site. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Workmanship:
 - 1. Use materials of the size and thickness shown, or if not shown, of the required size and thickness to produce adequate strength and durability of the finished product for the intended use. Work to the dimensions of fabrication and support. Use type of materials shown or specified for various components of Work.
 - 2. Form exposed Work true to line and level with accurate angles, surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the Work.
 - 3. Weld corners and seam continuously and in accordance with the recommendations of AWS. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
 - a. Welds should be smoothly ground to match surface texture of parent metal.
 - b. All gaps, holes and gouges should be filled with a permanent material (solder or brazing).
 - c. Design limitations of grinders, files, etc., dictate that adjoining metal tubing pieces at angles less than 125 degrees generally need a minimum of 1/4 inch radius butt weld in order to grind smooth.
 - 4. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type shown, or if not shown, use Phillips flat-head (countersunk) screws or bolts.
 - 5. Provide for anchorage of type shown, coordinated with supporting structure and the progress schedule. Fabricate as required to provide adequate support for the intended use of the Work.
 - 6. Cut, reinforce, drill and tap Miscellaneous Metal Work as may be required to receive finish hardware and similar items of Work.
 - 7. Use hot-rolled steel bars for Work fabricated from bar stock, unless Work is indicated to be fabricated from cold-rolled, or cold-finished stock.
- D. Carpenter's Iron Work:
 - 1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware are specified in Division 6 Sections.
 - 2. Manufacture or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural



connections; elsewhere, furnish steel washers.

- E. Loose Bearing Plates: Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.
- F. Loose Steel Lintels: provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions, as shown. Weld adjoining members together to form a single unit. Provide not less than 4 inch bearing at each side of openings, unless otherwise shown.
- G. Miscellaneous Framing and Supports:
 - 1. Provide miscellaneous steel framing and supports which are not a part of the structural steel framework, as required to complete Work.
 - 2. Fabricate miscellaneous units to sizes, shapes and profiles shown, or if not shown, of the dimensions required to receive adjacent grating, plates, doors or other Work to be retained by the framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill and tap units to receive hardware and similar items to be anchored to the Work.
 - 3. Equip units with integrally welded anchor straps for casting into concrete or building into masonry wherever possible. Furnish inserts if units must be installed after concrete is poured. Except as otherwise shown, space anchors 24 inches o.c., and provide minimum anchor units of 1-1/4 inch x 1/3 inch x 8 inch steel straps.
- H. Enclosure Gates: Fabricate to sizes and shapes indicated using steel tubing and shapes as detailed. Fabricate with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
 - 1. Hinges (Swinging Gates): Provide heavy duty galvanized steel butt hinges sized as required for weight of gate. Weld hinges to frame.
 - 2. Latching Mechanism (Swinging Gates):
 - a. Site Work: Provide plunger style cane-bolts with pipe receiver set into paving, size as indicated.
- I. Exterior Canopies, Awnings, Accents and Ornamentation:
 - 1. Fabricate to sizes, configurations and shapes indicated using steel tubing, shapes, plate, and rod as detailed.
 - 2. Continuously weld all joints and grind smooth.
 - 3. Provide exposed surfaces smooth, square, and free of surface blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness, except where these features are a design feature of the ornamental item.
 - 4. Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- J. Fabricate pipe bollards from steel pipe of diameter indicated on Drawings. Metal bollards shall be a minimum of 6 inches in diameter, round or square and be directly or sleeve set a minimum of 1/3 the exposed height below the finished adjacent surface.
- K. Miscellaneous Steel Trim: Provide shapes and sizes as required for the profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other Work.



Metal trim in continuous runs shall have concealed splices and be of sufficient gauge that natural distortions are not visually apparent. All exposed edges to the public shall be radiused or sharp edges eased.

2.04 FINISHING

- A. Primer and Paint should only be applied to items of steel and iron work indicated on drawings as receiving.
- B. Shop Painting:
 - 1. Shop paint Miscellaneous Metal Work, except those members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
 - 2. Remove scale, rust and other deleterious materials before shop coat of paint is applied. Clean in accordance with SSPC SP-2, SP-3, or SP-7, as required. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.
 - 3. Apply one shop coat of metal primer paint to fabricated metal items, except apply 2 coats of paint to surfaces which are inaccessible after assembly or erection.
 - 4. Immediately after surface preparation, brush or spray on metal primer paint in accordance with Manufacturer's instructions, and to provide a uniform dry film thickness of 2 mils for each coat.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 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 to appropriate Trades.
- C. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow 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 indicated on Shop Drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Install pipe bollards in concrete footings plumb and level, accurately fitted, free from distortion or defects. Provide adequate bracing as required to hold bollard in position until



concrete has been placed and cured.

1. Fill bollards solidly with concrete and mound top surface to shed water.

F. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

G. Touch-up Painting: Touch-up welds, abrasions, and other areas where shop prime paint has been removed or is damaged with specified prime paint or galvanizing repair paint.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch

3.05 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION



SECTION 05 53 00

METAL GRATINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal gratings.
 - 2. Metal frames and supports for gratings.

1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Gratings: Provide gratings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Floors: Uniform load of 125 lbf/sq. ft.(6.00 kN/sq. m) or concentrated load of 2000 lbf(8.90 kN), whichever produces the greater stress.
 - 2. Walkways and Elevated Platforms Other Than Exits: Uniform load of 60 lbf/sq. ft.(2.87 kN/sq. m).
 - 3. Walkways and Elevated Platforms Used as Exits: Uniform load of 100 lbf/sq. ft.(4.79 kN/sq. m).
 - 4. Sidewalks and Vehicular Driveways, Subject to Trucking: Uniform load of 250 lbf/sq. ft.(11.97 kN/sq. m) or concentrated load of 8000 lbf(35.60 kN), whichever produces the greater stress.
 - 5. Limit deflection to L/360 or 1/4 inch(6.4 mm), whichever is less.
- B. Seismic Performance: Provide gratings capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

1.03 SUBMITTALS

- A. Product Data: Clips and anchorage devices for gratings.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Provide templates for anchors and bolts specified for installation under other Sections.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Qualification Data: For professional engineer.
- E. Products Form: In accordance with Section 01 33 00, prior to installation in the project.

1.04 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:



1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of hardscape, walls and other construction contiguous with gratings by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating gratings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 2. Provide allowance for trimming and fitting at site.

1.06 COORDINATION

- A. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. McNichols
 2. Alabama Metal Industries Corporation.
 3. Fisher & Ludlow.
 4. IKG Industries; a Harsco Company.
 5. Morton Manufacturing Company.
 6. Ohio Gratings, Inc.
 7. Seidelhuber Metal Products, Inc.
 8. Tru-Weld.

2.02 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, unless noted or specified otherwise.

2.03 FASTENERS

- A. General: Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563(ASTM A 563M); and, where indicated, flat washers.
- C. Anchors: Provide cast-in-place, chemical, or torque-controlled expansion anchors with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.



2.04 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.

2.05 FABRICATION

- A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch(1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- D. Fit exposed connections accurately together to form hairline joints.
- E. Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
 - 1. Fabricate toeplates to fit grating units and weld to units in shop, unless otherwise indicated.
 - 2. Fabricate toeplates for attaching in the field.
 - 3. Toeplate Height: 4 inches(100 mm), unless otherwise indicated.

2.06 METAL GRATINGS

- A. General: Gratings used in publicly accessible areas shall be in accordance with ADA guidelines and requirements.
- B. Manufacturer and Product: McNICHOLS Grating, unfinished sheet steel (to allow natural rust finish): As indicated on Drawings.
 - 1. Accessories: Provide the following as required for a complete installation and as detailed on Drawings.
 - a. Angle
 - b. Bar Interlocks
 - c. Carrier Plates
 - d. Clips, Anchors, Etc.
 - e. End Plates Hardware
 - f. Kick Plate
 - g. Nosing
 - h. Splice Plates
 - 2. Options: Provide the following as applicable to installation requirements.



WEDDLE GILMORE ARCHITECTS

- a. Angle Cutting: Straight line cutting to produce an angle other than 90 degrees
- b. Annealing: Heating and slowly cooling to reduce the brittleness of a material.
- c. Bevel Cutting: A type of cut where the blade is set to other than a 90 degree angle with respect to the surface of the material.
- d. Circle Cutting: Shearing or sawing material in a circular path to a specified dimension.
- e. Cut to Size: This describes the option of cutting a standard size into pieces of specified size with typically 90 degree corners. Used to describe this process regardless of what tool or machine is used to do the cutting.
- f. Flange: An option for Mat and Pit Gratings, this is a piece of 1" material applied to the edge of the grating to trim the opening where the edge of the grating meets the opening in the floor.
- g. Install Toe Plate: The process by which a flat piece of material is attached to the edge of a piece of grating at a 90 degree angle to the surface and extending above the surface of the material, preventing a foot from extending over the edge of the grating
- h. Notching: A type of cutting where material is removed from a portion of the edge of a product to specified dimensions resulting in a "cut-out" or notch in the edge of the material
- i. Straight Cutting: Straight line cutting at a 90 degree angle to the edge of the material.
- j. Welding: The process of fusing two pieces of metal together through the application of heat, sometimes with pressure and sometimes with an intermediate or filler material having a high melting point.
- k. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

2.07 GRATING FRAMES AND SUPPORTS

- A. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
 - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- B. Finish steel frames and supports to match gratings.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing



gratings with neat, clean cut edges. Grind cuts to remove sharp edges.. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- D. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- E. Attach toeplates to gratings by welding at locations indicated.
- F. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.

3.02 INSTALLING METAL GRATINGS

- A. General: Comply with manufacturer's written instructions for installing gratings. Use manufacturer's standard anchor clips and hold-down devices for bolted connections.
- B. Attach removable units to supporting members by bolting at every point of contact.
- C. Attach nonremovable units to supporting members by welding, unless otherwise indicated. Comply with manufacturer's written instructions for size and spacing of welds.

END OF SECTION



SECTION 05 70 00

ORNAMENTAL METALS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Provide labor materials, equipment and services necessary to furnish and install ornamental metal and related work.

1.02 QUALITY ASSURANCE

- A. Subcontractor qualifications: Fabricate and install the work of this Section using a subcontractor having a minimum of 5 years experience in this type of work. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Allowable tolerances: Standard commercial tolerances shall apply to finished, fabricated and assembled materials except for flatness of sheets and plates for which the following tolerances apply.

Longitudinal or Transverse Distance, Feet
Center to center of Buckles or Edge Wave*

0 Through 2	2 Through 3	3 Through 4	4 Through 5	Over 6
3/32"	3/16"	1/4"	5/16"	3/8"

* Also applicable to overall length or width of sheet if only one longitudinal or transverse buckle or edge wave is present.

- C. Reference standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following.
1. NAAMM Metal Finishes Manual
 2. AWS Structural Welding Code
- D. Field Constructed Mock-Up: Prior to beginning production work, construct a mock up of custom laser cut metal panels, approximately 4 foot by 4 foot for approval by the Architect. Mock up may be located so as to be incorporated in the work after approval. Mock up shall include the specified finish and shall be complete with fastening method for review and acceptance by Architect.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawing for the work of this Section. Shop Drawings for items specified by design load shall include engineering calculations sealed by a Structural Engineer registered in the State of Arizona.
- B. Samples: Submit samples of the ornamental metal finishes.



- C. Product Data: Submit product data proprietary items used.
- D. Warranty: Submit warranty described below.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Storage: Store off ground and under cover, protected from damage.
- B. Handling: Handle materials so that surfaces are protected. Prevent distortion or damage to fabricated pieces.

1.05 WARRANTY

- A. Warrant finishes against excessive fading, excessive non-uniformity of color or shade, cracking, peeling, pitting or corroding, within the limits defined, for a period of three years. Upon notification of defects, make the necessary repairs and replacements at the convenience of the Owner. Warrant that repairs and replacements shall include resultant damage to adjacent materials, systems, and equipment.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel pipe, strip and plate: As specified in Section 05 50 00 - Metal Fabrications. Provide finishes as noted on Drawings.
- B. Stainless steel:
 - 1. Tubing and pipe: ASTM A269 and ASTM A312, seamless, and unless indicated otherwise on Drawings, required by design, or directed by Owner, provide Type 304 with minimum wall thickness equivalent to Schedule 40.
 - 2. Plate, sheet, and strip: ASTM A167 and unless indicated otherwise on Drawings, required by design, or directed by Owner, provide Type 304.
 - 3. Castings: ASTM A743 and unless indicated otherwise on Drawings, required by design, or directed by Owner, provide Grade CF-8.
 - 4. Finish: No. 4 unless noted otherwise indicated on Drawings.
- C. Aluminum (General): Provide alloy and temper as required by design and finish.
 - 1. Sheet and plate: ASTM B209, flat sheets. Coiled sheets are not acceptable unless specifically required by design and/or approved by Owner.
 - 2. Extruded shapes: ASTM B221.
 - 3. Tubing and pipe: ASTM B210 and ASTM B241, seamless, straight lengths. Coiled lengths are not acceptable unless specifically required by design and/or approved by Owner. Unless indicated otherwise on Drawings, required by design, or directed by Owner, provide with minimum wall thickness equivalent to Schedule 40.
 - 4. Castings: ASTM B26 and ASTM B108.
 - 5. Laser cut pattern: Ocotillo as provided by Architect.
 - 6. Finish: Metallic fluoropolymer (Kynar 500/Hylar 5000), color as noted on Drawings or as selected by Architect. Provide 3 part finish from standard palette for laser cut aluminum.
- D. Fasteners: Match metal being fastened, selected to prevent galvanic action with the



components fastened. Where exposed in finished surfaces, use oval-head countersunk cross-headed screws with head diameter one (1) screw size smaller than the shank diameter, finished to match adjacent surfaces.

2.02 FABRICATION

- A. General: Fit and assemble work in the shop as far as practicable.
- B. Welding and fitting: Complete the welding, cutting, drilling and fitting of joints prior to finishing. Weld with electrodes and by methods recommended by the ornamental metal manufacturer in accordance with applicable Structural Welding Code recommendations. Use only methods which will avoid distortion or dislocation of exposed faces. Grind weld areas smooth and restore finish before proceeding with other treatment.
- C. Fasteners: Conceal fastenings unless otherwise indicated or specified.
- D. Joints: Carefully fit and match work with continuity of line and design, using rigidly secured joints with hairline contact, unless otherwise indicated. Reinforce members and joints with plates, bar, rods or angles for rigidity and strength as needed to fulfill performance requirements. Use concealed non-ferrous metal fasteners for jointing which cannot be welded.
- E. Dissimilar materials: Separate unlike metals or alloys with a heavy coating of bituminous paint, separator gaskets or slip gaskets as required to prevent galvanic action.
- F. Miscellaneous trim: Provide miscellaneous non-ferrous panels and trim as indicated and as required in a single piece for each location. Provide trim at glass panels and mirrors as indicated.
- G. Finishes:
 - 1. Stainless steel: Provide with finish in accord with NAAMM AMP503 to match approved samples.
 - 2. Aluminum: Provide with finish in accord with NAAMM AMP501 to match approved samples
 - 3. Other metals: To match approved samples.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Field measurements: Verify dimensions before proceeding with the Work. Obtain field measurements for work required to be accurately fitted to other construction. Be responsible for the accuracy of such measurements and precise fitting and assembly of finished work.



3.03 INSTALLATION

- A. General: Install work in locations indicated, plumb, level and in line with adjacent materials where required.
- B. Coordination: Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section. Coordinate schedules for installation of the work of this Section with schedules for other installations to assure orderly progress of the total construction sequence.
- C. Attachment: Fasten metal work to solid masonry with expansion bolts or with fiber plugs and to hollow block with toggle bolts. Provide screws threaded full length to the head of the screw.

3.04 CLEANING

- A. Upon completion of this portion of the Work, promptly clean exposed portions and remove traces of dirt, grease and foreign materials.

3.05 DAMAGE AND REPAIR

- A. Upon completion of the installation, visually check exposed surfaces of the work of this Section, and touch up scratches and abrasives to be completely invisible to the unaided eye from a distance of five feet.

3.06 PROTECTION

- A. Protect finished surfaces against damage and overspray.

END OF SECTION



SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Rough carpentry including, but not limited to:
 - 1. Dimensional Lumber Framing
 - 2. Furring
 - 3. Sheathing
 - 4. Beams
 - 5. Posts and Columns
 - 6. Plywood telephone and electrical backer boards
 - 7. Miscellaneous backing, blocking, nailers and curbs.
 - 8. Wood for enclosures.

1.02 SUBMITTALS

- A. Product Data: Submit technical data for wood preservative and fire-retardant products.

1.03 QUALITY ASSURANCE

- A. Identify each piece of lumber or plywood used for structural framing with grade and trademark of a lumber grading organization. Trademark of manufacturer shall also appear on each piece.
- B. Grading Rules: Conform with applicable requirements of American Lumber Standards "Simplified Practice Recommendation R-16" and to grading rules of manufacturer's association under whose rules the lumber is produced.
- C. Standards: Conform with requirements of The Engineered Wood Association, U. S. Dept. of Commerce Commercial Standards and American Wood Preservers Institute Standards (www.preservedwood.com), as they apply.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Store off ground to assure adequate ventilation and protect against damage while stored at the site.
- C. Handling: Comply with manufacturer's instructions.

1.06 PROJECT CONDITIONS

- A. Environmental Requirements: Store materials for which maximum moisture is specified in areas where humidity can be controlled.



PART 2 PRODUCTS

2.01 LUMBER MATERIALS

- A. Species: Douglas Fir – Larch graded in accordance with Standard Grading and Dressing Rules of WCLIB. Framing lumber shall be stress grade. All sides shall be surfaced.
- B. Lumber Grades: As follows unless noted differently on the Structural Drawings:
 - 1. One inch boards: Construction.
 - 2. 2 x 4 studs, sills, plates, etc.: Number 2 or better.
 - 3. Other framing lumber, 2 to 4 inches thick: Number 2 or better.
 - 4. Beams, 5 inches and over in least dimension: Number 1 or better.
 - 5. Beams, where so noted on Drawings: Select Structural.
 - 6. Posts and columns, 5 inches and over in least dimension: Select Structural.
 - 7. Misc. blocking, bridging, etc: Utility.
 - 8. Grounds and furring: Construction Grade Douglas Fir or No. 2 White Pine.
- C. Moisture Content:
 - 1. Lumber shall be air-dried or kiln-dried.
 - 2. At time of installation, moisture content, expressed as a percentage of the weight of the oven-dry wood, shall not exceed 19 percent for lumber of up to two inches nominal thickness and 15 percent for exterior trim and siding.
 - 3. Moisture content of lumber over two inches nominal thickness shall conform to the rules of the association under which it is graded.

2.02 SHEATHING MATERIALS

- A. General:
 - 1. Panel thickness and identification index shall be as shown on the Drawings and as specified and shall also be stamped on each piece of sheathing.
 - 2. Plywood which has an edge or surface permanently exposed to the weather shall be exterior type.
 - 3. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
 - 4. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.
 - 5. Provide wood in accordance with the requirements of Section 06 05 13 - FSC Certified Wood.
 - 6. Wood and agrifiber products must contain no added urea-formaldehyde resins in accordance with the requirements of "Low Emitting Materials" as specified in Section 01 60 00 - Materials and Equipment.



- B. Plywood:
 - 1. Each panel of softwood plywood shall be identified with the APA grade-trademark and shall meet the requirements of PS-1 for softwood plywood.
 - 2. Plywood floor decking to be ¾ inch tongue and groove plywood.
- C. Plywood Backing Panels: For mounting of telephone and electrical equipment, provide Grade C-D Exposure 1 plywood panels, 15/16 inch thick, unless otherwise indicated.

2.03 FACTORY WOOD TREATMENT

- A. Preservative Treatment:
 - 1. In accordance with the low-emitting materials requirements of Section 01 60 00 - Materials and Equipment.
 - 2. Materials:
 - a. Chromated copper arsenate (CCA) shall not be allowed.
 - b. Provide ammoniacal copper quaternary (ACQ) or copper boron azole (CBA) as produced by the following manufacturers:
 - 1) Arch Wood Protection, Inc., Smyrna, GA (866) 789-4567, www.wolmanizedwood.com or www.naturalselect.com.
 - 2) Chemical Specialties, Inc., Charlotte, NC (800) 421-8661, www.treatedwood.com
 - 3) Osmose, Inc., Wood Preserving Division, Griffin, GA (800) 241-0240, www.osmose.com.
 - 3. Locations Required:
 - a. Wood sill plates and ledgers bolted in direct contact with concrete or masonry, located at or below grade only shall be pressure treated lumber.
 - b. Blocking occurring on top of or above the roof deck, including the nailer beneath the flashing at parapet caps, shall be treated lumber.
 - c. Wood for enclosures.
 - d. Other locations as required by Code.
- B. Fire-Retardant Treatment: Hickson Corp. Dricon FRTW in accordance with UL label.
 - 1. In accordance with the low-emitting materials requirements of Section 01 60 00 - Materials and Equipment.
 - 2. Where required by code, wood studs, plates, sheathing, blocking, etc. shall be pressure treated.
 - 3. Dimensioned lumber shall be kiln dried to a maximum moisture content of 18 percent before and after milling and fire protective treatment.

2.04 ACCESSORIES

- A. General
 - 1. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
 - 2. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.
- B. Nails:
 - 1. Common wire, galvanized for exterior Work, meeting ASTM F1667 of the sizes indicated on the Drawings.
 - 2. Ring shank nails shall be used at plywood subflooring.



- C. Screws: Standard domestic manufacture, bright steel, except galvanized for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials. Screws used for attaching interior trim and finish to drywall partitions shall be Type S self-drilling, self-tapping corrosion resistant coated steel drywall screws of required lengths as specified in Section 09 29 00.
 - 1. Screws used for attaching preservative treated wood shall be Type S self-drilling, self-tapping corrosion resistant coated steel screws. Acceptable products include the following:
 - a. DEC-KING Exterior Wood Screw with Climacoat.
 - b. Tapcon Concrete Anchor with Blue Climaseal or White UltraShield.
 - c. Wood-To-Metal TEKS with Grey Spex.
 - d. Roofgrip with Spex or Blue Climaseal.
 - e. GY-FAST Nail with Climacoat.
 - f. Maxi-Set Tapcon White UltraShield.
- D. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers as indicated. Bolts, nuts and washers, wholly or partially exposed on exterior shall be galvanized.
- E. Structural Bolts: Machine bolts, or carriage bolts, of structural grade steel with square nuts, conforming to ASTM A307.
- F. Steel plates and angles: ASTM A36, galvanized after fabrication.
- G. Lag screws, shear plates and split ring connectors: Conform to requirements of the "National Design Specifications for Stress Grade Lumber and its Fastenings" of National Forest Products Association.
- H. Framing anchors and joist hangers: Simpson Company products or similar devices as approved by Structural Engineer through Architect and noted on Drawings.
- I. Power driven inserts: Ramset, or as approved by Structural Engineer through Architect meeting FS GGG-D-777a. Install as per manufacturer's printed directions. Charge shall be powerful enough to prevent spalling of concrete.
- J. Galvanizing: ASTM A653.
- K. Toggle Bolts: FS FF-B-588.
- L. Fabricated Connections:
 - 1. Sheet metal galvanized of size and type shown on Drawings.
 - 2. Structural Steel: ASTM A36. Welding by qualified welders in conformance with AWS D1. One shop coat of paint per Federal Specification TT-P-86, Type II to parts not embedded.

PART 3 EXECUTION

3.01 FRAMING

- A. Coordination: Install wood framing making proper provisions for Work of other trades. Cut wood required to accommodate plumbing, heating and ventilating, electrical and other trades. Fit neatly around exposed items, like outlet boxes, conduit, pipes and ducts. Protect adjacent Work. Before proceeding with rigid sheathing, make certain required inspections have been made by Building Official.



WEDDLE GILMORE ARCHITECTS

- B. Structural Members: No cutting, notching or drilling without prior approval of the Structural Engineer through the Architect.
- C. Wood Backing: Provide wood backing, furring, stripping or blocking indicated or required for installation and attachment of work of other trades. Provide fire-proofed wood backing approved by Building Official where required by Code in noncombustible or fire-rated construction.
- D. Connections: Subdrill where necessary to avoid splitting.
- E. Bolts: Drill bolt holes 1/32 inch larger than bolt diameter. Use square plate or malleable iron washers under heads and nut where they bear against wood. Re-tighten bolts immediately prior to concealing with finish materials. Re-tighten exposed bolts immediately prior to final inspection by Building Official.
- F. Lag Screws and Screws: Subdrill, use square plate or malleable iron washer under lag screw heads when they bear on wood.
- G. Exterior base plates or sills resting on concrete: Bed in cement mortar to obtain a continuous bearing. Mortar shall consist of one part cement to three parts sand. Mix mortar in small quantities so that it can be used promptly. Size plates or sills and set level and true to line. Bolt down with bolts of size, length and spacing indicated with a bolt not more than 9 inches from the end of any piece.
- H. Rough framing: Fit closely, set accurately to required lines and levels, and secure rigidly in place. Set horizontal and inclined members with crown edge up. Reinforce cut members as directed by Structural Engineer through Architect. Bolt, nail and spike in a thorough manner with not less than the sizes and quantities indicated or specified. Structural members shall provide full contact at bearing surfaces.
- I. Studs: Wall and partitions shall be nominal 2x4 and 2x6 studs 16 inches on center unless otherwise noted or unless they are required to be larger to accommodate mechanical or electrical equipment, piping and fixtures or equipment of any other Trade. Unless otherwise detailed, panels, valve covers, cleanouts, devices, access doors, recessed cabinet boxes, etc., shall be mounted flush with the adjacent wall surface. When any such item is of a depth where it is not practical to use solid studding to the full thickness of the wall, then the wall shall be furred. When furring is required, it shall extend the full width and from floor to roof or ceiling joists. The studs comprising interior partitions and the wall material affixed thereto shall extend from floor to roof or ceiling joist framing except as shown. Staggered stud walls shall be constructed where shown on plans and as detailed.
- J. Top plates in bearing partitions: Shall be doubled and lapped at each intersection with walls or partitions. Stagger joints in upper and lower members of top plate not less than 4 feet.
- K. Provide blocking not less than 2 inches in thickness of same width as stud as follows:
 - 1. Stud partitions or walls more than 8 feet, but not more than 14 feet in height: One row of blocking fitted snugly and nailed into mid-height of stud.
 - 2. Walls or partitions over 14 feet in height: 2 or more rows of blocking. Locate rows of blocking so that in no case will the distance between sole or top plates and blocking or between lines of blocking exceed 8 feet.
 - 3. Provide solid fire blocking at ceiling line at dropped ceilings.



WEDDLE GILMORE ARCHITECTS

- L. Frame corners solid where stud walls or partitions meet or as shown on the Structural Drawing.
- M. Provide double joists under partitions parallel to joists, and for headers and side members at openings larger than 4 feet in dimension.
- N. Joist framing into headers and header joists shall be supported on joist hangers.
- O. At roofs: Provide crickets, cants, equipment curbs, wood saddles, cant strips, curbs for plywood at parapet walls; other miscellaneous backing, blocking, curbing, and wood nailers bolted to tops of concrete or masonry and expansion joints, as specified or required.

3.02 PLYWOOD SHEATHING

- A. Install roof sheathing and subflooring with long dimension perpendicular to joints.
- B. Install wall sheathing with long dimension vertical.
- C. Sheathing and subflooring shall have edges blocked and nailed for diaphragm or shear wall stresses as shown on the Drawings.
- D. Subflooring shall be glued and nailed.
- E. Install with the "C" or best face on exposed side.
- F. At non-tongue and groove sheathing, provide plywood clips at 24 inches O.C. maximum at unsupported or unblocked edges.

3.03 PLYWOOD BACKING PANELS

- A. Plywood Backing Panels: Install with the "C" or best face on exposed side.

3.04 CLEANING

- A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION



SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Rough carpentry including, but not limited to fire retardant treated miscellaneous backing, blocking, nailers and curbs, including wood construction related to roofing.

1.02 SUBMITTALS

- A. Product Data: Submit technical data for wood preservative and fire retardant products.

1.03 QUALITY ASSURANCE

- A. Identify each piece of lumber used for structural framing with grade and trade mark of a lumber grading organization. Trade mark of manufacturer shall also appear on each piece.
- B. Grading Rules: Conform with applicable requirements of American Lumber Standards "Simplified Practice Recommendation R-16" and to grading rules of manufacturer's association under whose rules the lumber is produced.
- C. Standards: Conform to requirements of U. S. Dept. of Commerce Commercial Standards and American Wood Preservers Association Standards, as they apply.
- D. Regulatory Requirements: Type VB construction, combustible materials allowed as indicated by the 2021 IBC.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Store off ground to assure adequate ventilation, and protect against damage while stored at the site.
- C. Handling: Comply with manufacturer's instructions.

1.05 PROJECT CONDITIONS

- A. Environmental Requirements: Store materials for which a maximum moisture is specified in areas where humidity can be controlled.

PART 2 PRODUCTS

2.01 LUMBER MATERIALS

- A. Species: Douglas Fir – Larch, Hem Fir graded in accordance with Standard Grading and Dressing Rules of WCLIB. Framing lumber shall be stress grade. All sides shall be surfaced.
- B. Lumber Grades: As follows unless noted differently on the Drawings:



1. Misc. blocking, bridging, etc.; including nailers at roofing: Utility.
 2. Grounds and furring: Construction Grade Douglas Fir or No. 2 White Pine.
- C. Moisture Content:
1. Lumber shall be air-dried or kiln-dried.
 2. At time of installation, moisture content, expressed as a percentage of the weight of the oven-dry wood, shall not exceed 19 percent for lumber of up to two inches nominal thickness and 15 percent for exterior trim and siding.
 3. Moisture content of lumber over two inches nominal thickness shall conform to the rules of the association under which it is graded.
- D. Blocking and nailers at roofing: Furnish wood blocking and nailers, sizes as detailed and as required. Provide longest lengths possible for blocking and nailers to eliminate joints.

2.02 WOOD SHEATHING MATERIALS

- A. In accordance with Section 06 16 36 – Wood Product Panel Sheathing.

2.03 FACTORY WOOD TREATMENT

- A. Preservative Treatment:
1. Materials:
 - a. Chromated copper arsenate (CCA) shall not be allowed.
 - b. Provide ammoniacal copper quaternary (ACQ) or copper boron azole (CBA) as produced by the following manufacturers:
 - 1) Arch Wood Protection, Inc., Smyrna, GA (866) 789-4567, www.wolmanizedwood.com or www.naturalselect.com.
 - 2) Chemical Specialties, Inc., Charlotte, NC (800) 421-8661, www.treatedwood.com
 - 3) Osmose, Inc., Wood Preserving Division, Griffin, GA (800) 241-0240, www.osmose.com.
 2. Locations Required:
 - a. Wood sill plates and ledgers bolted in direct contact with concrete or masonry, located at or below grade only shall be pressure treated lumber.
 - b. Blocking and nailers occurring on top of or above the roof deck, including the nailer beneath the flashing at parapet caps, shall be treated lumber.
 - c. Other locations as required by Code.
- B. Fire-Retardant Treatment: Hickson Corp. Dricon FRTW in accordance with UL label.
1. All, wood studs, plates, blocking, etc. shall be fire retardant treated.
 2. Dimensioned lumber shall be kiln dried to a maximum moisture content of 18 percent before and after milling and fire protective treatment.

2.04 ACCESSORIES

- A. Nails: Common wire, galvanized for exterior Work, meeting ASTM F1667 of the sizes indicated on the Drawings.
- B. Screws: Standard domestic manufacture, bright steel, except galvanized for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials. Screws used for attaching interior trim and finish to drywall partitions shall be Type S self-drilling, self-tapping corrosion resistant coated steel drywall screws of required lengths as specified in Section 09 29 00.
1. Screws used for attaching preservative and fire treated wood shall be Type S self-drilling, self-tapping corrosion resistant coated steel screws. Acceptable products include the following:



- a. DEC-KING Exterior Wood Screw with Climacoat.
 - b. Tapcon Concrete Anchor with Blue Climaseal or White UltraShield.
 - c. Wood-To-Metal TEKS with Grey Spex.
 - d. Roofgrip with Spex or Blue Climaseal.
 - e. GY-FAST Nail with Climacoat.
 - f. Maxi-Set Tapcon White UltraShield.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers as indicated. Bolts, nuts and washers, wholly or partially exposed on exterior shall be galvanized.
- D. Lag screws, shear plates and split ring connectors: Conform to requirements of the "National Design Specifications for Stress Grade Lumber and its Fastenings" of National Forest Products Association.
- E. Power driven inserts for attachment of wood blocking and nailers (including blocking and nailers at roofing): Ramset, or as approved by Structural Engineer through Architect meeting FS GGG-D-777a. Install as per manufacturer's printed directions. Charge shall be powerful enough to prevent spalling of concrete.
- F. Galvanizing: ASTM A653.
- G. Toggle Bolts: FS FF-B-588.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Wood Backing: Provide wood backing, furring, stripping or blocking indicated or required for installation and attachment of work of other trades. Provide fire-proofed wood backing approved by Building Official at roofing and where required by Code in noncombustible or fire-rated construction.
- B. Connections: Subdrill where necessary to avoid splitting.
- C. Bolts: Drill bolt holes 1/32 inch larger than bolt diameter. Use square plate or malleable iron washers under heads and nut where they bear against wood. Re-tighten bolts immediately prior to concealing with finish materials. Re-tighten exposed bolts immediately prior to final inspection by Building Official.
- D. Lag Screws and Screws: Subdrill, use square plate or malleable iron washer under lag screw heads when they bear on wood.
- E. Blocking and nailers at roofing:
 - 1. Install with mechanical fasteners at locations as detailed and as required, including but not limited to, edge conditions, penetrations, curbs, and parapets.
 - 2. Installation to concrete shall be with powder driven fasteners.

3.02 CLEANING

- A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION



SECTION 06 16 36

WOOD PANEL PRODUCT SHEATHING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plywood Sheathing
 - 2. Miscellaneous backing.

1.02 SUBMITTALS

- A. Product Data: Submit technical data for wood preservative and fire retardant products.

1.03 QUALITY ASSURANCE

- A. Identify each piece of plywood used for structural framing with grade and trade mark of a lumber grading organization. Trade mark of manufacturer shall also appear on each piece.
- B. Standards: Conform with requirements of The American Plywood Association, Engineered Wood Association, U. S. Dept. of Commerce Commercial Standards and American Wood Preservers Institute Standards (www.preservedwood.com), as they apply.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Store off ground to assure adequate ventilation, and protect against damage while stored at the site.
- C. Handling: Comply with manufacturer's instructions.

1.05 PROJECT CONDITIONS

- A. Environmental Requirements: Store materials for which a maximum moisture is specified in areas where humidity can be controlled.

PART 2 PRODUCTS

2.01 SHEATHING MATERIALS

- A. General:
 - 1. Panel thickness and identification index shall be as shown on the Drawings and as specified and shall also be stamped on each piece of sheathing.
 - 2. Design of project is based upon plywood sheathing, however, OSB Board may be substituted for plywood if it conforms to all requirements for plywood installed in like locations.
 - 3. Plywood (or OSB Board if allowed) which has an edge or surface permanently exposed to the weather shall be exterior type.



- B. Plywood: Each panel of softwood plywood shall be identified with the APA grade-trademark and shall meet the requirements of PS-1-83 for softwood plywood.
- C. Plywood Backing Panels: For mounting of telephone and electrical equipment, provide ¾ inch minimum Grade BC Exposure 1 plywood panels, unless otherwise indicated.
- D. OSB Board:
 - 1. Raw materials used in panel shall be manufactured from wood products conforming to ANSI A201.1.
 - 2. Each piece shall be stamped in accordance with American Plywood Associations (APA) grade rules and shall meet requirements of latest edition of U.S. Product standard for Softwood Plywood.
 - 3. Provide Grade 2-M-W or 2-M-F as required for thickness and application.
 - 4. OSB Panels used as floor sheathing or in any location which would leave board exposed to weather, shall have Structural 1, Exposure 1 rating.

2.02 FACTORY WOOD TREATMENT

- A. Preservative Treatment:
 - 1. Materials:
 - a. Chromated copper arsenate (CCA) shall not be allowed.
 - b. Provide ammoniacal copper quaternary (ACQ) or copper boron azole (CBA) as produced by the following manufacturers:
 - 1) Arch Wood Protection, Inc., Smyrna, GA (866) 789-4567, www.wolmanizedwood.com or www.naturalselect.com.
 - 2) Chemical Specialties, Inc., Charlotte, NC (800) 421-8661, www.treatedwood.com
 - 3) Osmose, Inc., Wood Preserving Division, Griffin, GA (800) 241-0240, www.osmose.com.
 - 2. Locations Required:
 - a. Wood sillplates and ledgers bolted in direct contact with concrete or masonry, located at or below grade only shall be pressure treated lumber.
 - b. Blocking occurring on top of or above the roof deck, including the nailer beneath the flashing at parapet caps, shall be treated lumber.
 - c. Other locations as required by Code
- B. Fire-Retardant Treatment: Hickson Corp. Dricon FRTW in accordance with UL label.
 - 1. Where required by code, wood studs, plates, sheathing, blocking, etc. shall be pressure treated.
 - 2. Dimensioned lumber shall be kiln dried to a maximum moisture content of 18 percent before and after milling and fire protective treatment

2.04 ACCESSORIES

- A. Nails: Common wire, galvanized for exterior Work, meeting ASTM F1667 of the sizes indicated on the Drawings.
- B. Screws: Standard domestic manufacture, bright steel, except galvanized for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials. Screws used for attaching interior trim and finish to drywall partitions shall be Type S self-drilling, self-tapping corrosion resistant coated steel drywall screws of required lengths as specified in Section 09 29 00.



1. Screws used for attaching preservative treated wood shall be Type S self-drilling, self-tapping corrosion resistant coated steel screws. Acceptable products include the following:
 - a. DEC-KING Exterior Wood Screw with Climacoat.
 - b. Tapcon Concrete Anchor with Blue Climaseal or White UltraShield.
 - c. Wood-To-Metal TEKS with Grey Spex.
 - d. Roofgrip with Spex or Blue Climaseal.
 - e. GY-FAST Nail with Climacoat.
 - f. Maxi-Set Tapcon White UltraShield.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers as indicated. Bolts, nuts and washers, wholly or partially exposed on exterior shall be galvanized.
- D. Structural Bolts: Machine bolts, or carriage bolts, of structural grade steel with square nuts, conforming to ASTM A307.
- E. Steel plates and angles: ASTM A36, galvanized after fabrication.
- F. Lag screws, shear plates and split ring connectors: Conform to requirements of the "National Design Specifications for Stress Grade Lumber and its Fastenings" of National Forest Products Association.
- G. Framing anchors and joist hangers: Simpson Company products or similar devices as approved by Structural Engineer through Architect and noted on Drawings.
- H. Power driven inserts: Ramset, or as approved by Structural Engineer through Architect meeting FS GGG-D-777a. Install as per manufacturer's printed directions. Charge shall be powerful enough to prevent spalling of concrete.
- I. Galvanizing: ASTM A653.
- J. Toggle Bolts: FS FF-B-588.
- K. Fabricated Connections:
 1. Sheet metal galvanized of size and type shown on Drawings.
 2. Structural Steel: ASTM A36. Welding by qualified welders in conformance with AWS D1. One shop coat of paint per Federal Specification TT-P-86, Type II to parts not embedded.

PART 3 EXECUTION

3.01 PLYWOOD SHEATHING

- A. Install roof sheathing and subflooring with long dimension perpendicular to joints.
- B. Install wall sheathing with long dimension vertical.
- C. Sheathing and subflooring shall have edges blocked and nailed for diaphragm or shear wall stresses as shown on the Drawings.
- D. Subflooring shall be glued and nailed.
- E. Install with the "C" or best face on exposed side.



- F. At non-tongue and groove sheathing, provide plywood clips at 24 inches O.C. maximum at unsupported or unblocked edges.

3.03 PLYWOOD BACKING PANELS

- A. Plywood Backing Panels: Install with the "C" or best face on exposed side.

3.04 CLEANING

- A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION



SECTION 06 17 53

SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Prefabricated wood trusses as shown on the Drawings and as specified. Miscellaneous fastening devices, except for connector plates, are specified elsewhere.

1.02 SUBMITTALS

- A. Shop Drawings: Submit engineering drawings conforming with the design load and deflection criteria shown on the Drawings for review before fabrication begins. These drawings shall bear the seal of a registered professional Engineer. See structural drawings for additional requirements.

1.03 QUALITY ASSURANCE

- A. Design: Trusses shall conform with applicable provisions of the following:
 - 1. NDS-85 for lumber.
 - 2. TPI-85 for criteria.
 - 3. IBC for code compliance.
- B. Report: Submit ICC report for metal connectors.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Handling: Handle fabricated trusses and subassemblies with care so that they are not subject to damage. During the construction period, provide means for adequate distribution of concentrated loads so that the carrying capacity of any one truss or other component is not exceeded.
- B. Storage: If the trusses are to be stockpiled or stored prior to erection, set in vertical positions and rest upon temporary bearing supports and brace so they will not be subject to unusual bending or tip over.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements and checking shop drawings details before proceeding with fabrications.



1.06 SCHEDULING

- A. Time delivery and installation of trusses to avoid delaying other trades whose work is dependent on or affected by the carpentry work and to comply with protection and storage requirements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Moisture Content: The average moisture content of lumber 2 inches or less in thickness shall be 19 percent or less at time of enclosure.
- B. Lumber defects such as wane or knots occurring in the connector plate area shall not affect more than ten percent of required plate area, or number of effective teeth required for each truss member.
- C. Connector Plates: Minimum of 0.036 inch thick and manufactured from ASTM A653 Grade A steel, hot dip galvanized to meet Coating Designation G60. In highly corrosive environments or when fire retardant lumber is specified, furnish stainless steel connector plates in lieu of hot dip galvanized.

2.02 FABRICATION

- A. Fabricate trusses in accordance with approved engineering drawings.
- B. Cut members accurately to length, angle and true to line to assure tight joints for the finished truss. Place members and connector plates in special jigs with the members tightly clamped in place and maintain in that position until the connector plates have been pressed into the lumber simultaneously on both sides of the joints. do not permit open joints which depend on the stiffness of the metal connector plates to transmit stresses or improperly fitting joints. Build camber into the member, as noted, by properly positioning the members in the fabricating jig.
- C. Apply connector plates to both faces of truss at each joint to provide firm even contact between the plate and the wood. Wood members shall be accurately cut and fabricated so that members have good bearing and completed truss units are uniform. See Truss Plate Institute Quality Standard for Metal Plate Connected Wood Trusses QST-88 for tolerances and other special requirements.



PART 3 EXECUTION

3.01 ERECTION

- A. Coordinate with other trades whose work relates to truss installation.
- B. Securely brace and block trusses both during erection and after permanent installation, in a building in accordance with Commentary and Recommendations (BWT-80) as published by the Truss Plate Institute and the manufacturer's written instructions. Erection bracing and blocking shall hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound roof framing system.
- C. Install erection and permanent bracing and blocking and permanently fasten trusses before application of loads. Permanent structural cross bracing to ensure overall rigidity of the roof system shall be in accordance with the project Structural Drawings. Check truss design drawings for additional special bracing or blocking requirements.
- D. Unless otherwise indicated on the Drawings, nailing shall be as required to assemble and secure wood construction, but in no case less than that required by applicable building codes. Connectors shall have current ICC approval.
- E. Unless specifically shown, wood plugs or nailing blocks shall not be used. Powder cartridge driven units may not be used on structural members without prior approval. Provide nails, strikes, screws, straps and similar items of suitable type and sizes to attach and hold members securely in place as may be necessary.
- F. Bridging: Install permanent bridging as recommended by Truss Manufacturer. At a minimum, provide the following:
 - 1. Install a continuous line of 2 inches x 4 inches bridging connected to each member at the web or chord member during the erection stage.
 - 2. Provide one line along the top and one line along the bottom chord.
- G. Alignment: Erect members with the top and bottom chords in true vertical alignment. Align top chords of trusses parallel to each other and straight with no point in the plane on the top chords more than 3/8 inch out of true horizontal.

3.02 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION



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SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.01 SUMMARY

- A. As required and as indicated on construction documents.

1.02 SUBMITTALS

- A. Samples: When requested by Architect, submit two samples of each profile of standing and running trim required. Samples shall be 12 inches long.

1.03 REFERENCES

- A. Reference Standards: Following standards apply to Work of this Section except where more stringent requirements are specified:
 1. Architectural Woodwork Standards (AWS), Edition 1.
 2. American Wood Preservers Association (AWPA).
 3. National Particleboard Association (NPA)

1.04 QUALITY ASSURANCE

- A. Applicable Standard: Perform work in accordance with AWS "Architectural Woodwork Standards ".
 1. Provide Premium when not otherwise indicated.
 2. Affix Quality Grade Stamp to each unit of product (e.g. each case; each panel; each bundle of trim, etc.).

1.05 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.
- B. Storage: Adequately protect against damage while stored at the site.

1.06 PROJECT CONDITIONS

- A. Physical Requirements for Proper Installation or Application: Provide humidity conditions which will not damage woodwork.
- B. Measurements: Verify dimensions shown on Drawings by taking field measurement; proper fit and attachment of parts is required.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wood Materials: As indicated on Drawings.
- C. Fasteners:
 1. Size and type: To suit application, galvanized finish in concealed locations and



- 2. stainless steel finish in exposed locations.
- 2. Concealed joint fasteners: Threaded steel.

- D. Adhesives (field applied): Solvent free, zero VOC, nonflammable, nontoxic and acceptable to Architect for application as required by Section 01 60 00. Titebond Solvent-Free Construction Adhesive as manufactured by Franklin International, Columbus, OH (800) 877-4583 www.titebond.com is an acceptable product.
- E. Finishing Materials for Field Finished Carpentry: As specified in Section 09 91 00.

PART 3 EXECUTION

3.01 PREPARATION

- A. Priming: Back-prime wood surfaces inaccessible and unexposed after installation before delivery with an approved linseed oil and aluminum primer. Prime coat unfinished metal parts prior to installation.

3.03 INSTALLATION

- A. Installation shall be in accordance with applicable standard specified herein under "Quality Assurance," for grade of work specified.
- B. Set and secure materials and components in place, plumb and level.
- C. Wood Components:
 - 1. Install members longest lengths practical to avoid end to end splices/joints.
 - 2. Miter external corners and cope internal corners.
 - 3. Where unavoidable in the finished work, splices shall be cut at a 22.5 degree angle (not square butted).
 - 4. Fasten with concealed fasteners to the greatest extent possible. When exposed fastening is required to complete installation, exposed fasteners shall be set in quirks, reveals, and reliefs (to be least visible when installation is complete).
 - a. Where blind nailing is not possible, drill pilot holes at locations best hidden in finished work.
 - b. Use only finish or casing nails. Set nails for putty stopping in surfaced members.
 - 5. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
 - 6. Touch-up shop applied prime paint and prepare woodwork as required to received paint finish specified in Section 09 91 00.

3.04 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION



SECTION 07 25 00

WEATHER RESISTIVE BARRIERS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Wall membrane system for above grade vertical wall applications over sheathing beneath exterior finishes as noted on Drawings.
- B. The design intent is that the exterior sheathing for vertical wall application shall have membrane applied continuously prior to the application of the finish.

1.02 SUBMITTALS

- A. Product Data: Submit Manufacturer's data, installation instructions, limitations and recommendations. Include certification of data indicating VOC content of components.
- B. Samples: Submit samples of membrane, protection board and composite drainage material.

1.03 QUALITY ASSURANCE

- A. Applicator Qualifications:
 - 1. Minimum 3 years' experience with Projects of similar scope and complexity.
 - 2. Applicator shall be approved by Membrane Manufacturer.
 - 3. Applicator shall furnish written evidence that applicator is currently approved by manufacturer to install the products required or specified for this project.
- B. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent Work. Agenda for meeting shall include review of special details and flashing.
- C. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the Manufacturer on-site periodically to review waterproofing installation procedures.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered in Manufacturer's original unopened packages with Manufacturer's labels intact.
- B. Material shall be protected from rain and physical damage. Store materials away from sparks or flames. Store membrane where it will not receive high temperature exposure for extended periods of time.
- C. Outdoors, place cartons on raised pallets and cover completely. Follow Manufacturer's directions.



1.05 PROJECT/SITE CONDITIONS

- A. Perform Work only when existing and forecasted weather conditions are within the limits established by the Manufacturer of the materials and products used.
- B. Proceed with installation only when substrate construction and preparation Work is complete and in condition to receive sheet membrane waterproofing.

1.06 WARRANTY

- A. Provide Manufacturer's written warranty for a period of 2 years, against failure of waterproofing system to perform in accordance with the terms expressed in the manufacturer's standard warranty.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Membrane:
 - 1. Description: .9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to .1 mm (4 mils) of cross-laminated, high-density polyethylene film to provide a min. 1 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.
 - 2. Performance Requirements:
 - a. Water Vapor Transmission: ASTM E 96, Method B - 2.9 ng/m²sPa (0.05 perms) maximum
 - b. Water Absorption: ASTM D 570 - Max. 0.1% by weight
 - c. Puncture Resistance: ASTM E 154 - 178 N (40 lbs.)
 - d. Tear Resistance:
 - e. Initiation - ASTM D 1004 - min. 58 N (7.0 lbs.) M.D.
 - f. Propagation - ASTM D 1938 - min. 40 N (4.0 lbs.) M.D.
 - g. Lap Adhesion at -4°C (25°F): ASTM D 1876 - 880 N/m (5.0 lbs./in.) of width
 - h. Low Temperature Flexibility - ASTM D 1970 - Unaffected to -43°C (-45°F)
 - i. Tensile Strength: ASTM D 412, Die C Modified - Min. 2.7 MPa (400 psi)
 - j. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412 - Die C - Min. 200%
 - 3. Acceptable Product: Perm-A-Barrier Wall Membrane manufactured by Grace Construction Products.



- B. Accessories:
 - 1. Surface Conditioner:
 - a. Description: Water-based latex liquid for substrate preparation.
 - 1) Flash Point: No flash to boiling point
 - 2) Solvent Type: Water
 - 3) VOC Content: Not to exceed 125 g/l
 - 4) Application Temperature: -4°C (25°F) and above
 - 5) Freeze/Thaw Stability: 5 cycles min.
 - 6) Freezing point (as packaged): -10°C (14°F)
 - b. Acceptable Product: Perm-A-Barrier Surface Conditioner manufactured by Grace Construction Products.
 - 2. Termination Mastic:
 - a. Description: Rubberized asphalt-based mastic with 200 g/l max. VOC Content.
 - b. Acceptable Product: Bituthene® Mastic manufactured by Grace Construction Products.
 - 3. Optional Primer:
 - a. Description: Water-based latex primer
 - 1) Specially designed for glass mat surfaced exterior gypsum boards
 - 2) VOC Content: Not to exceed 10 g/l
 - b. Acceptable Product: Perm-A-Barrier WB Primer by Grace Construction Products.
- C. Protection Material: Not applicable. Final finish shall provide protection.
- D. Other materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other work that affects, connects with, or will be concealed by this Work.

3.02 SURFACE PREPARATION

- A. Substrate to be smooth and free of voids, spalled areas, loose aggregate and sharp protrusions that would hinder the adhesion or regularity of the weather resistive barrier membrane.
- B. Remove all deleterious materials from surfaces to be covered.



3.03 INSTALLATION

- A. General: Install weather resistive barrier to dry surfaces at air and surface temperatures of 25°F and above in accordance with manufacturer's recommendations, at locations indicated on Construction Documents.

- B. Weather Resistive Barrier Membrane:
 - 1. Precut pieces of weather resistive barrier into easily-handled lengths.
 - 2. Remove silicone-coated release paper and position membrane carefully before placing length horizontally against the surface.
 - 3. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
 - 4. When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement.
 - 5. Overlap horizontally-adjacent pieces 50 mm (2 in.) and roll seams.
 - 6. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place.
 - 7. Seal around masonry reinforcing or ties and all penetrations with termination mastic.
 - 8. Continue the membrane into all openings in the wall, such as doors, windows, etc., and terminate at points that will prevent visibility from interior.
 - 9. At end of each working day seal top edge of weather resistive barrier to substrate with termination mastic.
 - 10. Do not allow the rubberized asphalt surface of the weather resistive barrier membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
 - 11. Do not expose weather resistive barrier membrane to sunlight for more than thirty days prior to enclosure.
 - 12. Inspect installation prior to enclosing and repair punctures, damaged areas and inadequately lapped seams with a patch of the membrane sized to extend 150 mm (6 in.) in all directions from the perimeter of the affected area.

- C. Accessories:
 - 1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture or if it becomes difficult to adhere the weather resistive barrier to the substrate, apply surface conditioner by spray, brush, or roller at the rate recommended by manufacturer, prior to membrane installation. Allow surface conditioner to dry completely before membrane application.
 - 2. Apply a bead or trowel coat of mastic along membrane edges, seams, cuts, and penetrations.
 - 3. Apply primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application.

- D. Install final finish material the same day the membrane is applied. Secure finish material in place by an approved method. Nails or other fasteners which penetrate through the membrane shall be treated in a manner acceptable to the waterproofing manufacturer.

END OF SECTION



SECTION 07 41 13

CORREGATED METAL ROOF PANELS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, accessories and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples:

1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

D. Qualification Data: For Installer.

E. Product Test Reports: For each product, for tests performed by a qualified testing agency.

F. Filed quality – control reports.

G. Sample Warranties: No Warranties: A 606 – 4 Weathering Steel

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who have a minimum of 3 years' experience in the installation of metal roof / wall panels.

- B. Mockups: Build mockup; to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1.03 WARRANTY

A. MANUFACTURER'S PRODUCT WARRANTY

1. Western States Metal Roofing, Inc. does not provide any warranties, express or implied on A 606 – 4 ® Weathering Steel roof and wall products.

B. CONTRACTORS WARRANTY

1. Warrant panels, flashings, sealants, fasteners, and accessories against defective materials and/ or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following Project Substantial Completion date.



1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver components, metal panels and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Store metal panels in a manner to prevent bending, warping, twisting and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weather tight and ventilated covering. Store metal panels to ensure dryness with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.05 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Western States Decking, Inc., DBA - Western States Metal Roofing, 901 W. Watkins St., Phoenix, AZ 85007; Phone: (877) 787-5467; Fax: (602) 261-7726

Email: sales@cortenroofing.com

Website: www.cortenroofing.com

- B. Substitutions: In accordance with contract documents and as approved by Architect.

2.02 METAL ROOF PANELS

- A. 7/8" Corrugated Profile; Exposed Fastener Metal Panels: Metal panel consisting of formed metal sheet with alternating curved ribs, installed by lapping edges of adjacent panels.
 - 1. Metal Panel Designation: 7/8" Corrugated
 - 2. Steel Sheet: Perforated A 606-4 ® Weathering Steel: ASTM A 606-4 High Strength Low Alloy Weathering Steel
 - a. Nominal Thickness: [22 gauge]
 - 3. Panel Coverage: [22 Gauge]
 - a. Panel Coverage: 34 2/3" Roof / 37" Wall
 - b. Panel Height: 7/8" inch
 - c. Continuous Rib Spacing: 2.67" inch on center



2.03 UNDERLAYMENT MATERIALS

- A. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.04 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin- foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters and Downspouts: Formed from same material as roof panels according to SMACNA's "Architectural Sheet Metal Manual." Finish to match metal roof panels.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.



2.05 ACCESSORIES

- A. Self-Adhering, High- Temperature Underlayment: Provide self-adhering, cold applied, sheet underlayment, a minimum of 30 mils thick, specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: Stable after testing at 220 deg F; ASTM D 1970.
 - 2. Low- Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
- B. Miscellaneous Metal Sub framing and Furring: ASTM C 645; cold formed, metallic- coated steel sheet, ASTM A 653/ A 653M, G90 coating designation or ASTM A 792/ A 792M, Class AZ55 aluminum- zinc alloy coating designation unless otherwise indicated. Provide manufacture's standard sections as required for support and alignment of metal panel system.
- C. Panel accessories: Provide components required for a complete, weather tight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 - 2. Backing Plates; Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or cross linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1 -inch-thick, flexible closure strips; cut or pre-molded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weather tight construction.
- D. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish systems adjacent metal panels.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide EPDM or PVC sealing washers for exposed fasteners.
- F. Panel Sealants: Provide sealant type recommended by manufacturers that are compatible with panel materials, are non-staining and do not damage panel finish.
- G. Metal Protection: When dissimilar metals contact each other or corrosive substrates, protect against galvanic.

2.06 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturers Standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendation in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.



2.07 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels Finish:
 - 1. Steel Sheet: A 606-4 Weathering Steel: ASTM A 606-4 High Strength Low Alloy Weathering Steel

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, area, and conditions, with installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the work.
 - 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
 - 2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacture.
 - a. Verify that air or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.



- b. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- c. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Miscellaneous Supports: Install sub framing, furring and other miscellaneous panel support members and anchorage according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.03 INSTALLATION OF UNDERLAYMENT

- A. Self- Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3- ½ inches. Roll laps with roller. Cover underlayment within 14 days.
- B. Felt Underlayment: Apply at locations indicated [below] [on drawings], in shingle fashion to shed water. And with lapped joints of not less than 2 inches.
 - 1. Apply over the entire roof surface.
 - 2. Apply on roof not covered by self- adhering sheet underlayment. Lap over edges of self- adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.
- C. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.
- D. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.04 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of ¼ inch in 20 feet on slope and location lines and within 1/8- inch offset of adjoining faces and of alignment of matching profiles.

3.05 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions, On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer, Maintain in a clean condition during construction.
- B. Replace metal roofing that has been damaged.

END OF SECTION



SECTION 07 46 23

RECLAIMED WOOD SIDING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Reclaimed wood siding at exterior wall as shown and detailed on the Drawings and as specified.

1.02 SUBMITTALS

- A. Shop Drawings: Submit drawings showing layouts, sizes, methods of construction and installation, including sizes and types of fastening devices, and other details as necessary to erect assembly.
- B. Samples: Submit two 12-inch-long samples of siding and sample of fasteners to be used.

1.03 QUALITY ASSURANCE

- A. Mock-up: Provide field sample of application of siding, including fastening method at location as directed by Architect. Provide successive mockups until accepted by Architect.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with manufacturer's instructions.

1.05 PROJECT CONDITIONS

- A. Measurements: Verify dimensions by taking field measurements; proper fit and attachment of items is required.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Siding: 1x6 inch rough sawn, lengths as required to allow a single piece to span entire width.
 - 1. Provide reclaim Wyoming snowfence as furnished by Centennial Woods, Laramie, WY (866) 778-8762 www.centennialwoods.com
 - 2. Plane wood down to 3/4 inch thickness.
 - 3. Edge Treatment: Butt joint.



- B. Fasteners:
 - 1. Nails (walls and ceiling): Corrosion resistant, galvanized (hot dipped), flat head, slender shank siding nails with head diameter of about 3/16 inch.
 - 2. Screws (barn door): Flat head, #2 Philips, black finish.
- C. Weather Resistive Barrier: As specified in Section 07 25 00.
- D. Black Scrim as approved by Architect or Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts

2.02 FLASHING MATERIALS

- A. Sheet Flashings: Sheet flashing as specified in Section 07 62 00.

2.03 FINISHING MATERIALS

- A. Finishing Materials: As specified in Section 09 91 00.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect.
 - 2. Commencement of Work will be construed as acceptance of subsurfaces.
 - 3. Examine alignment of support members before installing siding.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION - METAL FLASHING

- A. Comply with Section 07 62 00 and the following:
 - 1. Install base drip flashing at bottom edge of siding panels joints weather-lapped a minimum of 2 inches.
 - 2. Secure in place with nails at 8 inches o.c. Conceal fastenings.

3.03 INSTALLATION – WEATHER RESISTIVE BARRIER AND SCRIM

- A. Weather Resistive Barrier: As specified in Section 07 25 00. Provide weather resistive barrier over substrate just prior to installation of siding at locations exposed to weather.
- B. Provide black scrim continuous between siding and furring, substrate or weather resistive barrier at walls and ceilings to conceal any gaps at joints.



3.04 INSTALLATION

- A. Install siding and trim straight, plumb and level in pattern as indicated on Drawings.
- B. Establish level line and fasten in place continuous starter strip at bottom edge of siding.
- C. Install corner units in place, plumb in both directions, to establish alignment.
- D. Wood siding to be installed as indicated on Drawings and as directed by Architect. Install with ends offset a minimum of 16 inches from the adjacent piece. Continuously check plumb of subsequent courses as panels are placed.
- E. Nail siding at maximum 24 inches on center. Always place a nail 3/4 inches from the ends of each panel. Nail in place as recommended by manufacturer.
- F. Where power nailing is utilized, follow manufacturer's recommendations for type of nail. Adjust power nailer to set heads of nails flush with surface of panels. Do not bury heads.
- G. Make cuts, bends, punching and drilling accurate, neat and properly located.
- H. Use long sections of siding to avoid butt joints. If a butt joint occurs, it shall be located over solid backing and staggered between courses.
- I. Provide neatly cut or drilled holes and connection for other trades.
- J. Repair or replace, as directed, siding and trim which have been damaged.
- K. Seal spacing between joints with silicone sealant as recommended by manufacturer.

3.05 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION



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SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Flashings, sheet metal work and related items including, but not limited to:
 - 1. Counterflashing at vertical surfaces.
 - 2. Flashing at roof penetrations.
 - 3. Edge flashing.
 - 4. Metal copings.
 - 5. Sump pans.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Drawings indicating type of material, gage, dimensions, profiles, locations where used, fastening and anchoring methods, joints, and provisions of expansion and contraction.
- B. Samples: Submit samples of each type of prefinished metal in selected color.

1.03 QUALITY ASSURANCE

- A. Standards:
 - 1. Comply with design and installation methods of SMACNA Architectural Sheet Metal Manual.
 - 2. Comply with The NRCA Roofing and Waterproofing Manual installation details.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with Manufacturer's instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Flashing to Match Adjacent Roofing Finish, or as approved by Architect.
- B. Prefinished Metal:
 - 1. Hot-dipped galvanized, ASTM A653 Structural Quality, Grade 40, G90 coating 24 gage core steel, or prefinished Galvalume - ASTM A792.
 - 2. Finish: Full strength Kynar 500/Hylar 5000 Fluorocarbon coating, applied by the Manufacturer on a continuous coil coating line, with top side dry film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat, to provide a total dry film thickness of 0.95 to 1.25 mil.
 - a. Bottom side: Coated with primer with a dry film thickness of 0.25 mil.



- b. Finish: Conform to all tests for adhesion flexibility, and longevity as specified by the Kynar 500 finish supplier.
 - c. Color: As selected by Architect from manufacturer's full range of colors.
 - 3. Strippable film: Liquid applied to top side of painted coil to protect finish during fabrication, shipping and field handling.

C. Galvanized Steel: ASTM A653, 24 gage minimum and as indicated, with G-60 coating.

2.02 ACCESSORIES

- A. Reglets and Counterflashings: Fry Reglet Corporation, Type STX at stucco, Type SM at masonry and Concrete, or fabricated as indicated on Drawings. Provide prefabricated inside and outside reglet and counterflashing corners.
- B. Solder: ASTM B32, 50/50 type.
- C. Flux: FS O-F-506.
- D. Sealant: As specified in Section 07 92 00.
- E. Plastic Cement: ASTM D4586.
- F. Roofing Felt: ASTM D226, 15 pound type or 30 pound type.
- G. Bituminous Coating: FS TT-C-494 or SSPC paint - 12, dry film 15 mils per coat.
- H. Polyethylene: Black, 6 mil.
- I. Sheet Metal Fasteners: Pre-finished galvanized steel with soft neoprene washers at exposed fasteners. Where exposed in the finished work of prefinished metal, provide fasteners with prefinished heads matching prefinished metal.
- J. Prefinished Metal Seam Sealers and Adhesives: As recommended by prefinished metal manufacturer for waterproof and weather-resistant seaming and adhesive applications of flashing and sheet metal work.

2.03 FABRICATION

- A. Fabricate sheet metal with lines, arris, and angles sharp and true, and plane surfaces free from objectionable wave, warp or buckle. Hem exposed edges to form a 1/2 inch wide hem on the side concealed from view.
- B. Forming, anchoring, expansion and contraction details, shall conform to referenced quality standards.
- C. Provide for thermal expansion of running trim, flashing, expansion joints, and other items exposed for more than 15 feet continuous length.
- D. Fabricate cleats and starter strips of same material as sheet.
- E. Form pieces in longest practical lengths, except form flashing and facias in 8 to 10 foot units.
- F. Fabricate coping covers with butt seam with backup plate, fastened one side seams (item 19, figure 3-3 per SMACNA Architectural Sheet Metal Manual).



- G. Solder and seal metal joints or use seam sealer/adhesive as recommended by prefabricated metal manufacturer. After soldering, remove flux. Wipe and wash solder joints clean.
- H. Fabricate corners from one piece with minimum 18 inch long legs, with mitered corners; solder for rigidity, seal with sealant.
- I. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- J. Where prefabricated counterflashing and reglet system is used, form upper edge of counterflashing with an approved snap lock flange to engage reglet receiver and to provide a spring action at bottom edge against built-up flashing.

2.04 FINISH

- A. As indicated on construction documents.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
 - 1. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
 - 2. Verify membrane termination and base flashings are in place, sealed, and secure.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A. Installation shall conform to NRCA and SMACNA manuals.
- B. Expansion Seams: Maintain a watertight installation at expansion seams. Locate expansion seams as shown or if not shown, at the following maximum spacing for each general flashing use:
 - 1. Flashing, expansion joints, gravel stops, and trim: At 10 foot intervals, 24 inches on each side of corners and intersections.
 - 2. Sealant-type expansion joints: Where sealant-filled expansion joints are used, embed the hooked flanges of the joint members not less than 1 inch into the sealant. Form joints to completely conceal the sealant. When ambient temperature is moderate at the time of installation (40 to 70 degrees F.), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant type joints at temperatures below 40 degrees F. Installation of sealant is specified in Section 07 92 00.
- C. Where dissimilar materials abut, provide proper separation or protection to minimize the possibility of galvanic action.



D. Soldering:

1. Except where other methods of joining are indicated or specified, solder joints and connections of Sheet Metal Work.
2. Remove grease and dirt from metal surfaces to be joined.
3. Remove flux residue by scrubbing, neutralizing with ammonia or a 5 to 10 percent solution of washing soda, followed by a clear water rinse.
4. Assemble parts and solder using regular non-corrosive resin flux. Heat metal thoroughly to completely sweat solder through full contact area.

E. Reglets: Install reglets in masonry, concrete or stucco to receive flashings.

F. Counterflashing:

1. Provide metal counterflashing at top edges of built-up base flashings and at other locations indicated.
2. Lap end joints a minimum of 3 inches. Do not solder or weld joints. Make flashing continuous at angles. Counterflashing shall overlap base flashing a minimum of 4 inches, unless otherwise indicated.
3. Where counterflashing terminates in reglets, fasten flashing with lead wedges every 12 inches. Fill reglets continuously with synthetic rubber type sealant.

G. Facias:

1. Provide facias at exposed edges of built-up roofs. Fabricate from 24 gage galvanized metal.
2. Form expansion joints between units with 6 inch wide back-up plate and cover plates formed to exact profile of gravel stop. Fill space between units and plates with sealant.
3. Extend flanges of gravel stop out on top of built-up roofing not less than 4 inches. Set in full bed of plastic cement. Spread full bed of plastic cement between sheets of lap. Nail 1 inch from back edge at 6 inches o.c. into wood nailer.

H. Copings:

1. Cover top of parapet walls where indicated with 24 gage galvanized metal coping formed to design shown. Before applying metal, cover top of wall or wood blocking with polyethylene.
2. Extend front edge of coping covering down over the lock into a previously placed continuous edge strip. Secure edge strips with nails spaced 12 inches apart.
3. Join rear edge of coping covering to adjacent flashings as indicated.

I. Metal Edgings:

1. Provide metal edgings at exposed edges of built-up roofs. Fabricate from 24 gage galvanized iron, profile indicated.
2. Extend flanges of metal edgings out on top of built-up roofing or base flashing (as applicable) not less than 4 inches. Set in full bed of plastic cement. Spread full bed of plastic cement between sheets at laps. Nail flanges to wood nailer when nailers are under the membrane or flashing (as at roof edge or gravel stops). Nail as shown in the referenced quality standards.

3.03 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION



SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's current specifications and recommended installation procedures.
 - 2. Submit sample warranty to be signed jointly by applicator and manufacturer.
 - 3. Submit manufacturer's standard color chart.
- B. Shop Drawings: Illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.
- C. Field Adhesion Test and Stain Reports: Submit copies of logs and test reports showing results of field adhesion testing and stain testing.
- D. Contract Closeout: Submit Manufacturer's Warranty.

1.02 QUALITY ASSURANCE

- A. Qualifications:
 - 1. An approved manufacturer's installer shall perform the work, and have not less than 5 years of successful experience in the installation of caulks and sealants.
 - 2. Installers shall be thoroughly trained and experienced in the necessary skills and shall be thoroughly familiar with the specified requirements.
- B. Field Adhesion Testing: Perform preconstruction adhesion testing for each type of sealant and substrate as follows:
 - 1. Notify Architect at least 7 days prior to date of adhesion testing.
 - 2. Arrange for manufacturer's field technical representative and Architect to be present during testing.
 - 3. Install sealant in test joints in minimum 60 inch lengths.
 - 4. Test joints by standard field adhesion hand pull test.
 - 5. For joints with dissimilar substrates, test adhesion to each substrate separately as recommended by sealant manufacturer.
 - 6. Conduct number of field adhesion tests for each type of sealant and each type of substrate as follows:
 - a. Not less than 10 tests for the first 1,000 feet of installed sealant and 1 test for each additional 1,000 feet of sealant installed, or 1 test per floor per elevation.
 - 7. Document results of field adhesion tests and record results in field adhesion test log.
 - 8. Include in log data on pull distance used to test each joint sealant.
 - 9. Include data on joints where material connected with pull portion of sealant failed to adhere to joint substrate or tore cohesively.
 - 10. Inspect joints and record data for the following:
 - a. Complete fill.
 - b. No voids.
 - c. Joint dimensions matching those of manufacturer's recommended details.
 - 11. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - 12. Do not install joint sealants that fail to adhere to joint substrates during testing.



13. Repair sealant test areas by removing damaged materials and applying sealant to test area using same procedure used to originally install the sealant.
- C. Stain Testing: Perform Stain testing of natural stone, masonry and other porous substrates proposed for use in the Work. Obtain actual samples of materials proposed for use and test to determine if permanent discoloration of porous surfaces will occur from direct contact with sealants. Perform stain testing in conformance with ASTM C1248 and as follows:
1. Notify Architect at commencement of stain testing procedure.
 2. Arrange for manufacturer's field technical representative and Architect to be present during examination of test results.
 3. Cut substrate to provide flat surface for application of sealant.
 4. Separate substrate materials by removable shims to create 1/2 x 1/2 x 3 inch joint.
 5. Fill joint with scheduled sealant, tool, and allow to cure for 21 days at room temperature.
 6. After 21 day curing, remove shims, compress joint to 50 percent of original joint width to 1/4 inch, and place in an oven at 158 degrees F. for 14 days.
 7. After 14 days in oven, remove and allow sample to cool to room temperature.
 8. Examine sample to determine presence of discoloration or change in appearance in any way to exposed surfaces.
 9. After visual inspection, cut sample in half to determine presence of discoloration or change in appearance in any way into the sample itself at the adhesive bond line and presence of bleeding into the area around the adhesive bond line.
 10. Document results of stain tests and record results in stain test log.
 11. Do not install sealants that show evidence of staining substrates.
- D. Field Color and Workmanship Samples: Caulk a section of joint as directed, under job conditions, at least 7 days prior to start of work for review by Architect. When approved, sample shall be used as a standard of comparison for remainder of work.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site. Maintain product in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- C. Handling: Comply with manufacturer's instructions.

1.04 PROJECT/SITE CONDITIONS

- A. Physical Requirements for Proper Installation or Application: Observe manufacturer's temperature service range. Do not apply sealant when weather conditions will inhibit bonding and curing.

1.05 WARRANTY

- A. Provide warranty, in writing and signed jointly by the installer and sealant manufacturer, to replace sealants which fail at no additional cost to the Owner because of loss of cohesion or adhesion, or do not cure, and which fail to achieve air-tight and water-tight seal.



PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Single Source Responsibility for Joint Sealer Materials:
 - 1. Obtain joint sealer materials from a single manufacturer for each different product required.
 - 2. If sealants from separate manufacturers must be used and could come in contact with each other, provide written certification from every manufacturer involved that the sealants are compatible and will adhere to each other.

2.02 MATERIALS

- A. General:
 - 1. Sealants, primers, back-up materials, preformed joint fillers, bond breakers and related materials shall be compatible with adjoining materials.
- B. Sealant:
 - 1. The selection of proper sealant for a particular joint shall be in accordance with current published recommendations of the manufacturer and as scheduled herein.
 - 2. General: Silicone base, conforming to ASTM C-920, color to match adjacent, installed at joints and where required to weatherproof and waterproof the building.
 - a. Sealant to have permanent elasticity to allow continuous movement and flexibility.
 - b. Sealant shall have extremely high thixotropy (gap filling properties) and excellent weather and water resistance.
 - 3. Sealant at Wood Base: ChemLink NovaLink moisture curing, polyether sealant conforming to ASTM C920, Type S, Grade NS, Class 25, Uses NT, T, M, G,A and O. Sealant shall be solvent free and contain no isocyanates. Sealant shall not shrink upon curing, shall not discolor when exposed to UV light, and can not "outgas" or bubble on damp surfaces.
 - 4. Sealants at fire penetrations: As specified in Section 07 84 00.
 - 5. Color: Provide standard or custom colors as selected by Architect, In general, colors shall match adjacent materials.
- C. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- D. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- E. Joint Filler (Backer): Compatible with sealant.
 - 1. Buildings: ASTM C1330, Type B; round bi-cellular or closed cell polyethylene or polyolefin, or open cell polyurethane foam rod as recommended by the sealant manufacturer for the application; oversized 30 to 50 percent; "SofRod" as manufactured by Nomaco, or as approved.
 - 2. Pavement: ASTM D5249, Type 3, round bi-cellular or closed cell polyethylene, urethane or neoprene foam rod; oversized 30 to 50 percent; "SofRod" as manufactured by Nomaco.
- F. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- G. Gloss Reducer: Silica sand No. 20, color to match adjacent surface. Gloss reducer shall be provided at traffic sealant applications and at all cast-in-place concrete wall expansion joints.
- H. Other Materials: Provide other materials, not specifically described but required for a



complete and proper installation, as selected by the Contractor and approved by the sealant manufacturer as compatible, subject to the review of the Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces. Verify, before proceeding with this Work, that required inspections of existing conditions have been completed.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.02 PREPARATION

- A. Clean, prepare, and prime joints in accordance with manufacturer's instructions. Remove loose materials and other foreign matter which may impair adhesion of sealant.
- B. Verify that joint shaping materials and release tapes are compatible with sealant.
- C. Examine joint dimensions and size materials to achieve required width/depth ratios.
- D. Use joint filler to achieve required joint depths, to allow sealants to perform properly.
- E. Use bond breaker where required.
- F. Protect adjacent surfaces from damage by masking when necessary.

3.03 INSTALLATION

- A. General:
 - 1. Install sealant in accordance with manufacturer's instructions and ASTM C1193.
 - 2. In general, seal openings and other locations which normally require sealant to seal against infiltration from air, water and most insects, including; but not limited to:
 - a. Construction and expansion joints.
 - b. Joints between dissimilar materials.
 - c. Joints around windows, door frames, louvers and other penetrations and openings in the exterior wall. Provide minimum 3/8 inch sealant installation (exteriors only) around doors and windows.
 - d. Interior wall openings.
 - e. Sprinkler and conduit penetrations through classroom and lab walls (acoustical sealant).
 - f. Other locations indicated on drawings.
 - 3. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.
- B. Joints:
 - 1. Free of air pockets, foreign embedded matter, ridges, and sags.
 - 2. Tool joints concave.
- C. Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to



completely fill joints as detailed.

- D. Neatly point or tool joint surfaces to provide slightly concave surfaces, free of wrinkles and skips, uniformly smooth and with perfect adhesion along both sides of joint.

3.04 CLEANING

- A. Clean adjacent surfaces of sealant as work progresses.
- B. Use solvent or cleaning agent as recommended by sealant manufacturer.
- C. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

3.05 SCHEDULES

- A. Provide joint sealers per the following schedule:
 - 1. Expansion and Control Joints
 - a. Horizontal Traffic: Type 'A'
 - b. Masonry, concrete to concrete, stucco, steel, and wood: Type 'B'
 - c. Glass (except IGU or coated glass), aluminum, or natural stone: Type 'C-1'
 - d. Insulating glass, coated glass, aluminum and plastics: Type 'C-2'
 - 2. Non-expanding Joints
 - a. Glass (except insulating glass or coated glass), aluminum, or natural stone: Type 'C-1'
 - b. Insulating glass, coated glass, aluminum and plastics: Type 'C-2'
 - c. Concrete to concrete, stucco, masonry, aluminum, steel, and wood: Type 'D'
 - 3. Mechanical: Type 'D'
 - 4. Plumbing fixtures, kitchen and food service equipment: Type 'E'
 - 5. Acoustical: Type 'F'
 - 6. Wood Base: Type 'G'
- B. Sealant Material Descriptions:
 - 1. Type 'A': 2-part or 3-part self leveling urethane sealant
 - 2. Type 'B': 3-part chemically curing polyurethane sealant capable of 50% movement (ext/comp)
 - 3. Type 'C-1': 1-part low modulus moisture cure silicone rubber sealant capable of 100% movement in extension, 50% movement in compression
 - 4. Type 'C-2': 1-part low modulus neutral cure silicone rubber sealant capable of 50% movement in extension, 50% movement in compression
 - 5. Type 'D': ASTM C920, Type S, Grade NS
 - 6. Type 'E': Silicone rubber sealant with mold inhibitor
 - 7. Type 'F': Acoustical sealant
 - 8. Type 'G': Moisture curing, polyether sealant
- C. Provide UL listed fire rated sealants, safing, and accessories for all penetrations through rated assemblies.

END OF SECTION



SECTION 08 11 13 HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Steel (hollow metal) doors and frames as noted on Drawings and as specified herein.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Drawings showing elevations of each door and frame type, typical and details of construction, location and installation requirements for hardware, size and thickness of material.
- B. Fire Rated Doors and Frames:
 - 1. Installation Instructions: Door and frame manufacturer shall clearly identify the hardware products, other materials and work requirements necessary to maintain compliance with UL 10(c) (positive pressure testing) as required by 2021 IBC.
 - 2. Certification: Submit certification that fire rated doors (including frames and hardware as a unit) will comply with UL 10(c) (positive pressure testing) as required by 2021 IBC.
- C. Furnish recognized independent test lab certification that products comply with ANSI A250.4.

1.03 DELIVERY AND STORAGE

- A. Deliver welded frames with spreaders and doors with wrappers.
- B. Store doors and frames under protective cover in dry, enclosed spaces at the site. Place doors and frames on non-staining blocking. Raise bottoms of doors at least 4 inches high and provide 1/4 inch air space between stacked doors to avoid metal to metal contact and permit air circulation.

1.04 QUALITY ASSURANCE

- A. Doors and frames shall be certified to comply with ANSI A250.4, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing, and ANSI A250.8, Recommended Specifications for Standard Steel Doors and Frames.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish steel doors and frames from one of the following Manufacturers, except as otherwise approved by the Architect, subject to compliance with Specification requirements:
 - 1. Ceco Door Products (Assa Abloy) www.cecodoor.com (Basis of Design)
 - 2. Steelcraft Manufacturing Co.
 - 3. Curries Company www.curries.com
 - 4. The Kewanee Corp. www.kewaneeecorp.com
 - 5. Republic Builders Products www.republicdoor.com



6. Fleming Steel Doors and Frames

B. Doors and frames shall be furnished by the same Manufacturer.

2.02 MATERIALS

- A. Doors: Furnish Level, Model and Physical Performance level in accordance with ANSI A250.8/SDI-100.
 - 1. Interior Doors: Ceco Ultrador (UP) Polystyrene Core Doors, or approved equal.
 - a. Level: Level 2, 18 gauge.
 - b. Physical Performance: Level B.
 - c. Model: Model 1, Full Flush.
 - 2. Exterior Doors: Ceco Ultrador (UP) Polystyrene Core Doors, or approved equal.
 - a. Level: Level 3, 16 gauge.
 - b. Physical Performance: Level A.
 - c. Model: Model 1, Full Flush.
 - 3. Where doors are to be used as part of an acoustical barrier assembly, they shall be rated a minimum of STC 33.
- B. Core: Polystyrene core. Core shall be as allowed by UL 10(c) for fire rated doors.
- C. Frames: ANSI A250.8/SDI 100, 16 gauge steel.
- D. Glazing Beads: Minimum 20 gauge steel.
- E. Steel: ASTM A1008 cold-rolled or ASTM A1011 hot-rolled. Hot-dip galvanized meeting ASTM A653, Grade A60 galvanized for exterior openings.
- F. Paint:
 - 1. Interior
 - a. Non-lifting, rust-inhibitive grey primer meeting ANSI A224.1, compatible with field finish specified in Section 09 91 00, applied after bonderizing.
 - 2. Exterior: Primer as specified for System 101 in Section 09 91 00.

2.03 FABRICATION- DOORS

- A. Construct hollow metal doors, flush and vision lite types as scheduled on Drawings, in accordance with ANSI A250.8/SDI-100 with core as specified above. Reinforce top and bottom of doors horizontally by 16 gauge steel channels, full width, spot welded to each face at least 3 inches on center. Bevel edge of lock stile.
- B. Door Edge Joint and Treatment: Painted Steel Doors: Joints at the edges of doors shall have manufacturer's standard edge construction with continuously welded seam, dressed smooth.
- C. Where heavy duty hinges have been specified, provide 7 gauge or equivalent reinforcing at hinge cut outs. Coordinate with hardware schedule.
- D. Exterior Doors: Provide insulated doors. Close top and bottom edges of all exterior doors flush as an integral part of the door construction, or by placing end closure channel with web of channel flush with top and bottom edge of door (not inverted), or by addition of end cap at top and bottom of door, spot welded to each face at least 3 inches on center, filled and dressed smooth. Doors to have weatherstripping as specified in Section 08 71 00.
- E. Interior Doors:
 - 1. Provide view lites as indicated on Drawings.



2. Fire rated doors shall have fire-resistive-rated glazing complying with IBC Sections 716.2 and 716.5.5 (fire-protective-rated glazing shall not be acceptable) as acceptable to Architect.
- F. Reinforce openings in doors for lites and vents on all sides with 14 gauge steel channel.
 - G. Provide non-egress double doors with one-piece astragals of 14 gauge steel unless otherwise indicated or scheduled. Provide solid drip cap at top of exterior out-swinging doors.
 - H. Accurately mortise doors for locks and hinges. Provide adequate box type reinforcement with steel plates welded to the interior reinforcing channels and drilled and tapped. Provide reinforcement for all other items of hardware.
 - I. Doors with glass lite openings shall have trim recessed from the face of the door, beveled and attached with screws.
 - J. Fire-Rated Doors: Provide fire rated doors investigated and tested as fire door doors, complete with type of hardware to be used. Identify each fire door with recognized testing laboratory labels, indicating applicable fire rating of steel doors. Doors required to meet smoke and draft control assembly requirements shall have labels that identify that the door has been tested and approved for smoke and draft control assemblies (S-label). Construct doors to comply with NFPA Standard No. 80.

2.04 FABRICATION - FRAMES

- A. Construct to shapes and sizes shown, meeting various wall thicknesses in accordance with ANSI/SDI-100.
- B. Provide fully profile welded type frames with welds ground and dressed smooth. Continuously weld, fill, grind and dress smooth face frame miters. Continuously back-weld casing, stop, soffit and rabbet.
- C. Mortise, reinforce, drill and tap for standard weight, full mortise template hinges and template strike.
- D. Provide 18 gauge anchors at 16 inches on center at each jamb. Provide adjustable 18 gauge floor clips at each jamb, welded to back face of jamb, punched for securing to floor with two spaced anchors.
- E. Make cutouts for required hardware specified under Section 08 71 00, from templates furnished. Reinforce butt cutouts with minimum 8 gauge thick steel plate drilled and tapped and welded in place. When heavy duty hinges are specified, provide high frequency reinforcing at frames for hinges. Coordinate with hardware vendor. Provide strike stops of frames with holes for three rubber door silencers; on double door frames, provide for two silencers per door at head.
- F. For openings over 42 inches wide and at double openings, reinforce head members full length with a matching profile of 12 gauge steel. Provide anchor at midpoint of door, if practical.
- G. Construct frames for UL labeled doors in accordance with UL requirements and label as scheduled. Frames required to meet smoke and draft control assembly requirements shall have labels that identify that the frame has been tested and approved for smoke and draft control assemblies (S-label).



2.05 FABRICATION TOLERANCES

- A. Allowable Tolerances for Fabrication: As specified in ANSI/SDI-117, Manufacturing Tolerances Standard Steel Doors and Frames.

2.06 PAINTING

- A. Bonderize and prime doors and frames with one shop coat of rust inhibitive primer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install metal door frames plumb, level, rigid and in true alignment as recommended in SDI 105 and ANSI/DHI A115.IG.
- B. Install doors and fasten to maintain alignment with frames to achieve maximum operational effectiveness and appearance.
 - 1. Maintain clearances as specified in ANSI A250.8, 2.1.8.
 - 2. Shim as required per NFPA 80, ANSI/A115.IG and SDI 122.
- C. Fill backs of frames solid with mortar at concrete and masonry construction, except where electrified and the frames are used as wiring chase.
- D. Install fire doors and frames to comply with NFPA 80 and in accordance with manufacturer's printed instructions.
- E. Prepare and install doors in accordance with ANSI A115 and SDI 122.

3.02 FIELD QUALITY CONTROL

- A. Manufacturer's representative shall inspect fire rated doors (including frames and hardware as a unit) and verify compliance with UL 10C (positive pressure testing) as required by 2021 IBC. Fire rated doors (including frames and hardware as a unit) which do not comply with UL 10C (positive pressure testing) as required by 2021 IBC Section 714 shall be removed and replaced at no additional cost to Owner.

3.03 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION



SECTION 08 41 13

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Exterior:
 - a. Punched Openings - Basis of Design: Arcadia AFG451 Series, non-thermally broken frame, 2 inches by 4-1/2 inches with one inch insulated glass.
 - b. Aluminum Entry Doors at Exterior and Interior - Basis of Design: Arcadia WS512 Standard Wide Stile, 1 3/4" thick door rail with one inch insulated glass.
- B. Related Sections:
 - 1. Section 08 71 00 - Door Hardware
 - 2. Section 08 80 00- Glazing.

1.02 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Window wall framing system shall provide for flush retained glazing on all sides without projecting stops, with glass located at either center of the frame or offset within the frame as indicated on Drawings.
 - 2. Framing system shall be suitable for outside or inside glazing.
 - 3. System shall be either screw spline, shear block or a compensating/stick system.
- B. Performance Requirements: Window wall.
 - 1. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. of wall area at 6.24 PSF as measured in accordance with ASTM E283.
 - 2. Water leakage: None, when measured in accordance with ASTM E 331 with a minimum static test pressure of 6 psf.
 - 3. Limit deflection to L/175 with a maximum of 3/4 inch when subjected to 25 psf wind load design pressure acting inward and outward.
 - 4. System shall not deflect more than 1/8 inch at the center point of a horizontal member, or more than 1/16 inch at the center of members located directly above operable doors and windows, once deadload points have been established.
 - 5. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.
 - 6. Seismic requirements shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.
 - 7. Provide framing systems with condensation resistance factor (CRF) of not less than 55 when tested according to AAMA 1503.1.
 - 8. Provide framing systems with average U values of not ore than 0.63 Btu/sq. ft. x h. x degree F when tested according to AAMA 1502.7.



- C. Performance - Aluminum Doors (Swinging): Resistance to corner racking shall be tested by the Dual Moment Load test as follows:
1. Test section shall consist of standard top door corner assembly. Side rail section shall be 24 inches (600mm) long and top rail section 12 inches long.
 2. Anchor "top rail" positively to test bench so that corner protrudes 3 inches beyond bench edge.
 3. Anchor a lever arm positively to side rail at a point 19 inches from inside edge of top rail. Attach weight support pad at a point 19 inches from inner edge of side rail.
 4. Test section shall withstand a minimum load of 155 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation on the lever arm in excess of 45 degrees.

1.03 SUBMITTALS

- A. Submit product data, shop drawings and samples in accordance with Section 01 33 00.
1. Product Data: Submit 2 copies of Manufacturer's Specifications, recommendations and standard details for aluminum doors, frames and components of the Work. Include manufacturer's installation manual.
 2. Shop Drawings:
 - a. Include wall elevations at 1/2 inch scale, and full-size detailed sections of every typical composite member.
 - b. Show anchors, joint system, expansion provisions, end dams, water diverters and other components not included in Manufacturer's standard data.
 - c. Include glazing details.
 3. Samples:
 - a. Submit 3 samples of each required aluminum finish on 12-inch-long extrusions or 6-inch square sheets of the alloys to be used for the Work.
 - b. Where normal color and texture variations are to be expected, include 2 or more units in each Sample, to show the range of such variations.
 - c. Samples will be reviewed by Architect for color and texture only.
 - d. Architect reserves the right to require samples of typical fabricated sections, showing joints, exposed fastenings (if any), quality of workmanship, hardware and accessory items, before fabrication of the Work proceeds.

1.04 QUALITY ASSURANCE

- A. Standards: Except as otherwise indicated, the requirements for aluminum doors and frames, and the terminology used in this Section, are those of NAAMM, AAMA and AA and in particular, those of the "Entrance Manual" by NAAMM.
- B. Regulatory Requirements:
1. ANSI A117.1, 1998 "Accessible and Usable Buildings and Facilities."
 2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA)."
 3. ADA Accessibility Guidelines (ADAAG).
 4. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG)



- C. Single Source Responsibility: Obtain entrance, storefront, ribbonwall, and curtain wall systems, including finishes, used for this project through one source from a single manufacturer. Operable windows used in conjunction with entrances, storefront, ribbonwall and curtainwall systems shall be manufactured by a company whose products are compatible with the specified entrances, storefront, ribbonwall and curtainwall systems.

1.05 PROJECT/SITE CONDITIONS

- A. Field Measurements:
 - 1. Whenever possible, check the actual openings in the construction Work by accurate field measurement before fabrication, and show recorded measurements on final shop drawings.
 - 2. Coordinate fabrication schedule with construction progress as directed and avoid delays of the Work.
 - 3. Where necessary, proceed with fabrication without field measurement, and coordinate installation tolerances to ensure proper fit of units.

1.06 WARRANTY

- A. Warrant entire system of aluminum entrance doors and frames against leaks or other defects for a period of ten (10) years.
 - 1. Defective materials and workmanship are hereby defined to include, but are not limited to, evidence of:
 - a. Penetration of water into the building through fixed glazing and framing components.
 - b. Air infiltration exceeding specified limits.
 - c. Structural failure of components resulting from forces within specified limits.
 - d. Failure of insulated glass units.
 - e. Cracking, crazing, flaking, of coatings or opacifiers on glass.
 - f. Secondary glass damage and/or damage due to falling components.
 - g. Adhesive or cohesive failure of sealant.
 - h. Crazing on surface of non-structural sealant.
 - i. Non-structural sealant hardening beyond Shore A durometer 50 or softening below 20.
 - j. Failure of operating parts to function normally.
- B. Warrant aluminum finish against excessive fading, excessive non- uniformity of color or shade, cracking, peeling, pitting or corroding (all within the limits defined). Warranty shall include replacement at no charge (material and labor) for a period of five (5) years beginning on the date of final acceptance.
- C. Upon notification of defects within the warranty period, make the necessary repairs and replacements at the convenience of the Owner. Repairs and replacements shall include resultant damage to adjacent materials, systems and equipment.



PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following manufacturers subject to compliance with specifications requirements:
 - 1. Arcadia, Inc. www.arcadiainc.com
 - 2. EFCO www.efcocorp.com
 - 3. Kawneer Co. www.kawneer.com

2.02 MATERIALS

- A. General
 - 1. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
 - 2. Provide regional materials in accordance with Regional Materials provisions of Section 01 60 00.
- B. Framing members, transition members, mullions, adapters, and mountings: Extruded 6063 T5 aluminum alloy (ASTM B221 - Alloy G.S. 10aT5).
- C. Screws, miscellaneous fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM B633. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.
- D. Glazing gaskets: Elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.
- E. Steel Sections: ANSI/ASTM A36; shaped to suit mullion sections.
- F. Shop and Touch-Up Primer for Steel Components: SSPC 15, Type 1, red oxide.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPS 20, zinc rich type.
- H. Glass: As specified in Section 08 80 00.
- I. Sealant:
 - 1. Silicone sealant in accordance with Section 07 92 00.
 - 2. Interior Applications: In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

2.03 COMPONENTS

- A. Sizes and Profiles: The required sizes for doors and frame units, and profile requirements, are shown.

2.04 FABRICATION

- A. General:
 - 1. Weld by methods recommended by the Manufacturer and AWS to avoid discoloration at welds.
 - 2. Grind exposed welds smooth and restore mechanical finish.
 - 3. Remove arises from cut edges and ease edges and corners to a radius of approximately 1/64 inch.
 - 4. Conceal fasteners, wherever possible, except as otherwise shown.
 - 5. Maintain continuity of line and accurate relation of planes and angles.



6. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.
 7. Reinforce the Work as necessary for performance requirements, and for support to the structure.
 8. Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion.
 9. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.
- B. Frames:
1. Fabricate tubular assemblies as shown, with either welded or mechanical joints in accordance with Manufacturer's standards, with concealed fasteners wherever possible.
 2. Provide members of the size, shape, and profile shown.
 3. Reinforce internally with steel channel shapes as shown, or as necessary to support the required loads. Secure vertical steel at head and sill as necessary for structural performance.
 4. Weatherstripping: Provide compression weatherstripping on door-contact face of door stops on exterior door frames and/or other frames where indicated.
 5. Glass framing members shall provide for flush glazing with through sight lines, without projecting stops for glass thicknesses noted on drawings or as specified in Section 08 80 00.
 6. Provide glazing system for frames to receive lights. Design system for replacement of glass.
 7. System shall provide resilient settings for glass by use of elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.
 8. Fabricate frame assemblies for exterior walls with flashing and weeps to drain penetrating moisture to exterior.
 9. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.
 10. Allow for thermal expansion of exterior units.
 11. Include flashings in conjunction with components as detailed, finished to match.
- C. Doors (Swinging)
1. Materials: Sections shall be extruded for 6063-T5 aluminum alloy (ASTM B221 - Alloy G.S. 10A T5).
 2. Fasteners, where exposed, shall be aluminum, stainless steel or plated steel in accordance with ASTM A-164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.
 3. Glazing gaskets shall be TPE or EPDM elastomeric extrusions.
 4. Major portions of the door stiles shall be 0.125 inch in thickness and glazing molding shall be 0.050 inch thick.
 5. Construction:
 - a. Wide Stile:
 - 1) Vertical Stile: 5 inches.
 - 2) Top Rail: 5 inches.
 3. Bottom Rail: 12 inches
 - b. Thickness of stiles and rails: 1-3/4 inches.
 - c. Corner construction: Fillet weld and mechanical clip fastening.
 6. Door shall be weatherstripped on 3 sides with metal-backed pile cloth installed in door and/or frame. Provide an integral adjustable (uninterrupted) dual weathering at meeting stiles of pairs of doors.



7. Hardware: Provide the following items:
 - a. Hinges, push-pulls, locks, closers, threshold, weatherstrip, and door bottom/sweep: Aluminum Door Manufacturer's standard.
 - b. Cylinder: As specified in Section 08 71 00.
- D. Exterior Ornamentation:
 1. Fabricate assemblies as shown with tubular shapes, plates and sheet. Fabricate with either welded or mechanical joints in accordance with Manufacturer's standards, with concealed fasteners wherever possible.
 2. Provide members of the size, shape, and profile shown.
 3. Provide anchorage and alignment brackets for concealed support of assembly from aluminum storefront and ribbon wall frames.
 4. Allow for thermal expansion.
 5. Continuously weld all joints and grind smooth. Provide exposed surfaces smooth, square, and free of surface blemishes.
- E. Flashings and Miscellaneous Trim:
 1. Provide interior sills, exterior sill (or subsills) with end dams, closures, flashings, trim and other elements in conjunction with or adjacent to storefront system as required for watertightness and aesthetics. If sill frame does not provide means for conducting water out of the aluminum frame systems, then suitable flashings to ensure that water is conducted out of system shall be provided. Provide water diverters at ends of the horizontal mullion glazing pockets to drain water down the vertical mullion/hamb glazing pockets to sill can or flashing.
 2. Fabricate miscellaneous trim from 0.060-inch-thick minimum aluminum (break metal) finished to match other components, except fabricate interior and exterior sills(or subsills) from 0.075-inch-thick minimum extruded aluminum (unless the sill or subsill is supporting the weight of the system and then a 0.125-inch thick minimum extruded aluminum shall be provided).
 3. Flashings and sill can, in conjunction with mechanically fastened end dams and/or water diverters shall direct water entering the system to the outside of the building and shall not depend solely upon sealants.
- F. Hardware Installation at Factory:
 1. Cut, reinforce, drill and tap frames as required to receive hardware except do not drill and tap for surface-mounted items until the time of installation at the Project Site. Comply with Hardware Manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
 2. Install hardware, except surface-mounted hardware, at fabrication plant. Remove only as required for final finishing operations, and for delivery and installation of the Work at the Project Site.
- G. Aluminum Finishes:
 1. Prepare the aluminum surfaces for finishing in accordance with the aluminum producer's recommendations and standards of the finisher or processor.
 2. Process components of each assembly in a manner to attain complete uniformity of color.
 3. Finish: Dark Bronze anodized, Architectural Class 1 anodic coating conforming to Aluminum Association Designation AA-M-12 C22 A42/44.



PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A. Comply with Manufacturer's Specifications and recommendations for the installation of aluminum entrance and storefront frames.
 - 1. Furnish necessary material, labor, and equipment for the complete installation of the following: glass framing, vertical and horizontal mullions, transitional members connecting these components, adapters and mountings for trim moldings and facing materials.
 - 2. Set units plumb, level and true in line, without warp or rack of frames, doors or panels.
 - 3. Anchor securely in place.
 - 4. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
 - 5. Set sill members and other members in a bed of compound as shown, or with joint fillers or gaskets as shown to provide weathertight construction.
- B. Comply with Section 07 92 00 for sealants, compounds, fillers and gaskets to be installed integrally with aluminum entrances and storefronts.
 - 1. Seal joints in aluminum entrance and storefront in a concealed manner, unless exposed sealant is indicated.
- C. Comply with Section 08 80 00 and Aluminum Storefront Manufacturers printed instructions for installation of glass shown to be glazed into aluminum entrances and storefront.
- D. Dimensions indicated are based on an assumed design temperature of 70 degrees F. Take into account the ambient temperature range at the time of fabrication and erection.
- E. Cut and trim component parts of the aluminum entrance and storefront during erection only with the approval of the manufacturer or fabricator and in accordance with his recommendations. Do not cut through reinforcing members. Restore finish completely to protect material and remove evidence of cutting and trimming. Remove and replace members where cutting or trimming has impaired strength or appearance.
- F. Do not erect members which are warped, bowed, deformed or otherwise damaged to such extent as to impair strength or appearance. Remove and replace members damaged in the process of erection.

3.03 FIELD QUALITY CONTROL

- A. At Owner's request, test the storefront system for water leaks in accordance with AAMA 501.2.94.



3.04 CLEANING

- A. Clean aluminum surfaces promptly after installation of frames, exercising care to avoid damage of the protective coating.
- B. Remove excess glazing and sealant compounds, dirt, and other substances.
- C. Construction Waste: In accordance with Section 01 74 19 .

END OF SECTION



SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Hardware and related items for interior and exterior doors, other than specified in specific door sections.

1.02 SYSTEM DESCRIPTION

- A. Performance Requirements: The Manufacturer or Authorized Distributor shall confirm that there is an established local agency which stocks a full complement of parts and offers service during normal working hours for the finish hardware to be furnished and that the agency will supply parts without delay and at reasonable cost.
- B. Furnish hardware items of proper design for use in doors and frames of the thicknesses, profile, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information in the Contract Documents.

1.03 SUBMITTALS

- A. Submit shop drawings and product data of each type of hardware required for Project, in accordance with Section 01 33 00. Indicate the following:
 - 1. Style and finish.
 - 2. Locations and mounting heights of each item of hardware. Use established numbering system.
 - 3. Include a complete listing of equipment and materials including manufacturer, catalog number, finish, diagrams, (including cut-sheets), schematics and all other pertinent data.
- B. Templates: Supply to Door and Frame Manufacturer(s) to enable proper and accurate sizing and locations of cutouts for hardware.
- C. Certification:
 - 1. At the completion of installation, certify that material is properly installed according to Manufacturers printed instructions.
 - 2. Submit certification that hardware for fire rated doors (including doors and frames as a unit) will comply with UL 10C (positive pressure testing) as required by IBC Section 714.
- D. Operating and Maintenance Data: Submit in accordance with Section 01 77 00. Provide Owner with Manufacturer's parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.

1.04 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. ANSI/NFPA 80 - Fire Doors and Windows.
 - 2. UL Standard 305 - Panic Hardware.



B. Regulatory Requirements:

1. Comply with the following:
 - a. ANSI A117.1, 1998 "Accessible and Usable Buildings and Facilities."
 - b. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
 - c. ADA Accessibility Guidelines (ADAAG).
 - d. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG)
2. Hardware listed or furnished shall meet requirements of Federal, State and Local codes having jurisdiction.
3. Any item furnished or installed that does not meet code requirements shall be removed and proper items substituted at no additional cost or expense to the Owner.
4. Provide hardware for fire-rated openings in compliance with A.I.A. (NBFU) Pamphlet No. 80 and NFPA Standards No. 80 and No. 101 and UL 10(c) (positive pressure testing). This requirement shall take precedence over other requirements for such hardware.
5. Provide hardware which has been tested and listed by U.L. for the types and sizes of doors required, and which complies with the requirements of the doors and door frame labels.
6. Provide 3-point latches at aluminum double doors used as entrance, not egress exit.
7. Hardware on all doors leading to or from electrical rooms, mechanical rooms, service stairs, dock areas and the like which represent a hazard to the blind, shall have knurling or abrasive coating on the door lever, handle, or bar which will alert the user to potential perils present. The hardware product and installation shall satisfy all governing handicapped codes.

C. Supplier Qualifications:

1. Employ an AHC member of the DHI.
2. Factory authorized stocking distributor of the approved items.
3. Holder of legally required licenses.

D. Manufacturer Qualifications: 5 years experience in manufacture of comparable systems.

1.05 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Package each item of hardware in original and individual containers, complete with all necessary fastenings, keys, instructions, and templates for spotting mortising tools.

1. Mark each container with its item number corresponding to the item number on the finish hardware schedule.
2. Containers holding locks shall show the following corresponding to that shown on the finish hardware schedule:
 - a. Heading number
 - b. Door number
 - c. Hand of door (when required)
 - d. Keying symbol (developed by Owner)
3. A typewritten schedule in DHI format conforming with the approved schedule shall accompany each shipment.

B. When hardware must be installed at the factory, the hardware supplier shall send all such needed items to the respective supplier for their use in installation. The cost of this shipping requirement shall be borne by the hardware supplier.

C. Acceptance at Site: Upon delivery of the finish hardware to the job site, check in and sign for all material delivered and thereafter be responsible for same.



- D. Storage and Protection: Provide a secured area with sufficient space and shelving in which to store and inventory all materials under lock and key. Protect hardware from damage at all times.

1.06 WARRANTY

- A. Warranty hardware against defects in materials and workmanship for 2 years. Repair, replace or otherwise correct deficient materials at no additional cost to Owner.
1. Locksets: 3 year warranty.
 2. Closers: 10 year warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products equaling or exceeding quality requirements of the specified product as manufactured by the following are acceptable:
1. Butts: Ives: www.iveshardware.com , Stanley www.stanlybostich.com , McKinney www.mckinneyhinge.com .
 2. Exit Devices: Dorma www.dorma-usa.com , Von Duprin www.vonduprin.com , Precision www.precisionhardware.com .
 3. Locksets: BEST www.besthdw.com , Schlage www.schlagelock.com , Yale www.yalesecurity.com .
 4. Closers: LCN www.lcnclosers.com , Norton www.nortondoorcontrols.com, Dorma www.dorma-usa.com .
 5. Thresholds, Door Bottoms, Weatherstripping: Pemko www.pemko.com , Hager www.hagerhinge.com , Ultra www.ultrahardware.com , National Guard www.ngp.com .
 6. Stops, Kickplates, Pulls, Push Plates: Ives www.iveshardware.com , Trimco www.trimcobbw.com , Hager www.hagerhinge.com.
 7. Pocket Door Hardware: Hager www.hagerco.com, Stanley www.stanleyworks.com , Grant.
 8. Overhead Concealed Closers: LCN www.lcnclosers.com, Dorma www.dorma-usa.com.
 9. Coordinators and Automatic Flush Bolts: DCI www.doorcontrols.com, Trimco www.trimcobbw.com, Hager www.hagerco.com.
 10. Push/Pull Latches: Glynn Johnson www.glynn-johnson.com , ABH www.abhmfg.com , Trimco www.trimcobbw.com
 11. Digital Locks: Locknetics www.locknetics.com , Unican www.ilcounican.com.
- B. To the greatest extent possible, obtain all finish hardware of the same type of item from only one Manufacturer.

2.02 HARDWARE

- A. General:
1. Provide items as listed in schedule complete to function as intended.
 2. Manufacture hardware supplied for metal doors or jambs to template and secure with machine screws.
 3. Where cylindrical locks are used in hollow metal doors, furnish lock reinforcing in the door at the time of manufacture.



4. Furnish finish hardware with all necessary screws, bolts, or other fastenings of suitable; size and type to anchor the hardware in position for heavy use and long life, and of compatible material and finish.
 5. Furnish fastenings with anchors according to the material to which it is applied, and as recommended by the Manufacturer.
 6. Furnish hardware fastened to concrete with machine screws and tampins.
 7. Fasten closers on wood or mineral core doors with fasteners recommended by the closer manufacturer for the apparent intended use of the device, unless the installation is in an opening requiring UL-rated hardware in which case sex nuts and bolts (approved by UL) are required by UL.
 8. For surface mounted closer, pivot hinges, concealed closers or holders or other hardware mortised into the top or bottom edges, edges shall be a minimum of 4-1/2 inches, thoroughly kiln-dried hardwood.
- B. Finishes: US 26D (626), satin chrome, and US 32D (630), satin stainless steel, unless scheduled otherwise.
- C. Butt Hinges:
1. Determine correct clearance from the Drawings.
 2. Provide non-removable pins on exterior outswinging doors and reverse bevel interior locked doors.
 3. Doors with closers shall have ball bearing butts.
 4. Flat button, top and bottom tips required.
 5. Butt Hinge Length: As recommended by Manufacturer.
 6. Number of Butt Hinges Required: As recommended by Manufacturer.
- D. Door Locks and Latchsets: Types, series, designs, functions and finishes as listed in hardware sets.
1. Design shall permit removal of cylinder without removing lock from door.
 2. Provide locks and latchsets with 2-3/4 inch backset unless otherwise noted.
 3. Provide strikes with extended lip where required to protect trim from being marred by latch bolt.
 4. Provide wrought boxes with strikes.
- E. Door Closers:
1. Surface mounted without covers, finish sprayed to match other hardware.
 2. Bodies to be close grained malleable iron, with 3 separate control valves (including backcheck) ANSI Grade 1 or aluminum, ANSI Grade 1.
 3. Closer to be equipped with size adjustment (1 through 6) in the field by the installer.
 4. Equip closers mounted on wood or mineral core doors with conventional fasteners unless the manufacturer of the closer recommends sex nuts and bolt because of the apparent frequency use of the closer. In the event the door is indicated to be UL-rated, the sex nuts and bolts shall be UL approved.
 5. Closers to be installed on interior of door.
 6. Provide EDA arms for parallel applications.
 7. Provide type as listed in sets.



- F. Exit Devices:
 - 1. U.L. approved for Casualty.
 - 2. Devices to match in design.
 - 3. Types, functions and finishes as listed in hardware sets.
 - 4. Fire doors to be equipped with UL rated exit devices meeting the fire label requirement.
- G. Push Plates: Type and size as listed.
- H. Pull Plates: Type and size as listed.
- I. Kickplates and Armorplates: Size as listed. Provide .050 inch thick stainless steel with No. 4 finish, edges ground smooth.
- J. Overhead Holders or Stops: As listed in hardware sets.
- K. Stops and Bumpers: Wall type WC9XT shall be used when possible. Locate wall bumpers to prevent lockset lever or closer from touching wall. Walls to receive proper backing for wall bumpers as specified in Section 06 10 00 - Rough Carpentry.
- L. Silencers: At metal frames; 3 at each jamb of single doors, 2 at each jamb of double doors. Not required on doors having weatherstrip or seals.
- M. Flushbolts: As listed in hardware sets.
- N. Weatherproofing, Smoke Seals and Door Bottoms:
 - 1. Continuous at head and jamb of exterior doors; continuous smoke seals at head and jamb of corridor doors.
- O. Thresholds: Sized for opening; to meet handicapped conditions. Provide as detailed on Drawings, or as listed in hardware sets.

2.03 KEYING

- A. Keying to be in accordance with Owner / City requirements and standards. Contractor to coordinate with Owner / City & Architect.
- B. Permanent keys will not be made available to the General Contractor or any Subcontractor or Supplier under any circumstances.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine conditions under which finish hardware will be installed. Report deficiencies to the Architect.

3.02 INSTALLATION

- A. Install hardware in accordance with Manufacturer's recommendations, using proper templates.
- B. Maintain ANSI standard mounting heights for doors, from finished floor to center line of hardware item.



3.03 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's representative(s) shall inspect hardware at fire rated doors (including doors and frames as a unit) and verify compliance with UL 10C (positive pressure testing) as required by IBC Section 714. Hardware at fire rated doors which does not comply with UL 10C (positive pressure testing) as required by IBC Section 714 shall be removed and replaced at no additional cost to Owner.

3.05 SCHEDULES

- A. As noted on construction documents.

END OF SECTION



SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.01 PERFORMANCE REQUIREMENTS

- A. Glass and glazing materials shall provide continuity of building enclosure vapor and air barrier.
 - 1. To utilize the inner pane of multiple pane sealed units for the continuity of air and vapor seal.
 - 2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Glass thickness indicated is minimum and shown for detailing only. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with IBC Chapter 24, as measured in accordance with ANSI/ASTM E330.
- C. Limit glass deflection to 1/175 or flexure limit of glass, with full recovery of glazing materials, whichever is less.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's Product Data for glass [and plastic] units, including the following:
 - 1. Structural, physical and environmental characteristics.
 - 2. Size limitations.
 - 3. Special handling or installation requirements
 - 4. Special application requirements for glazing materials.
 - 5. Available colors of glass and glazing materials with color selections.
- B. Manufacturer's Certificate: Submit Manufacturer's certification that sealed insulated glass meets or exceeds specified requirements.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to IBC Chapter 24 [1997 UBC Chapter 24], to local requirements and to State law.
- B. Standards:
 - 1. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 2. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
 - 3. GANA'S - Glazing Manual and Laminated Glass Design Guide.



- C. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, and Laminators Safety Glass Association - Standards Manual for Glazing Installation Methods.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with Manufacturer's instructions.

1.05 WARRANTY

- A. Provide 10-year Manufacturer's warranty for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glass Materials: Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
 - 1. Guardian Industries. www.guardian.com .
 - 2. Oldcastle Glass Group. www.oldcastleglass.com .
 - 3. Pilkington LOF. www.pilkington.com .
 - 4. PPG Industries. www.ppg.com .
 - 5. Viracon. www.viracon.com .
 - 6. Visteon Float Glass www.visteon.com .

2.02 GLASS MATERIALS

- A. Float Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; 1/4 inch thick minimum.
- B. Safety Glass: ASTM C1048, Kind FT fully tempered with horizontal tempering Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97.1; 1/4 inch thick minimum.
- C. Low E Glass: Float type heat strengthened or tempered as required by application as per building code, clear, coating on inner] surface; visible light transmittance of 89 percent, solar light transmittance of 79 percent, shading coefficient of 0.96; 1/4 inch thick.



2.03 SEALED INSULATING GLASS MATERIALS

- A. General: Individual panes of insulated glass units shall be Kind HS (heat strengthened) or Kind FT (fully tempered) where required to resist thermal stress in insulating glass units, or Kind FT (fully tempered) where indicated or required by Code by location.
- B. Insulated Glass Units - Low E: Solarban 70 or Viracon VE1-2M complying with ASTM E774 and E773 and as follows:
 - 1. Pane: Double pane
 - 2. Edge Seal: Manufacturer's standard.
 - 3. Outer Pane: 1/4 inch thick clear glass with Low E glass coating on inside surface, tempered or heat-strengthened as required by manufacturer for building code for application
 - 4. Inner Pane: 1/4 inch thick clear glass, tempered or heat-strengthened as required by manufacturer for building code for application
 - 5. Visible Light Transmittance: 70 percent
 - 6. SHGC: 0.39
 - 7. LSG Ratio: 1.79
 - 8. Interpane Space: Purged dry air
 - 9. Interpane Spacer: Clear anodized.
 - 10. Total Unit Thickness: One Inch.

2.04 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene or other resilient blocks of 70 to 90 Shore A durometer hardness tested for compatibility with glazing sealant, minimum length 4 inches.
- B. Spacers: Neoprene blocks of 40 to 50 Shore A durometer hardness, adhesive backed on one face only and tested for compatibility with specified glazing sealant.
- C. Glazing Gaskets: As specified in Section 08 41 13.
- D. Interior Glazing Compound:
 - 1. Polymerized Butyl Rubber and Inert Fillers (pigments), solvent based with minimum 75% solids, non-sag consistency, tack-free time of 24 hours or less, paintable non-staining.
 - 2. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.
- E. Exterior Glazing Compound: Conforming to ASTM C920, Type S, Grade NS, Use G. Compound shall be paintable, or colored to match frame.
- F. Glazing Tape: Preshimmed 10 percent solids, non-shrinking, butyl rubber tape compatible with sealants. If exposed, tape shall be paintable, or colored to match frame.
- G. Mirror Mastic: Polymer type mirror mastic (compliant with the low-emitting materials requirements of Section 01 60 00 – Product Requirements) resistant to water, shock, cracking, vibration and thermal expansion. Mastic shall be compatible with mirror backing paint and approved by mirror manufacturer.

2.07 MARKINGS

- A. Tempered glass shall have each light permanently etched with Manufacturer's name and his compliance with ANSI Z-97.1.



PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Examine framing or glazing channel surfaces, backing, removable stop design, and conditions under which glazing is to be performed.
- C. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A. Comply with combined recommendations of Glass Manufacturer, aluminum frame manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified.
- B. Clean the glazing, channel, or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate.
- C. Do not attempt to cut, seam, nip or abrade glass which is tempered or heat strengthened.
- D. Comply with "Glazing Manual" by GANA, except as shown and specified otherwise by Manufacturers of glass and glazing materials.
- E. Inspect each piece of glass immediately before installation, and discard those which have observable edge damage or face imperfections.
- F. Install setting blocks of proper size at quarter points of sill rabbet.
- G. Provide spacers inside and out, and of proper size and spacing, for glass sizes larger than 50 united inches. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width.
- H. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other pieces.
- I. Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in the glazing system.

3.03 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Clean contact surfaces with solvent.
- B. Cut glazing tape to proper length and set against permanent stops, 3/16 inch below sightline. Weld corners together by butting tape and dabbing with sealant.
- C. Apply bed of sealant along exterior void ensuring full contact with glass.
- D. Place setting blocks at 1/4 points.



- E. Rest glass on setting blocks and push against tape (and heel bead of sealant) with sufficient pressure to ensure full contact and adhesion at perimeter.
- F. Install removable stops, spacer strips inserted between glass and applied stops at 2-foot intervals, 1/4 inch below sightline. Place glazing tape on glass with tape flush with sightline.
- G. Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass but not more than 3/8 inch below sightline.
- H. Apply cap bead of sealant along exterior void, to uniform and level line, flush with sightline. Tool or wipe cap bead surface with solvent for smooth appearance.

3.04 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to proper length and install against permanent stop, projecting 1/16 inch above sightline.
- B. Place setting blocks at 1/4 point.
- C. Rest glass on setting blocks and push against tape with sufficient pressure to ensure full contact and adhesion at perimeter.
- D. Install removable stops; spacer strips inserted between glass and applied stops at 2-foot intervals, 1/4 inch below sightline.
- E. Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.
- F. Neatly trim off excess tape to sightline.

3.05 ADHESIVE INSTALLATION OF MIRRORS

- A. Apply mirror mastic to cover not more than 25 percent of back of mirror.
- B. Set mirror in support on setting blocks or continuous gasket and press against substrate to ensure bond of adhesive.
- C. Leave open ventilation space, 1/8 inch or more in thickness between mirror and substrate, over 75 percent of mirror area (wherever there is no adhesive).

3.06 ADJUSTING

- A. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents and vandalism.



3.07 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.
- B. Remove labels after Work is completed.

3.08 PROTECTION

- A. Protect glass from breakage immediately upon installation, by attachment of crossed streamers to framing held away from glass.
- B. Do not apply markers of any type to surfaces of glass.

END OF SECTION



SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Painting as specified and as noted on Drawings. Surfaces requiring finishing and left unfinished by the requirements of other Sections shall be painted or finished as part of the Work of this Section.

1.02 DEFINITIONS

- A. Touch-Up: Painting of items missed by painter at no additional cost to Owner.
- B. Re-Paint: Repairs to paint work for damages caused by other trades.
- C. Block Resistance (Non-Blocking): The capability of a coating to resist sticking to itself when used on 2 surfaces that come in contact with each other (e.g. door and jamb, window sash and sill).

1.03 SUBMITTALS

- A. Product Data: Submit schedule of manufacturers of products required for the Work, together with specifications recommended by each manufacturer.
- B. Samples: Submit samples of each type of finish specified.
 - 1. Architect will furnish Contractor a color schedule of colors selected either from manufacturer's stock colors or specially requested color mixes before Work is begun.
 - 2. Submit two 8 inch x 12 inch samples of each color, including the correct sheen and texture, on heavy cardboard or masonry. Submit sealer and stain finishes on material of the same quality and species of wood on which that particular finish shall be used. Rejected samples shall be resubmitted until approved.
 - 3. Samples shall be submitted at least 30 days prior to the start of painting work. Label and identify each sample as to location and application. Upon submittal of color samples, minor variations or changes in color selection may be requested by the Architect and new samples ordered, until final color approval.

1.04 QUALITY ASSURANCE

- A. Standards: Preparation, application and workmanship shall be in accordance with manufacturer's recommendations and applicable provisions of the following:
 - 1. Painting and Decorating Contractors of America (PDCA) "Painting Specification Manual" and "Standards".
 - a. PDCA P1-09, "Touch-Up Painting and Damage Repair - Financial Responsibility and Definition of a Properly Painted Surface."
 - b. PDCA P2-09, "Third Party Inspections: Qualifications, Responsibilities and Procedures."
 - c. PDCA P3-09, "Designation of Paint Color."
 - d. PDCA P4-09, "Responsibility for Inspection and Acceptance of Surfaces Prior to Painting and Decorating."
 - e. PDCA P5-09, "Benchmark Sample Procedures for Paint and Other Decorative Coating Systems."



2. Gypsum Association - GA210, "Gypsum Board for Walls and Ceilings."

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's sealed containers, legends and labels, intact.
- B. Storage:
 - 1. Adequately protect against damage while stored at site.
 - 2. In no case shall the amount or method of materials stored exceed the amount permitted or the manner allowed by local ordinances, state laws, or fire underwriter regulations.

1.06 PROJECT/SITE CONDITIONS

- A. Physical Requirements for Proper Installation or Application: Do not apply exterior paint in damp or rainy weather or until after the surface has dried thoroughly from the effects of such weather.
 - 1. Do not apply varnish or paint when temperature is below 50 degrees F.. Avoid painting surfaces exposed to hot sunlight.
 - 2. During interior application, maintain minimum temperature of 65 degrees F. unless otherwise directed by Architect or manufacturer's printed instructions. Hold temperature as constant as possible.
 - 3. Provide adequate ventilation at all times so the humidity cannot rise above the dew point of the coldest surface to be painted.
 - 4. Moisture-containing surfaces, such as concrete, stucco and cement plaster shall have a moisture content of less than 8 percent as measured by moisture meter. Remove surface salt deposits prior to painting. Verify that pH is neutral, or within acceptable limits of Paint Manufacturer. Paint after thoroughly cured.

1.07 MAINTENANCE

- A. Extra Materials: Upon completion of the Work, furnish Owner with one fresh gallon of each type and color of paint and finish used on this Project. Label containers with manufacturer's name, batch, color, shelf life, instructions, and cautions.

1.08 WARRANTY

- A. Manufacturer's Warranty: Furnish 2 year warranty covering materials and labor required to maintain paint finishes in good condition from date of Substantial Completion of the Work.
 - 1. Warranty shall cover repair or replacement of paint finishes (interior and exterior) that fail in materials or workmanship.
 - 2. Warranty shall cover all materials and installation from the substrate up including, but not limited to, removal of defective finishes, surface preparation, primers and finish coats in accordance with original specifications.
 - 3. Manufacturer's Warranty for Exterior Metal (System 101): 15 years, issued to Owner on Project, covering corrosion, blistering, checking or cracking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Furnish products of one of the following manufacturers, except as otherwise approved by Architect, subject to compliance with specification requirements.



1. Benjamin Moore www.benjaminmoore.com
2. Dunn-Edwards Corporation www.dunnedwards.com
3. Frazee Industries www.frazeepaint.com
4. Glidden Professional <https://www.gliddenprofessional.com/home>
5. PPG <http://www.ppgpittsburghpaints.com/>
6. Sherwin Williams www.sherwin-williams.com
7. Tnemec www.tnemec.com

2.02 MATERIALS

- A. Provide materials in accordance with the Schedule of Paint Products at the end of this Section as applicable to project and as follows:
1. Block resistant (non-blocking) materials shall be used for doors, door jambs, railings and other locations subject to handling, or where surfaces will come into contact with other painted surfaces or belongings.
 2. Shall not be formulated or manufactured with formaldehyde, halogenated solvents, aromatic hydrocarbons, mercury, or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI, and their oxides
 3. Shall not be formulated or manufactured with formaldehyde, mercury, or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI, and their oxides.
 4. Materials used shall comply with applicable Federal and local air pollution regulations, lead content laws, and current VOC requirements. If products listed in Schedule of Paint Products located at the end of this Section are not in compliance with regulations, laws, or requirements, Contractor shall notify Architect and shall provide information regarding substitute products.
- B. Basic painting materials such as linseed oil, shellac, turpentine, thinners, driers, and other similar products, shall be of highest quality, made by reputable, recognized manufacturers, and have identifying labels on containers. Paint materials shall be factory fresh.
- C. Alternate materials submitted for prior approval shall have qualities and materials equal to the other listed manufacturer's scheduled products. Materials selected for coating systems for each type of surface shall be the products of a single manufacturer, unless otherwise specified or scheduled.
- D. Standard Gloss Range: Provide paints in accordance with the following ranges in accordance with ASTM D523 and in accordance with Finish Legends on drawings:
- | <u>Sheen</u> | <u>Geometry</u> | <u>Gloss Range</u> |
|--------------|-----------------|---|
| Flat | 85 degree | Below 15 (see also Paint Finishes herein) |
| Eggshell | 60 degree | 5-20 |
| Lo Luster | 60 degree | 15-25 |
| Satin | 60 degree | 15-35 |
| Semi-Gloss | 60 degree | 30-650 |
| Gloss | 60 degree | Over 65 |
- E. Paints shall be ready mixed except for field catalyzed coatings.
- F. In addition to other requirements specified herein, provide the following when deemed appropriate:
1. Low-Biocide Paint: Interior use. Shall not contain formaldehyde. Shall not contain fungicides or bactericides that are classified as mercury acetates, phenol phenates, or phenol formaldehyde.
 2. Natural Plant- and Mineral-Based Finishes: Contain extracts from plant sources and minimally processed earth minerals, such as chalk or iron oxides. Solvents



- include citrus oils and small amounts of low-odor petroleum solvents (de-aromatized isoparaffinics).
- 3. Milk-Based Paint: Contains lime, milk protein, clay, and earth pigments; interior use only; not suitable for damp conditions
- 4. Clay- and Mineral-Based Pigments:
 - a. Native earths: Ochre, raw umber, raw sienna
 - b. Calcined earths: Burnt umber, burnt sienna
 - c. Iron oxides: Mars black, Mars yellow, Mars violet
- 5. Biocides: Provide paint with levels below 0.025%.
- G. Transparent Finishes:
 - 1. Urethane finishes: Water emulsion urethane
 - 2. Penetrating oil-based, waterborne finishes: Shall not contain lead acetate or cobalt manganese (drying agents)
 - 3. Stain: Vegetable oil-based, waterborne stain for exterior use with UV Protection
 - 4. Acrylic: Waterborne, urethane; VOC less than 100grams/liter
 - 5. Plant-based oil finish: Low odor, water reducible; interior use
 - 6. Polymerized linseed oil: Interior use
 - 7. Polymerized tung oil: Interior Use
- H. Paint Strippers - Low-Emitting: Shall not contain methylene chloride. Avoid products containing methanol and trichloroethane.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report in writing with a copy to Architect, conditions detrimental to Work. Commencement of Work will be construed as acceptance of subsurfaces.

3.02 PROTECTION

- A. Before painting, remove hardware, accessories, electrical plates, lighting fixtures and similar items and protect.
 - 1. Provide "Wet-Paint" signs and other barricades and protections as required to protect adjacent surfaces and work of other trades, whether being painted or not.
 - 2. Mask permanent labels.
 - 3. Provide, distribute, and maintain a sufficient supply of clean drop cloths and other protective coverings.
 - 4. Protect foliage and other exterior finished surfaces from contact with cleaning materials and thoroughly flush with water after contact.
 - 5. On completion of each space, replace above items.

3.03 SURFACE PREPARATION

- A. General:
 - 1. Surfaces requiring painting or finishing shall be thoroughly dry and cured, free of dirt, dust, rust, stains, scale, mildew, wax, grease, oil, deteriorated substrates, bond-breakers, efflorescence and other foreign matter detrimental to the coating's adhesion and performance. Repair voids, cracks, nicks and other surface defects with appropriate patching material. Finish flush with surrounding surfaces and match adjacent finish texture.
 - 2. Spot prime marred or damaged shop coats on metal surfaces with appropriate metal primer.



3. Determine moisture content of plaster, stucco, cementitious materials, wood and other moisture-holding materials by use of a reliable electronic moisture meter.
 4. Determine alkalinity of plaster, stucco and other cementitious materials by performing appropriate tests.
 5. Do not paint surfaces where moisture content or alkalinity exceeds that which is allowed by paint manufacturer.
- B. Existing Surfaces:
1. Clean, sand, patch, repair and prepare existing surfaces to be painted so that such existing finished surfaces are indistinguishable from new surfaces.
 2. Surfaces which cannot be prepared or painted as specified shall be immediately brought to the attention of the Architect in writing.
 3. Remove loose peeling and checked paint.
 4. Remove mildew by washing the surface with a commercially available mildew killer/remover.
 5. Remove efflorescence by wire brushing, power brushing or washing. Thoroughly rinse surfaces wire brushed. After removal of efflorescence, wash the surface with a commercially available cleaner acceptable to the manufacturer of the substrate.
 6. Remove existing wallcovering and wash the surface to remove paste residue. Seal surface before making any surface repairs.
 7. Dull and roughen glossy surfaces to obtain proper adhesion by either sanding, washing with a tri-sodium phosphate solution, or treating with a liquid deglossing compound.
 8. Overlap and feather edge spot-primed areas.
- C. Wood:
1. Sandpaper to smooth and even surface and then dust off. After primer or stain coat has been applied, thoroughly fill nail holes and other surface imperfections with putty tinted with primer or stain to match wood color. Sand woodwork between coats to a smooth surface. Cover knots and sap streaks with a thin coat of shellac, or seal with a suitable stain blocking sealer.
 2. Finish door and window edges after final fitting.
 3. Backpriming:
 - a. Backprime exterior woodwork, which is to receive paint finish, with exterior primer paint.
 - b. Backprime interior woodwork, which is to receive paint or enamel finish, with enamel undercoater paint.
 - c. Backprime interior and exterior woodwork, which is to receive stain and/or varnish finish with VOC compliant varnish acceptable to the Architect.
 - d. Back-prime wood trim before installation.
 4. Where existing stained surfaces are indicated to be coated with a transparent stain, test apply stain to small area where directed by Architect and obtain Architects approval of color.
- D. Steel and Iron:
1. Remove grease, oil, mill scale, rust and rust scale and touch-up chipped or abraded places on items that have been shop coated. Remove and reprime incompatible or damaged shop applied primers. Comply with the Steel Structures Painting Council's (SSPC) recommendations for cleaning of uncoated steel and iron surfaces.
 2. When area will be exposed to view, sandpaper the entire primed area smooth, feather the edge of surrounding undamaged prime coat and spot prime in a manner to eliminate evidence of repair.
 3. Where steel or iron at existing Work have a heavy coating of scale, remove by



sand blasting, sanding, descaling, grinding or wire brushing, as necessary, to produce a satisfactory surface for painting.

E. Galvanized Metal and Aluminum:

1. Thoroughly clean by wiping surfaces with a non-hydrocarbon solvent that will not leave an oily residue. Apply surface conditioner or vinyl-wash pretreatment as required for proper adhesion if required by paint manufacturer. Prime galvanized metal with galvanized iron primer as recommended by paint manufacturer. A test sample of the complete painting system should be applied and checked for adhesion before final painting begins.
2. Clean visible portions of throats of galvanized steel ductwork with solvent; wipe dry with clean rags and paint flat black.

F. Concrete:

1. Existing exposed concrete structure shall be patched smooth to the satisfaction of the Architect prior to painting.
2. The method of surface preparation shall be at Contractor's discretion, provided the results are satisfactory to the Architect, and the method is in compliance with applicable codes and requirements.
3. Repair surfaces to be painted prior to application of prime and finish coat(s). Apply a tinted primer to the substrate to help identify surface imperfections. After the primer has thoroughly dried, patch, fill and repair surface imperfections to match and flush-out with adjacent finish texture and profile.
4. Before first paint coat is applied, spot prime nails and other exposed metal occurring in the surfaces with a rust inhibitive primer as recommended by paint manufacturer.

G. Plaster and Gypsum Board Surfaces:

1. Fill cracks, holes or imperfections with compatible patching material and smooth off to match adjoining surfaces. Before painting, surfaces shall be first tested for dryness with a moisture testing device.
2. Apply no paint or sealer on gypsum board or plaster when the moisture content exceeds 8 percent. Test sufficient areas in each space and as often as necessary to determine if the surface has the proper moisture content for painting. If the moisture content is between 8 percent and 12 percent, prime with alkali resistant primer.
3. If 8 percent or less, prime with specified primer. Remove the dry salt deposits from plaster surfaces by brushing with a stiff brush before painting.

H. Acoustical Surfaces (Tectum Acoustical Panels):

1. Tectum Panels shall be fastened in place prior to field painting.
2. Thoroughly vacuum clean surfaces to remove dust and debris from acoustical surface pores. Use a soft brush attachment that will not damage or loosen acoustical surface.
3. Seal surface stains with a suitable stain blocking sealer that will not fill pores of acoustical surface.

3.04 WORKMANSHIP

- A. Apply products to achieve paint manufacturer's printed specifications for dry mil thickness
- B. Apply each coat of paint evenly and comply with manufacturer's drying time before applying subsequent coats.
- C. Finished work shall be uniform, match approved color, texture and coverage, and free from runs, sags, clogging or excessive flooding. Make edges of paint adjoining other



materials or colors sharp and clean, without overlapping. Where varnishes or enamel is used, lightly sand, dust and clean undercoats to obtain a smooth finish coat. Sand carefully between each coat of finish on smooth surfaces for good adhesion of subsequent coats.

- D. Where clear finishes are required, ensure tinted fillers match wood. Work fillers well into the grain before set. Wipe excess from the surface.
- E. Where specific mil thicknesses are required, check thickness by the following methods:
 - 1. Over ferrous metal - Elecometer Film Gauge
 - 2. Other surfaces - Tooke Dry Mil Inspection Gauge

3.05 APPLICATION

- A. The number of coats scheduled is the minimum number of coats required. Additional coat(s) shall be applied, at no additional cost to the Owner, to completely hide base material, provide uniform color and to produce satisfactory finish results. All surfaces shall receive a minimum of 2 coats of finish paint, allowed to dry complete between coats.
- B. Apply coatings without thinning except as specifically required by label directions, or required by these specifications. In such cases, thinning shall be the minimum reduction permitted. Application techniques shall be as follows:
 - 1. Metal: Spray applied.
 - 2. Walls: Spray or roller applied.
 - 3. Floor: Spray or roller applied.
 - 4. Doors and Jambs: Spray or brush applied.
 - 5. Millwork: Spray applied.
- C. Priming will not be required on items delivered with prime or shop coats, unless otherwise specified. Touch up prime coats applied by others as required to ensure an even primed surface before applying finish coat.
- D. Block Fillers: Provide level of block fill as scheduled to conform with the following:
 - 1. Level 1 – Regular Fill: Minimum block fill, reduces irregularity in masonry profile. One coat, spray applied.
 - 2. Level 2 – Medium Full Fill: Masonry profile slightly reduced. One coat, spray applied and back-rolled.
 - 3. Level 3 – Full Fill: Minimum block fill required for semi-gloss and gloss finishes. Use where conformance with health regulations is required. Number of coats as required to conceal most of masonry texture, spray applied and back-rolled.
- E. Plumbing, Mechanical and Electrical:
 - 1. Exterior and interior exposed water, gas, waste piping, sprinkler piping, conduit, lighting and electrical panels, telephone terminal boxes, galvanized ducts and insulated ducts, shall be painted in areas other than mechanical rooms, unless otherwise scheduled.
 - 2. Paint exposed unfinished fixtures, metal ducts, switch boxes, control panels, devices, starters, junction boxes, vents, drains, and other similar items, as directed by Architect.
- F. Spray paint prime coated (not pre-finished) grilles and registers with enamel or lacquer to match walls and ceilings. Paint materials shall not sag, run or bind movable parts of grilles, registers, louvers, baffles and other similar items.
 - 1. Throats of ducts shall be given one coat of flat black paint, wherever visibility of the interior of the duct is allowed through registers or other similar items. At fiber lined duct, use black latex paint.



2. Examine the Mechanical and Electrical Drawings and Specifications to determine the amount of exposed work to be painted.
-
- G. Paint exposed surfaces of every member; paint items inaccessible after installation before installation, if required to be painted. Edges, tops and bottoms of wood doors shall be sealed and finished with the same finish as the door faces, to meet door manufacturer's warranty requirements. Verify edge color with Architect as different colors may be selected for each face.
 - H. Edges, tops, and bottoms of wood doors shall be sealed and finished with the same finish as the door faces, to meet door manufacturer's warranty requirements. Verify edge color with Architect as different colors may be selected for each face.
 - I. Paint items fitted with finish hardware after hardware has been temporarily removed.
 - J. Heating and other equipment on or adjacent to walls or surfaces scheduled for painting, shall be disconnected, using workmen skilled in appropriate trades and moved temporarily to permit painting of surface. Following completion of painting, replace and reconnect items.
 - K. Each succeeding pigmented coat shall be distinguishably lighter than the previous coat. Tint prime and undercoats to a color similar to finish coat. Each coat of material applied must be inspected and approved by the Architect before the application of the succeeding specified coat; otherwise no credit for the concealed coat will be given, and the Contractor shall assume the responsibility to recoat work in question. Contractor shall notify the Architect when each coat is completed.
 - L. Brush, wipe or roll stain in 2 coat application. Avoid lap marks by maintaining "wet-edge" continually being merged with existing liquid coverage and stop only at natural edges, turns and breaking places.
 - M. Do not paint over Underwriters' Laboratory labels, fusible links, exposed sprinkler heads and other similar items.
 - N. Paint piping, electrical or other equipment, conduit, vents and other similar items, on roof or other exterior locations as directed by Architect.
 - O. Finish closets and the interior of cabinets with same color as adjoining rooms, unless otherwise specified. Finish other surfaces same as nearest or adjoining surfaces, unless otherwise shown or scheduled.
 - P. Paint surface of walls which will be concealed by cabinets, chalkboards and other items attached to wall.
- 3.06 ADJUSTING
- A. At completion, do touch-up and re-paint work and leave finish surfaces in good condition.
- 3.07 CLEANING
- A. During the course of the Work, remove misplaced paint and stain spots or spills. Leave Work in clean condition acceptable to Architect.
 - B. Remove oily rags and waste daily, taking precaution to prevent fire.



3.08 SCHEDULES

- A. Color Schedule:
 - 1. Architect will provide a complete schedule of colors. Colors may be selected from various manufacturer's color palettes. Manufacturer supplying paint shall match these colors. Contractor shall prepare duplicate set of samples of treatments for major surfaces. If a specific surface or item receiving a paint finish does not have a specific color indicated or selected by the Architect, obtain clarification from the Architect. Do not assume the confirmation of the same color on the adjacent surfaces.
 - 2. Final coat of paint shall not be applied until colors have been approved by the Architect.
 - 3. Colors: As selected by Architect.
 - 4. Owner shall walk site for final approval of colors prior to painting.
- B. Schedule of Finishes: As indicated on Construction Documents, and as provided and approved by Architect.
- C. Finishing of the following listed items and materials will not be required and shall be protected:
 - 1. Stainless Steel, brass, bronze, copper, monel, chromium, anodized aluminum; specially finished articles such as porcelain enamel, plastic coated fabrics, and baked enamel, unless otherwise indicated.
 - 2. Finished products such as ceramic tile, glass, brick, resilient flooring and acoustical tiles, board and metal tees.
 - 3. Pre-finished products such as wood folding partitions and doors, wood classroom and laboratory casework, bleachers and elevator cabs.

3.09 EXTERIOR PAINT FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 101 (Ferrous Metals): Apply to exposed steel such as beams and column connectors, metal doors and frames, grilles, light fixture standards in parking areas, metal handrails, sectional and coiling doors, canopy overhangs and other exposed miscellaneous ferrous metals that are not pre-finished.
 - 1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning (shop)
 - 2. 1st Coat: Metal Primer (Red or White color as applicable to finish coats). Primer shall be applied in shop prior to delivery to jobsite. Touchup and/or repaint primer application in field shall be material compatible with shop primer and finish coats.
 - 3. 2nd Coat: Aliphatic Acrylic Polyurethane.
 - 4. 3rd Coat: Semi-Gloss unless noted otherwise. Advanced Thermoset Solution Fluoropolymer.
- C. System 102 (Galvanized Metals): Apply to exposed galvanized metal such as copings, and metal flashings.
 - 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment (if required by paint manufacturer).
 - 2. 1st Coat: Galvanized Metal Primer.
 - 3. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 - 4. 3rd Coat: Semi-Gloss unless noted otherwise. Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
 - a. Gloss (if noted on Drawings): Enamel, Gloss - Waterborne (100% Acrylic - Non-Blocking).



- D. System 103 (Aluminum): Apply to exterior louvers and other miscellaneous exposed exterior unfinished aluminum surfaces.
 - 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment.
 - 2. 1st Coat: Aluminum Primer.
 - 3. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 - 4. 3rd Coat: Semi-Gloss unless noted otherwise. Enamel, Semi-Gloss - Waterborne (100% Acrylic - Non-Blocking).
- E. System 104 (Concrete Masonry Units): Not applicable.
- F. System 105 (Concrete and Stucco): Apply to exterior cementitious surfaces as indicated or noted. Precast concrete lintels, beams, caps, sills, etc. at exterior of buildings shall not be painted, unless specifically noted. Roller apply 2nd or 3rd coat.
 - 1. 1st Coat: Concrete and Masonry Primer.
 - 2. 2nd Coat: Same material as 3rd coat as recommended by manufacturer.
 - 3. 3rd Coat: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 85 degree gloss meter. One of the coats shall be roller applied.
- G. System 106 (Exterior Wood): Apply to wood fascias, soffits, trim, wood posts, columns, beams and exposed trim and framing where indicated to be painted.
 - 1. 1st Coat: Exterior Wood Primer - Waterborne (100% Acrylic) unless noted otherwise.
 - 2. 2nd and 3rd Coats: Paint, Flat - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 60 degree gloss meter.
- H. System 107 (Exterior Gypsum Board): Apply to exterior grade gypsum board soffits.
 - 1. 1st Coat: Exterior Gypsum Board Primer/Undercoater – Waterborne unless noted otherwise.
 - 2. 2nd and 3rd Coats: Flat Paint - Waterborne (100% Acrylic) unless noted otherwise. Sheen shall be 4 to 6% per a 85 degree gloss meter. One of the coats shall be roller applied.

3.10 INTERIOR PAINT FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 201 (Ferrous Metals): Apply to exposed metals such as steel doors, hollow metal frames, metal beam saddles, columns, grilles and registers, stair and hand railings, ladders, and other exposed miscellaneous metals.
 - 1. 1st Coat: Ferrous Metal Primer (Red or White color as applicable to finish coats), or epoxy-polyamine primer as specified in specific sections. Primer shall be applied in shop prior to delivery to jobsite. Touchup and/or repaint primer application in field shall be material compatible with shop primer and finish coats.
 - 2. 2nd Coat: Same material as 3rd Coat as recommended by manufacturer.
 - 3. 3rd Coat: Enamel, Eggshell.
- C. System 202 (Interior Wood Finishes - Enamel): Apply to wood wall base, wood wall cap, wood door frames, columns, exposed and concealed casework and millwork, wood-window wall construction, medium density plywood surfaces, shelving, roll-up wood doors, perforated and plain type hardboard, particleboard and other exposed miscellaneous wood and trim, except wood specified for a transparent or stain finish.
 - 1. 1st Coat: Enamel Undercoater.
 - 2. 2nd and 3rd Coat: Enamel, Semi-Gloss



- D. System 203 (Interior Wood Finish - Flat): Apply to plywood telephone backing boards and other miscellaneous softwood as noted, specified or scheduled.
 - 1. 1st Coat: Enamel Undercoater/Primer.
 - 2. 2nd and 3rd Coat: Flat Paint, - Waterborne (Vinyl Acrylic)
- E. System 204 (Galvanized Metals): Apply to exposed galvanized metal.
 - 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment (if required by paint manufacturer)
 - 2. 1st Coat: Galvanized Metal Primer
 - 3. 2nd and 3rd Coats: Enamel, Eggshell
- F. System 205 (Aluminum): Apply to interior louvers and other miscellaneous exposed unfinished aluminum surfaces.
 - 1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pretreatment.
 - 2. 1st Coat: Aluminum Primer
 - 3. 2nd and 3rd Coats: Eggshell: Enamel, Eggshell
- G. System 206 (Gypsum Board, Plaster and Concrete - Wet Areas): Apply to gypsum board, plaster and concrete surfaces in toilet rooms, janitor rooms, kitchens, and other areas as scheduled.
 - 1. 1st Coat: Enamel Undercoater - Solventborne, unless noted otherwise.
 - 2. 2nd and 3rd Coats: Enamel, Semi-Gloss - Solventborne or Enamel - Solventborne (Epoxy-Polyester).
- H. System 207 (Gypsum Board, Plaster and Concrete - Non-Wet Areas): Apply to gypsum board, plaster and concrete except for wet areas.
 - 1. 1st Coat: Waterborne Primer/Sealer. (Solventborne {Alkyd} shall be used at new untextured smooth gypsum board surfaces covered with powdery or unstable soft top joint cement)
 - 2. 2nd and 3rd Coat: Enamel, Eggshell
- I. System 208 (Ferrous Metal - Chemical Resistant Finish): Not applicable.
- J. System 209 (Interior Concrete Masonry - Wet Areas): Not applicable.
- K. System 210 (Interior Concrete Masonry or Plaster - Extremely Wet Areas): Not applicable.
- L. System 211 (Interior Concrete Masonry - Non-Wet Areas): Not applicable

3.11 CLEAR WOOD FINISHES

- A. This schedule uses the generic names listed in the Schedule of Paint Products.
- B. System 301 (Stained and Clear Finish): Apply to wood doors, handrails and chair rails. Fill open grain hardwood such as Oak.
 - 1. Stained and Finished with Clear Satin or Gloss Varnish - Solventborne:
 - a. 1st Coat: Semi-Transparent Stain - Solventborne (Oil)
 - b. 2nd Coat: Varnish, Gloss – Polyurethane (Solventborne)
 - c. 3rd Coat:
 - 1) Satin: Varnish, Satin – Polyurethane (Solventborne)
 - 2) Gloss: Varnish, Gloss – Polyurethane (Solventborne)
 - 2. Stained and Finished with Clear Satin or Gloss Varnish– Waterborne:



- a. 1st Coat: Semi-Transparent Stain - Solventborne (Oil)
- b. 2nd Coat: Varnish, Gloss – Polyurethane (Waterborne)
- c. 3rd Coat:
 - 1) Satin: Varnish, Satin – Polyurethane (Waterborne)
 - 2) Gloss: Varnish, Gloss – Polyurethane (Waterborne)

END OF SECTION



SECTION 21 00 00- FIRE PROTECTION PERFORMANCE SPECIFICATION

(Wet Automatic Sprinkler System)

PART 1 GENERAL

1.1 General Conditions and Special Conditions:

- A. Bidding requirements, general conditions, general requirements, appendices, and addendums apply to the work under this section as depicted in Project Specification Manual.

1.2 General Description:

- A. Provide all materials, labor, and equipment required for new Wet, Automatic Sprinkler (A.S.) system in accordance with State Fire Marshal, National Fire Protection Association (NFPA), International Building Code and Scottsdale Fire Marshall. It shall further include furnishing and installing all miscellaneous items required for the proper operation of the A.S. system, whether specifically called for or not. Install and deliver all systems complete, in perfect working order, and in full accordance with the intent and meaning of the specifications and/or drawings.
- B. This Contract shall begin at point of connection to the fire riser supply line (two risers).

1.3 Intent of Specifications:

- A. It is intended that the work performed pursuant to these specifications shall be complete in every respect; resulting in a system installed entirely in accordance with all current applicable codes, standards, manufacturer's recommendations and U.L. listings and FM approvals. All work in general consists of, but is not necessarily limited to, these specifications and latest accepted code approved design and installation standards.
- B. It is further intended that upon completion of work, the Owner shall be provided with the following:
 - 1. Complete information and drawings describing and depicting the entire system as installed, including all information necessary for maintaining, trouble-shooting, and expanding the system at a future date.
 - 2. Complete documentation of system testing.
 - 3. Written certification that the system has been tested and inspected, is installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations, U.L. listings, F.M. approvals, etc. and is in proper working order.
 - 4. It is intended that the Contractor be responsible for coordinating work with other trades.

1.4 Related Work Provided by Other Sections:

- A. The following related work shall be performed under other sections:
 - 1. Painting of sprinkler piping and valves, including the placement and removal of bags or other protection devices on sprinklers to prevent paint from touching any portion of the sprinkler.
 - 2. Alarm system shall be provided by Electrical and/or Alarm Contractor(s).
 - 3. Concrete filled pipe guard posts for protection of riser(s), backflow assembly, etc. shall be provided where equipment or materials are subject to vehicular traffic.
 - 4. Concrete splash blocks at main drain, inspector's test outlets and auxiliary drain outlets, if necessary.

1.5 Work to be Performed:

- A. Complete automatic sprinkler system protection throughout the project in accordance with these specifications.
- B. Be fully informed regarding all regulations and limitations of the spaces available for installation of the automatic sprinkler system. Later claims for labor, work, material, and equipment required for any difficulties encountered that could have clearly been foreseen will not be recognized, and all such difficulties shall be properly handled by this Contractor at no additional cost to the Owner.
- C. Risers, alarms, bells, drains, Fire Department Connections (if building mounted), Fire hose rack(s), with hose valves, fire hose nozzles and automatic drip, etc., as required.
- D. Valve diagrams, pipe markers, metal signs and riser design placards.
- E. Operating and maintenance manual.
 - F. Shop drawings, equipment submittals, record drawings and other submittals required herein.
- G. Testing of A.S. system.
- H. Guarantee all new equipment and systems for a one year period after date of substantial completion as determined by Architect, Owner or His/Her Agent and Contractor.
- I. Repair all damage resulting from this work. Including all materials, fittings and fixtures. All pipe openings shall be closed so as to prevent obstructions and damage.
- J. Sleeves and related fire rated seals and waterproofing commensurate with the penetration.
- K. Inserts, hangers, clamps, sway bracing, etc., as required to hang and support piping in accordance with NFPA and/or this specification.
- L. Accuracy of pre-fabricated pipe, location of sprinklers and deflectors (per NFPA and inspections), field fit of piping, piping elevations, riser nipple lengths and dimensioning.

1.6 Codes, Standards, Ordinances and Permits:

- A. All work shall conform to the requirements of the applicable portions of the National Fire Protection

Association (NFPA) Standards and Recommended Practices (including Appendices) listed herein:

1. NFPA-13, Current Edition, "Standard for the Installation of Sprinkler Systems".
2. NFPA-291, Current Edition, "Recommended Practice for Fire Flow Testing and Marking of Hydrants".
3. NFPA-24, Current Edition, "Private Fire Service Mains and their Appurtenances".
4. NFPA-25, Current Edition, "Inspection Testing and Maintenance of Water-Based Fire Protection Systems".

- B. All work, materials, and equipment shall conform to all Local, State and Federal Codes as well as all other Authorities having jurisdiction. If alternate editions of aforementioned standards, or additional standards are required then they shall be applied as accepted by Local and State codes. *All work shall meet the City of Chandler DS&PM standards.*
- C. If there is a conflict between the referenced standards, codes, or Authorities having jurisdiction; then it shall be the Contractor's responsibility to bring the conflict to the attention of the Owner or his/her Agent immediately for resolution prior to commencement of any additional work. This conflict shall be resolved at no additional cost to the Owner.
- D. The Contractor shall be responsible for filing all documents, paying all fees and securing all permits, inspections and approvals necessary for conducting this work.

1.7 Quality Assurance:

- A. Installer Qualifications: Installation and alterations of fire protection piping, equipment, specialties, accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified means experienced in such work (experienced shall mean having a minimum of 5 previous projects similar in size and scope to this project), familiar with all precautions required and has complied with all the requirements of the Authorities having jurisdiction. Installer shall be licensed with the State and Local Authorities having jurisdiction. Submit evidence of such qualifications to the Owner or his/her Agent with submission of bid.

1.8 Definitions:

- A. Design-Build Contractor: The Fire Protection Design-Build Contractor and any of his/her sub-contractors, vendors, suppliers, or fabricators.
- B. Provide: Furnish and install.
- C. Furnish: Purchase and deliver to other trades or Owner for installation.
- D. Install: Install materials, equipment or assemblies furnished by other trades or Owner.
- E. Concealed: Where used in connection with installation of piping and accessories, shall mean that hidden from sight as in chases, furred spaces, pipe shafts, or above suspended ceilings.
- "Exposed" shall mean "not concealed" as defined above.

F. Owner: City of Chandler.

G. Fire Protection Consultant (performance specifications only):

H. Concealed: Where used in connection with installation of piping and accessories, shall mean that hidden from sight as in chases, furred spaces, pipe shafts, or above suspended ceilings.
"Exposed" shall mean "not concealed" as defined above.

I. Owner: City of Chandler.

J. Fire Protection Consultant (performance specifications only):

1.9 Submittals:

A. The Owner or his/her Agent, Architect and Fire Protection Consultant shall review all submittals for conformance to these specifications.

B. Contractor may submit for review and approval any proposed substitution of materials or method of installation, from that specified, with material submittals.

1. Proposed substitutions of method of installation shall be designed by a NICET Level III or IV Certified Engineering Technician or Technologist.

2. Before proposed substitutions of method of installation are submitted to Architect for approval, they shall have the following specified stamps of approval:

a. City Chandler

C. If submittals or proposed substitutions, upon review are found not to conform to the requirements of these specifications, the Contractor shall be required to resubmit with modification. Not approved items shall be resubmitted. The Contractor shall be responsible for the Owner's expenses for subsequent revisions of rejected submittals necessitated by the Contractor's failure to make the requested modifications. Such extra fees shall be deducted from payments by the Owner to the Contractor.

1.10 Manufacturer's Data:

A. The Contractor shall submit with his/her bid, manufacturer's data sheets showing the type and model of all equipment or material proposed. This information shall include, but not be limited to:

- 1) Riser Assemblies.
- 2) Type of pipe.
- 3) Hangers.
- 4) Valves.
- 5) Pipe fittings/joining methods.
- 6) Sprinklers.
- 7) Supervisory devices.
- 8) Escutcheons.
- 9) Fire rated and waterproof penetration seals.

- 10) Pressure Gauges.
- 11) Nozzles (where required).

- B. When a data sheet shows more than one product, the proposed product shall be clearly indicated by arrows or other suitable means. This includes sprinkler orifice sizes, finishes, and temperature ratings.

1.11 Shop Drawings:

- A. Within 30 days after award of contract, the Contractor shall submit six (6) sets of Approved shop drawings, manufacturer's data sheets, catalog cut sheets and data on devices for all necessary approvals prior to fabrication of materials.
- B. Contractor shall submit complete packages. Partial submittals will be returned without further explanation.
- C. No extension of the contract time will be granted for the Contractor's failure to allow sufficient time for review and processing, or for shop drawings which have been returned due to improper submission.
- D. The Contractor will not be authorized to start any portion of the work until the shop drawings, catalog cuts and other required submittals for that portion are received, reviewed, and approved by all required parties.

1.12 Operation and Maintenance Manual:

- A. The Contractor shall provide the Owner with a loose leaf manual containing;
 - A. A detailed description of the system.
 - 1. A detailed description of routine maintenance required or recommended or as would be provided under a maintenance schedule and detailed maintenance instructions for each type of device installed.
 - 2. Manufacturer's data sheets and installation manuals/instructions for all equipment installed.
 - 3. A list of recommended spare parts.
 - 4. Service Directory.
 - 5. 11-inch by 17-inch reduced copies of the "record" drawings.
- B. Within 30 days of the completion of the work, eight (8) copies of the manual shall be delivered to the Owner.

1.13 Record Drawings:

- A. The Contractor shall maintain on the site an accurate record of all changes made to the system layout from that shown on the approved drawings.
- B. Upon completion of the work, before final approval, one (1) Auto-cad (V. 2000 or higher) file "record" drawings and two (2) additional sets of blue line "record" drawings shall be delivered to the Owner. Contractor shall coordinate this with Architect.

- C. At least one set of approved drawings with all required stamps of approval shall be maintained on-site and made available to all Authorities having jurisdiction on demand during construction phase of work.

1.14 Valve Diagrams:

- A. At the completion of the work, provide a small scale of the building(s) indicating the location of all control valves, low point drain(s), and inspector's test(s). The plan shall be neatly drawn and color coded to indicate the portion of the building protected by each system, framed under glass (not plastic), and permanently mounted on the wall adjacent to each sprinkler riser.

1.15 Leak Damage:

- A. The Contractor shall be responsible during the installation and testing period of the sprinkler system for any damage to the work by others, to the building, its contents, etc. caused by leaks in any equipment, by unplugged or disconnected pipes, fittings, etc., or by overflow, and shall pay for the necessary replacement or repairs to work of others, damaged by such leaks.

1.16 Freight and Hauling:

- A. Deliver materials to the job site, unload, and store in location determined by the Owner's Representative and General Contractor.

1.17 Base Bid:

- A. The base bid shall be lump-sum or in accordance with Division I of specifications.
- B. The Contractor shall indicate the number of sprinklers included in the base bid, including the number of sprinklers allowed for obstructions and ductwork.

1.18 Cleanup:

- A. Maintain the premises free from accumulation of waste material or rubbish caused by this work.

- B. At the completion of the work, remove all surplus materials, grease, oil, etc. from piping, tools, etc., and leave premises in a neat, clean workmanlike manner.

1.19 Safety:

- A. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 and Construction Safety Acts Standards (or current).

1.20 Guarantee Period:

- A. The Contractor shall guarantee in writing (triplicate) all materials and workmanship for a period of one year beginning with the date of substantial completion. The Contractor shall be responsible during the design, installation, testing and guarantee period for any damage caused by him/her (or his/her Subcontractors) or by defects in his/her (or his/her Subcontractor's) work, materials, or equipment.

1.21 Emergency Service:

- A. During the warranty period, the Contractor shall provide emergency repair service for the entire automatic sprinkler system. This service shall be provided on a 24-hour per day, 7 day per week basis. Coordinate details with Owner's Representative.

1.22 Spare Parts and Special Tools:

- A. Contractor shall install code approved metal sprinkler cabinet(s) containing sprinklers of all types, finishes, and temperature ratings used and two (2) sets of sprinkler wrenches compatible with each type of sprinkler provided. The cabinets shall be installed at the locations approved by the Owner and NFPA requirements. Sprinkler and cabinet quantities shall be per NFPA-13.
- B. The Contractor shall supply the Owner with two (2) complete sets of special tools and equipment necessary to perform routine maintenance on the sprinkler systems.

1.23 Final Approval and Acceptance:

- A. Final approval and acceptance of the work will not be given by the Owner until:
 - 1. The completed sprinkler system(s) has/have been inspected, tested and approved by the Owner, Architect, and all other Authorities having jurisdiction.

2. Required submittals, system operation and maintenance manuals, "record" drawings, spare parts, and special tools have been provided to, reviewed, and accepted by the Owner.

PART 2 PRODUCTS

2.1 Design Criteria:

- A. Provide wet-pipe sprinklers in all areas as required by NFPA, Authorities having jurisdiction and these specifications.

2.2 Sprinkler System Components - General:

- A. All equipment and system components furnished and installed shall be new and unused, of first quality, and be listed by Underwriters Laboratories Inc. and approved by Factory Mutual for their intended use. All such equipment and system components shall be installed within the limitations of the respective U.L. listings or FM approvals. Equipment and material used shall generally be from a consistent manufacturer.

2.3 Piping:

- A. Manufacturers:
 1. Allied Tube and Conduit (Tyco)
 2. Western Tube and Conduit Corp.
 3. Bull Moose Tube Company
- B. Sprinkler system piping or tubing shall meet the requirements of NFPA 13, be U.L. listed and F.M. approved. Contractor shall base his/her bid on the use of any one or a combination of the following: In addition, all pipe shall have a minimum Corrosion Resistance Ratio (CRR) of 1.00 or greater, as per U.L. listings.
- C. Pipe meeting ASTM A-795 and/or A-135 requirements for above grade use. All piping shall be black carbon steel.
- D. Flanges and flanged fittings shall be 175 psi cast iron with standard ring gaskets.
- E. Pipe and fittings shall be listed by Underwriters Laboratories, Inc. and approved by Factory Mutual for use in fire protection systems and designed to withstand a working pressure of not less than 175 psi.

- F. All pipe and fittings exposed to the weather, downstream of all inspector's test valves, between exterior wall and check valve on FDC, or located in a corrosive atmosphere shall be hot-dipped zinc coated (galvanized).
- G. Flexible couplings shall be U.L. and F.M. approved.
- H. Pipe penetrations through masonry and fire rated construction shall be sleeved and sealed with fire rated seals commensurate with the building construction.
- I. Pipe penetrations through floors and exterior walls shall be approved waterproof seals.
- J. When system piping pierces a foundation wall below grade or is located under the foundation wall, clearance shall be provided to prevent breakage of piping due to building settlement. Do not locate pipe joints within or under a foundation wall and a 1-3 inch clearance shall be provided around piping by use of sleeve for piping piercing a foundation wall. Sleeve properly and fill clear space with approved waterproof packing.
- K. Use of foreign-made piping or fittings shall not be permitted.
- L. Use of copper or CPVC piping and fittings in accordance with NFPA-13 and pipe listing is permissible where prior-approved only.

2.1 Automatic Sprinklers:

- A. Sprinklers shall be of the listed automatic, glass bulb type, and shall be distributed throughout the building per code and approved construction documents.
- B. Sprinklers required due to ceiling projections/obstructions and ductwork are not considered additional sprinklers. Contractor shall be responsible for identifying these locations.
- C. Install ordinary, intermediate and high temperature sprinklers of proper degree rating wherever necessary to meet requirements of NFPA, and Authorities having jurisdiction.
- D. Provide corrosion resistant sprinklers with factory applied coating where sprinkler is to be located in a corrosive atmosphere (canopies, etc.).

- E. Sprinkler and escutcheon finishes shall be suitable for area or ceiling finish provided. Verify finish of all sprinklers and escutcheons with Owner or his/her Agent prior to ordering.

2.2 Inspector's Test Connections:

- A. Provide test connection at most remote portion of each A.S. system, with 1" pipe and valve. Test connection piping shall be connected to sprinkler branch line at least 1-1/4" in diameter and shall discharge outside building through smooth bore brass outlet. Outlet orifice shall be equal to smallest sprinkler orifice utilized in the sprinkler system.

2.3 Hangers:

- A. Use beamclamps and rings and hang from top chord of joists. Do not hang from bottom chord of joist or bridging.
- B. Trapeze hang all mains where possible. Verify all hanger types with Structural Drawings and Engineer prior to commencement of any work.
- C. Provide sway bracing. Install in accordance with NFPA-13. Pipe to be generally supported by clamps and rods and secured to overhead construction.

PART 3 EXECUTION

3.1 Starting and Completion Dates:

- A. The schedule for installation of the sprinkler systems will be established at the pre-bid meeting. Coordinate schedule closely with General Contractor, Owner, and Architect.

3.2 Inspection:

- A. The Contractor shall daily examine all areas in which the work will be performed. The Contractor shall immediately report unsatisfactory working conditions to the Owner or his/her Agent for resolution. The Contractor shall not proceed with the work until all unsatisfactory working conditions have been corrected.
- B. Owner, Architect, and all Authorities having jurisdiction shall be allowed to conduct inspections and tests as they choose. Approved sprinkler plans must be available on the project site during installation and inspection of the work.

3.3 Installation General:

- A. All holes made by the Contractor in any wall, ceiling or floor shall be patched by the Contractor, restoring the wall, ceiling or floor to its original condition, fire resistance and integrity.
- B. Removal and repair of all finished surfaces shall be coordinated with the Architect and subject to his/her approval.
- C. Location of all equipment, controls, piping, valves and drain shall be subject to Architect/Owner approval.
- D. Standard metal signs shall be provided in accordance with NFPA-13.
- E. All sprinklers and equipment shall be installed in accordance with manufacturer's instructions. All special tools recommended by the manufacturer shall be used.

3.4 Installation Piping and Sprinklers:

- A. Where sprinkler piping is installed in finished areas, the Contractor shall install all new piping so that it is concealed above finished ceilings, provide a minimum separation of 12" between the ceiling height and the bottom of the sprinkler pipe. Pipe installed in unfinished areas may be exposed.
- B. All exposed pipe which passes through a wall, ceiling, or floor shall be provided with escutcheon plates.
- C. All piping shall be installed so as not to obstruct any portion of a window, doorway, stairway or passageway, and shall not interfere with the operation or accessibility of any mechanical, plumbing or electrical equipment. Run piping horizontally and at right angles to walls and ceilings or along slope of ceilings.
- D. Center sprinklers in both horizontal directions with respect to ceiling components, such as ceiling grid (in center tile of 2'-0" direction and at quarterpoints of 4'-0" direction), light fixtures, HVAC diffusers, speakers and detectors as required.
- E. All sprinkler piping, drain and test piping, etc. installed through exterior walls shall be galvanized and have a 4'-0" minimum length to first valve located inside insulated building envelope.

- F. All sprinkler piping must be substantially supported from building structure and only approved type hangers shall be used. Sprinkler lines under ducts shall not be supported from ductwork, but shall be supported from building structure with trapeze hangers where necessary, in accordance with NFPA-13. Tapping or drilling of structural elements is not permitted. Use beam clamps or hang from top chord of joist. Do not hang from bottom chord of joist.
- G. Pendent sprinklers shall be in alignment with, and parallel to ceiling fixtures, walls, etc.
- H. Install sprinkler piping in exposed areas as high as possible using necessary fittings and auxiliary drains to maintain maximum clear head room, and to keep space aesthetically acceptable to Architect/Owner.
- I. Sprinklers shall be installed per the requirements of NFPA 13 with regard to ducts, obstructions, steel beams and joists, partitions, and ceiling projections. Provide additional sprinklers as required.
- J. Provide sprinkler protection below any ducts, banks of piping, etc., greater than 48" in width in all sprinklered areas.
- K. Contractor shall provide complete sprinkler protection before combustible contents are moved into the building.
- L. All sprinkler piping and fittings shall be so installed such that system may be drained. System shall primarily be designed to drain through main drain at riser(s).
- M. Minimum and maximum deflector distances shall be per NFPA requirements. A minimum of 18-inches from deflector to top of storage shall be provided.
- N. A minimum distance between sprinklers, as required by NFPA and the individual sprinkler U.L. listing or F.M. approval, shall be provided to avoid cold soldering of sprinklers.
- O. Provide fire protection during construction as required by local Authorities having jurisdiction.

3.5 Ceiling and Wall Plates:

- A. Install chrome wall plates wherever exposed sprinkler piping passes throughout ceiling and walls.

3.6 Sleeves:

- A. Set sleeves securely in place for all pipes passing through floor and masonry wall openings.
- B. Space between sleeve and pipe shall be filled with packing commensurate with construction. Provide chrome wall plates at each side of wall.
- C. Sleeves and seals through floors and exterior wall shall be watertight.
- D. All sleeves shall meet requirements of all Authorities having jurisdiction and Owner.

3.7 Sprinkler Guards and Water Shields:

- A. Provide guards for sprinklers within 7 feet of finish floor or wherever sprinklers may be subject to mechanical damage.
- B. Sprinklers located under open gratings, stairways, or in racks, shall be provided with shields and wire sprinkler guards.

3.8 Welding and Flame Cutting:

- A. No welding or flame cutting by the Contractor shall be permitted on the premises.
- B. Shop welding (off-site) shall meet all NFPA-13 and related requirements. Retrieve all discs from piping prior to site delivery.

3.9 Final Inspection and Tests:

- A. Overhead sprinkler piping: Tested for a period of two hours at a hydrostatic pressure of 200 lbs. and all piping, valves, sprinklers, etc., shall be watertight.
- B. Underground piping: Tested (by Utility Contractor) for a period of two hours at a hydrostatic pressure of 200 lbs. in accordance with NFPA Standards. Leakage shall not

exceed quantities indicated. Coordinate with Utility Contractor to ensure proper testing and test schedule.

- C. Replace piping system components which do not pass the test procedures specified, and retest repaired portion(s) of the system.
- D. All underground piping shall be thoroughly flushed (by Utility Contractor) in accordance with the requirements of NFPA Standards, prior to connection to overhead piping system. The flush test must be witnessed by all Authorities having jurisdiction. A test shall be made before the trench in which pipe is laid is backfilled. Coordinate with Utility Contractor to ensure proper testing and test schedule.
- E. The Contractor shall make arrangements with all Authorities have jurisdiction for final inspection and witnessing of the final acceptance tests.
- F. If, when the Owner's consultant or any other Authorities having jurisdiction visit the job site for this purpose after being advised by the Contractor that the work is completed and ready for test, the work has not been completed, or the final acceptance tests are unsatisfactory, the Contractor shall be responsible for Consultant's extra time and expenses for reinspection and witnessing the retesting of the work. Such extra fees shall be deducted from payments by the Owner to the Contractor.
- G. Contractor shall provide at least (5) working days notice to Architect and Owner via General Contractor for all tests and field observations.
- H. Flushing of all piping shall be conducted with water flowing at a minimum velocity of 10 feet per second.

END OF SECTION



**SECTION 26 00 00
BASIC ELECTRICAL MATERIALS AND METHODS**

PART 1.00 – GENERAL

1.01 RELATED DOCUMENTS

- A. The Drawings and the general provisions of the Contract, including the General and Supplementary Conditions and other Division 1 Specification Sections, apply to the work of this section.
- B. All installations to comply fully with the latest City of Chandler Design Standards and Policies manual.

1.02 WORK SPECIFIED HEREIN

- A. All labor, materials, equipment and services necessary to furnish and install complete electrical systems and related items of work as indicated or specified.
- B. The work in general shall consist of, but is not limited to the following:
 - 1. Panels, services, conduit, wiring, etc., for all outlets and equipment.
 - 2. Electrical service - modify as indicated.
 - 3. Telephone outlets, mounting board, conduits with pull wire, etc.
 - 4. Provide temporary electrical service in accordance with the specification, including meter and related work as required.
 - 5. Motors, controls, air conditioning and plumbing control wiring, etc., when such items are specified as work under other Sections.
 - 6. Painting as specified under other Sections, except for factory-finished material and equipment.

1.03 SUBSTITUTIONS

- A. In accordance with provisions of the specification.

1.04 QUALITY ASSURANCE

- A. Workmanship and material of electrical work shall comply with or exceed applicable provisions of the following (most recent additions including addenda and errata):
 - 1. National Electrical Code (NEC)
 - 2. National Bureau of Fire Underwriters (NBFU)
 - 3. American National Standards Institute (ANSI)
 - 4. American Society for Testing and Materials (ASTM)
 - 5. National Electrical Manufacturers Association (NEMA)
 - 6. Standards and requirements of serving utilities
 - 7. The latest City of Chandler Design Standards and Policies manual.

1.05 SUBMITTALS

- A. Submit shop drawings in accordance with provisions of the specification for work under this Section.
- B. Submit data for review on service entrance section, panelboards, other distribution equipment, lighting fixtures, and any items substituted or deviating from the specification and drawings.
- C. When applicable, furnish Owner with 2 screwdrivers which match the type of tamper proof screws used on the Project.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Receive, accept and provide protection for all electrical equipment and materials, including that furnished by others which is to be installed or electrically connected under this section. Provide a dry storage area for lighting fixtures. Store conduit a minimum of 6" above grade and slope to drain. Cover service and distribution equipment with approved cover and secure tightly to prevent weather and other elements from damaging factory finishes.

1.07 JOB CONDITIONS

- A. Coordinate location of electric outlets, piping, ducts, and other items between trades so that there will be no interferences between lighting fixtures, piping and ducts.
- B. Provide cutting and patching necessary for the installation of the work included under this section. Cutting shall be neatly done and in no case shall openings be cut larger than necessary to allow convenient installation of the work. Provide and set thimbles for the reception of work as work progressed. Cut no columns, beams, joists or ceiling hanger rods without the written approval of the Architect. Coordinate cutting of existing construction with the Architect prior to commencing any work.
- C. Patching shall be of such materials to match the existing wall, partitions, floors and ceilings.

1.08 GUARANTEE

- A. Guarantee the electrical installation, and all work under this Section, for a period of one year from the date of final acceptance by the Owner against all evidence of imperfect workmanship or failure or malfunction of materials. Furnish this guarantee in writing to the Owner in accordance with the Specification. Work and materials found to be defective within this period shall be promptly replaced without cost. Incandescent lamps for lighting fixtures are excluded from this guarantee.

PART 2.00 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Material furnished under this contract, unless otherwise noted, shall be new, free from defects and shall conform with the standards of UL, where such a standard has been established, and shall be so labeled. Materials not UL rated and materials not specified herein, that are required to complete the electrical installation shall be of first class quality for use intended and shall be subject to Architect's approval. Items to be furnished under this Section shall be the standard product of established manufacturers regularly engaged in the production of such equipment.
- B. Provide enclosures for all equipment, suitable for intended use. For exterior areas and areas subject to water exposure use NEMA III weatherproof type enclosure.
- C. Voltage, ampere, and other ratings of equipment shall be suitable for use intended. Disconnect switches shall be properly horsepower rated and suitable for voltage applied, and ampere rating of load. Enclosures requiring opening for electrical service shall have only those openings that are necessary. For irregular surfaces increase openings and finish surfaces flat so that flush covers properly fit surfaces without deforming the covers.
- D. Raceways shall be sized according to NEC Tables 1 and 4 unless indicated otherwise.
- E. The drawings generally indicate the raceway size, the number, size, and insulation type of conductors to be provided and installed. Where these items do not meet minimum applicable codes, rules, regulations or minimum requirements for equipment being served; e.g., 3 conductors serving a 4 wire panel or a raceway too small for conductors noted, comply as required at no additional cost.

2.02 RACEWAYS

- A. Galvanized Rigid Conduit (GRC): Clifton, Pittsburgh Standard Conduit, Republic Steel Corp., Triangle Conduit and Cable Co. Inc, and Columbus Brand; including elbows and couplings.
- B. Intermediate Metal Conduit (IMC): Clifton, Pittsburgh Standard Conduit, Republic Steel Corp., Triangle Conduit and Cable Co. Inc, and Columbus Brand; including elbows and couplings.
- C. Electric Metallic Tubing (EMT): Same as GRC above.
- D. EMT Fittings: Pressed steel or malleable iron, compression type: Efcor, T & B, Appleton, Regal, or Gedney. Connectors shall have insulated throats.
- E. Flexible Metal Conduit (FLEX): Acme International Metal Hose, American Brass Sealtite, or Electrical Flex Co. Liquid tight flex shall be type UA.
- F. Flex Fittings: Same as EMT Fittings above.
- G. Rigid Non-Metallic Conduit: As manufactured by Pacific Western Extruded Products, Baldwin Extruded Products or Triangle Conduit and Cable; U.L. labeled Schedule 40 P.V.C.
- H. Non-ferrous EMT and fittings are required in any MRI exam rooms.
- I. Wireways: Screw and/or hinged cover, of code gauge enameled sheet steel; Square D, Wiremold, or equal.

- J. Plastic covering: #50 Scotch Wrap.
- K. Thread Sealant: Permacel 412 Ribbon Dope.
- L. Lubricant: (To facilitate the installation of wire through raceway systems) Minerallac #100 compound.

2.03 **OUTLET BOXES**

- A. Outlet, Pull and Junction Boxes: By Racor, Steel City, Bowers or Appleton. Include plaster rings, covers, bar hangers and KO seals as required. Provide in accordance with following schedule:
- B. Octagon or square boxes: For all light fixtures 3/8" fixture stud fastened through from back of box for surface or wall pendant light fixtures with proper finish ring.
- C. Minimum 4" or 4-11/16" square: Galvanized steel knock-out type for all switches and receptacles. Firmly fasten to building construction set ring flush with finished surface, and keep free of foreign substance.
- D. Junction and pull boxes: Provide with screw covers located in an accessible location.
- E. Condulets: Crouse-Hindes, R & S, Appleton, Efcor, Gedney or Killark; cast ferroalloy types with sheet steel covers; provide neoprene gaskets for exterior and wet locations.

2.04 **CONDUCTORS**

- A. Wire and Cable: Carol Wire and Cable, General Cable Corporation, Anaconda Wire and Cable Company, Phelps Dodge Corporation, Capitol Wire and Cable or Triangle Conduit and Cable Co.
- B. Unless otherwise noted, wire and cable shall be soft drawn, annealed copper having conductivity of not less than 98% of that pure copper, uniform in cross section, free from flaws, scales and other imperfections. (Aluminum conductors only where specifically indicated). All conductors shall be stranded cable.
- C. Portable cords type SJO, 300 volt constant service and type SJ, 600 volt constant service shall be used as shown and as required.
- D. Insulation: Type THWN/THHN 90C, 600V insulated wire for interior wiring, Type XHHW 90C, 600V insulated wire for exterior wiring.
- E. Sizes: Minimum wire size shall be No. 12 AWG, except No. 14 and smaller size may be used for control and signal wiring where applicable.
- F. Wire color identification: Neutral wire - white, live wire - black, red, blue on 120/208 volt system; Neutral wire - grey, live wire - brown, orange yellow on 277/480 volt system; ground - green.

- G. Fixtures connectors: Pressure type solderless connectors - Buchanan, Scotchlock, Wing Nut, or approved equal, complete with insulator and security ring.
- H. Where applicable, cover exposed taps, joints, splices with insulating material, equal to original insulation of conductor. For 600 volt or less use sufficient self- vulcanizing Okonite or electrical rubber tape covered with Manson, or electrical friction tape of highest quality.
- I. Ground Clamp Hinges: Raco, Gedney or Appleton, Grange alloy type, sizes and types as indicated or required.

2.05 SERVICE ENTRANCE AND DISTRIBUTION EQUIPMENT

- A. New gear to be free from defects, and manufactured by GE, Siemens, Square D, Cutler Hammer, Al's Electric, or as noted on drawings.
- B. Equipment shall have space and bussing as shown and shall be fully bussed.
- C. Equipment shall be dead front standard sectional type with enclosed top, front, rear and sides with front access and shall be free standing, unless otherwise shown, and self- supporting.
- D. Equipment shall be symmetrical and so constructed that no unfinished edges are exposed. Finish shall consist of a rust-resisting prime coat on all surfaces with baked enamel factory finished exteriors.
- E. Current density in any buss shall not exceed 1,000 amperes per square inch in cross sectional area and 200 amperes per square inch areas in any bolted joint. Support cross busses, risers and jumpers at intervals with supports of sufficient strength so that bus and all components will withstand magnetic stresses of short circuit of at least 100,000 amps RMS.

2.06 PANELS

- A. Square D, General Electric, Siemens, Cutler Hammer. Interiors shall be fastened in cabinets by supports with means to provide adjustment for alignment.
- B. Boxes shall have ample side, top and bottom wiring gutters to accommodate proposed and future wiring. Provide 20" (or greater) wide boxes and covers for panelboards unless indicated otherwise.
- C. Panelboard covers: shall be made from single sheet of steel, full finished patent leveled, door struck out, trim proper width around door. Hinged, locking door-in-door construction.
- D. Panels shall have flush surface type covers with dead fronts when covers are removed.
- E. Doors shall be fastened to trim with concealed hinges and provided with flush type combination latch and lock with 3 keys each (all keyed alike).
- F. Provide and install typewritten neat circuit identification cards (8-1/2" W x 7-1/2" h) in each panel showing use of each pole. Odd numbered circuits on left side and even numbered circuits on right side. Tie bars to form two pole breakers will not be accepted. Adjacent single pole breakers shall be opposite potential. Panels shall be furnished with ground bus when

bond wires are indicated.

2.07 BUSSES

- A. Busses for all electrical equipment shall be constructed of 98% conductivity pure electrolytic copper buss bar (hard drawn).

2.08 NAMEPLATES

- A. Provide and install with standard plate brass screws black lamicaid #7025 identifying nameplates with 3/16" high white letters on the following equipment: Panels, switchboards, mains and submains, distribution equipment and switch components, motor control center and switch components, remote safety switches, circuit breakers, time switches, contactors and starters.

2.09 SAFETY SWITCHES

- A. Square "D", G.E. or ITE Safety switches (fusible and nonfusible), heavy duty industrial type A (HD).

2.1 FUSES

- A. Furnish a complete set of Bussman fuses of proper type and rating for all switches and other devices requiring fuse protection.

2.2 STARTERS, CONTACTORS AND CONTROL DEVICES

- A. Provide starters, contactors and control devices shown and as required by Code.
- B. Starters (manual and magnetic) shall be Square "D" or comparable G.E. or Westinghouse. Furnish complete with green pilot lights to indicate equipment energized, auxiliary contacts as required, push buttons, hand-off-on switches, and control devices overload relays in each line to motors except neutral, as required to complete installation. Thermal overloads to be sized per manufacturers recommendations. Ambient compensate all heaters exposed to high temperature or installation outside.
- C. Control devices (push button stations, hand-off-auto, on- off, limit switches) Square "D", or comparable G.E. or Siemens. Time switches (astronomical) and photocells shall be Tork, Intermatic, Paragon or prior approved equal.

2.3 WIRING DEVICES

- A. Hubbell or comparable P & S, Slater, Sierra: color shall be white, or as noted on plans. All devices to be industrial grade with captive wire clamps for all conductors including the grounding conductor. (No wire wrapping or crimp style connections (e.g. split fork) allowed.
- B. Switch style shall be toggle style, or as noted on plans
- C. Receptacles: Duplex grounding type, 125 Volt, 20 amperes, single phase, Hubbell, P & S, Slater, Sierra; flush - 4" square box with plaster ring and device cover; surface - 4" square box

and "RS" cover.

- D. Ground Fault Interrupter Type Receptacle: Duplex grounding type, 125 Volt, 20 Amperes, single phase, 5 mA ground trip, feed through construction.
- E. Waterproof outlets: Taymac cover enclosure (weatherproof when in use).
- F. 15 amp devices allowed only when specifically denoted on electrical construction drawings.

2.4 WALL PLATES

- A. Wall plate shall be provided for each switch, receptacle, signal and telephone outlet and special purpose outlet. Sectional gang plates shall not be used. Multi-gang outlet plates shall be used for multi-gang boxes.
- B. Device Plates: Stainless steel, or as noted on drawings. Hubbell, A.H. & H., P & S, Sierra, or Slater. Provide nameplates for all special purpose receptacles and switches and for all switches in gangs of three or more. Special coverplates to match device color (e.g. red device on emergency power to have red nylon coverplate).
- C. Provide label at all receptacles (1/4" black text on clear tape) designating panel and circuit origination.

2.5 LIGHTING FIXTURES

- A. As per Lighting Fixture Schedule.
- B. Provide lighting fixtures shown which shall have all parts including plaster frames for recessed fixtures and fittings necessary to completely and properly install fixtures. Lighting fixtures shall be prewired type.
- C. Verify ceiling construction, recessed depth, etc., prior to ordering fixtures.
- D. All recessed incandescent lighting fixtures shall conform to Article 410-65 © of the NEC.
- E. Lighting fixtures shall be complete with lamps. Provide lamps of size, type and quantity required to lamp fixtures, unless smaller sizes are shown. If lamps are ballasts noted are not of the type suitable for specified fixture, notify the Architect and provide proper lamps and ballasts as required at no additional cost.
- F. Finishes except as otherwise noted in schedule shall be top quality organic baked enamel, applied over iron phosphate rust inhibitor, after five-stage washing and phosphatizing process. Minimum enamel thickness shall be 1.5 mils, average reflectance shall be not less than 85%.
- G. Lampholders in all fixtures shall be mounted to 18 gauge socket bracket. Bracket and lampholders shall be reinforced by end of electrical chassis to prevent spreading.
- H. Incandescent Lamps: General Electric, 130 volt, extended life lamps, wattage and types as required by fixture.

- I. Fluorescent Lamps (T-8): General Electric energy saving type, as specified on drawings. Minimum CRI of 80.

PART 3 - EXECUTION

2.01 GENERAL INSTALLATION

- A. The entire electrical installation shall be made in a neat, approved, workmanlike, finished and safe manner. Conceal all wiring in finished areas. The entire installation shall be subject to the Architect's approval.
- B. Remove all tools, scaffolds, scrap and surplus materials promptly upon completion of any portion of the work. Keep all areas clean of waste and debris.
- C. Minimum installation requirements shall be in accordance with manufacturer's written up-to-date installation recommendations.
- D. Inspect and make tight all connections for all equipment, including factory connections. Torque all connections per manufacturer's recommendations.
- E. Construct and brace equipment, materials, etc., to minimize unnecessary and undesirable rattling and vibration in all electrical systems.
- G. Drawings showing electrical work are generally diagrammatic and are not intended to show in detail all features of work. No extra payment will be allowed where obstructions in work of other trades or work under this section require offsets, etc. Check location of electrical work to determine in advance that it clears all openings and structural members, that equipment will be properly concealed and that equipment clears cabinets, fixed equipment, windows, door openings, or other obstruction.
- H. Notify serving agencies prior to time work is started and submit plans, specifications, shop drawings and other related work as required, including the providing and installing of required materials to complete all systems.
- I. Lighting fixtures installed and used for lighting during construction shall be relamped with new lamps just prior to final acceptance of the Project.
- J. Install seismic restraint devices for all ceiling mounted equipment, i.e. fluorescent lay-in type ceiling fixtures in modular type ceilings. Provide grid clips and #12 slack wires from fixture corners to structure.
- K. Flush mounted equipment, panels, junction and outlet boxes, etc., shall mount within 1/8" of finish surface. Where too deep to completely recess, provide approved finished wood or approved trim and fill space between finish surface and panel trim as directed by Architect.
- L. Free standing and self-supporting equipment shall be anchored (bolted down) to a 6" (exterior) 4" (interior) raised concrete slab. Where equipment is not free standing type, anchor to wall with approved type mounting support as required.

- M. Method of supporting fixtures shall be subject to Architect's approval.
- N. Where fixture stems are used, they shall be one continuous uniform stem.
- O. Provide wiring to time switches and photo cells as required, and set time switches and adjust photo cells as directed by Architect.
- P. Where two or more conduits run to a single outlet box, each circuit shall be color coded as a guide in making connections colors shall be carried continuously throughout the system. If more than one multiwire branch circuit is carried through a single raceway. All circuit conductors of the same color shall be connected to the same feeder conductor throughout the installation.
- Q. Deviations from conduit runs will only be permitted with the Architects approval. Combining circuits in single conduit is permitted with proper identification and wire and conduit size increase required by NEC.
- R. Provide all conduit, wiring and connections for equipment furnished by the Owner or under other Sections, including line and low voltage wiring for the cooling and heating equipment compressor wiring. Obtain required information from the other trades and rough-in to meet requirements of said equipment. No allowance will be made for failure to comply with obtaining complete information from other trades.

2.02 RACEWAYS

- A. Install approved complete raceway systems for all electrical conductors including conductors for telephone, signal, control and other systems required by applicable codes, rules and regulations.
- B. Unless otherwise noted, install all raceways concealed, generally in furred spaces, walls, or below floors, in roof insulation, below grade or other approved available spaces. Where it is not feasible to conceal raceways, they shall be installed as directed by Architect.
- C. Where exposed raceways are permitted by Architect in finished areas, paint as directed by Architect and use approved escutcheons where entering or leaving finished areas.
- D. Raceways shall not be installed in close proximity to any steam pipe, hot water pipe, heating duct or appliance or areas subject to heating above temperature rating of conductors installed in raceways. If conductor insulation types are not noted, verify for compliance prior to installation of raceways. In no case shall raceways be installed within 3" from outside finish covering of pipes or ducts being crossed.
- E. Install exposed raceways to run parallel or at right angles to structural building lines with neat bends where required and neatly offset into points or terminations.
- F. In empty raceway provide and install a No. 14 nylon drag line or approved equal pull wire with adequate slack at each end to facilitate the installation of future electrical conductors.
- G. Install approved expansion joint type fittings in raceway systems crossing building expansion joints and as recommended by raceway manufacturer where expansion is caused by

temperature changes or similar type conditions. Expansions fittings to maintain approved raceway system (provide bonding jumpers as required). The minimum size approved conduit type raceway shall be 3/4" trade size.

- H. Install raceways with approved heavy duty supports, straps, hangers, connectors, and couplings, as required to maintain an approved installation. Raceways shall have independent supports from building or similar structure only. Do not support raceways from other crafts pipe, pipe supports, ducts, ceiling support wires or other related equipment. Wire or perforated strapping shall not be used for hanging conduit.
- I. Support vertical runs of raceways on heavy steel clamps. Bolt clamps tightly around the conduit and rest securely on the building structure without blocking. Place clamps below couplings.
- J. Make all raceway bends without collapse or injury and make bends for telephone raceway systems with large radii sweep type bends. Verify size of radii required for serving agency.
- K. Flash raceways extended through roof and similar areas in accordance with Roofing Specifications.
- L. Carefully ream raceway ends to remove all burrs. Cut ends of raceway at right or proper angle to length of raceway and install to butt flush into couplings or fittings. Cap all conduit raceway ends as soon as installed and deep free of foreign substances. Use approved type caps for use intended. Make no more than 4 quarter bends, pockets or depressions in a continuous run of conduit raceway, install up and over obstructions rather than down and under.
- M. Swab clean, dry and remove any foreign materials from raceways prior to installation of any electrical conductors.
- N. Unless otherwise indicated where conduit raceways enter or leave the top of a concrete slab, it shall be accomplished with an approved hot dipped galvanized rigid steel (heavy wall) coupling installed flush to 1/4" below finish floor level. Extend conduit raceways from flush coupling as required to complete run.
- O. Install raceways below grade a minimum of 24" below finish grade, or a minimum of 3" from surface of raceway to bottom side of 4" thick or greater concrete slabs poured on grade.
- P. Do not install conduit raceways in concrete slabs. Provide double reducing washers where conduit raceways enter oversized and concentric knockout openings. Provide insulation and insulated grounding bushing as required for all conduit raceway systems.
- Q. Do not install raceways where they will be subject to injury or damage; e.g., sharp rocks, in bottom of trench or backfill.
- R. Support Underground conduit runs or banks on preformed, nonmetallic separators, Spacing between exterior surfaces of conduits generally shall be not less than the following:
 - 1. Between telephone conduits: 2"
 - 2. Between conduits containing conductors at not over 600 volts: 2"
 - 3. Between telephone conduit and power conduit in same envelope: 6"

- S. Spacing between separators shall not exceed 5 feet and be close enough to prevent sagging of conduits and breaking of couplings and watertight seals.
- T. Raceways shall not be covered until approved by the Architect.
- U. Where an underground conduit, without a concrete envelope, enters the building through a nonwaterproofed wall or floor, a sleeve made of Schedule 40 galvanized pipe shall be filled with a suitable plastic expandable compound or an oakum and lead joint on each side of the wall or floor in such a manner as to prevent entrance of moisture.
- V. Mark underground stub out with concrete monuments (8" x 8" x 8") installed 1" below finish grade, over but not in contact with capped ends. Identify capped empty raceway with linen tags located inside of raceway ends. Pitch all conduits uniformly to manholes to eliminate pockets. All joints shall be watertight.

2.03 GALVANIZED RIGID CONDUIT (GRC)

- A. All raceways shall be GRC for entire installation except as noted or shown. Rigid steel conduit, elbows, standard couplings shall be hot dipped galvanized rigid steel. If partitions or walls are solid concrete or are grouted solid with concrete or mortar, rigid steel conduit shall be used, also where subject to injury or damage; e.g., consider area up to 4 feet above floor level subject to injury. Verify these areas prior to installation.
- B. Double locknut, one inside and one outside rigid conduits entering cabinets, pull boxes and outlet boxes. Provide bushing.
- C. Apply thoroughly, thread sealant to male threaded ends of metallic raceways installed below grade, in concrete or mortar, or in wet type locations. Running threads shall not be used.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

- A. IMC raceway and approved fittings where permitted by applicable codes and regulations may be used in lieu of rigid steel conduit, where installed above finish grade and above concrete slabs on grade.

2.05 ELECTRIC METALLIC TUBING (EMT)

- A. EMT may be used where concealed in areas above ceilings, furred spaces, partitions or walls.

2.06 FLEXIBLE METAL CONDUIT (FLEX)

- A. Use flexible conduits for connections to motors and where other electrical equipment is subject to movement, vibration, misalignment, cramped quarters or where noise transmission is to be eliminated or reduced. Length shall be adequate, but not to exceed 30". Flexible conduits and fittings used to meet the above requirements shall in addition be of the liquid-tight type when installed under any of the following conditions:

2.07 EXTERIOR LOCATIONS

- A. Moisture or humidity laden atmospheres where is it possible for condensation to accumulate.

- B. Where water or spray due to washdown operation is frequent or possible.
- C. Wherever there is a possibility of seepage, dripping, etc., of oil, grease or water.
- D. Where permitted by Code and with written approval of Architect, flex may be used where the installation of rigid steel conduit and EMT are not feasible. Where flex is installed in runs over 4 feet in length, it shall be tight with a minimum of slack.

2.08 RIGID NONMETALLIC CONDUIT

- A. PVC Schedule 40 may be installed for direct burial raceways where installed a minimum of 24" below grade.
- B. All bends shall be rigid galvanized conduit, wrapped with plastic tape half lapped. Make transition to rigid conduit with approved fittings. PVC conduit may be used for branch circuits under floor slabs. PVC above grade is not acceptable.

2.09 WIREWAYS AND FITTINGS

- A. Wireway and fittings installed on exterior and where subject to water or similar conditions shall be raintight type construction without knockouts, constructed from galvanized sheet steel.

3.10 OUTLET, PULL AND JUNCTION BOXES

- A. Provide boxes installed rigid and true where shown or as required. Prior to installation of boxes; such as wall switch boxes, verify size, location dimensions and door swings (switches shall be on strike side of door unless directed otherwise by the Architect). Provide necessary hangers or grout into masonry as required.
- B. Unless otherwise shown or as directed prior to installation, outlet boxes shall generally be placed at the following heights, center of box to finished floor level.
- C. Wall Switches: 44".
- D. Convenience Receptacles: 18" mounted horizontally (or above cabinets) and/or as noted. (Similar type outlets shall be mounted at same height in each area).
- E. Provide gang devices wherever possible, and provide partitions for gang boxes where conductors of different voltages and system enter same box. Verify equipment sizes and requirements with supplier of equipment prior to rough-in and setting of boxes.
- F. Boxes shall have open holes only when necessary. On finished surface, plaster rings shall be used on outlet boxes. The size and kind of boxes, plaster rings and junction boxes required shall be determined by purpose for which it is to be used, and shall be subject to Architect's approval.
- G. For exposed wiring on the exterior of building and on interior of building where subject to water, use cast ferroalloy type boxes with weatherproof covers, and neoprene gaskets, and for other exposed wiring on the interior of building, use code gauge 4" square or larger galvanized

boxes and ½" raised steel cover plates.

3.11 CONDUCTORS

- A. Use specified color schedule for all wiring. Where large conductors are not available in colors, identify with permanent colored plastic tape at all terminations, junction boxes, etc. color coding as per NEC and Owner's requirements.
- B. Identify all conductors by number with wraparound cloth wire markers in all manholes, junction boxes, pull boxes and at all terminations and junctions.
- C. Make taps, joints, splices, and other connections with fixture connectors.
- D. Make splices and taps only when required and as directed in approved locations, such as within junction boxes, or wireway.
- E. Do not install wiring, including fish tapes, and pull wires, in raceways until raceway system is complete, clean and dry and free of all foreign materials. Lubricate as required with specified lubricant.
- F. Conductors serving motors or subject to vibration shall terminate to screw or similar type connections with approved crimping type terminals.

3.12 LIGHTING FIXTURES

- A. Install all lighting fixtures at locations indicated.
- B. Leave fixtures and lamps clean of all dirt, dust, grease spots and debris and all glass, plastic and other components, unscratched and unbroken.
- C. Fit and adjust all fixtures. Where structural conditions, partitions, furniture, shelving, and air conditioning diffusers interfere with the lighting fixtures at locations shown, notify Architect in writing and relocate at no additional cost as directed. Coordinate lighting fixtures with ceiling patterns as directed.
- D. Where unmarked outlets are shown notify the Architect and install fixtures complete with lamps similar to fixtures in similar areas at no additional cost as directed by the Architect.
- E. Fixtures with finish trim or lens frames shall be gasketed and baffled to prevent light leaks. Install so that no light leaks exist.
- F. Fixtures mounted directly on combustible low-density ceilings shall have UL approval for this condition and be plainly marked so indicating. Fixtures and components requiring additional requirements to comply with all code requirements shall be provided under this section at no additional cost.

3.13 GROUNDING

- A. Grounding for distribution equipment, equipment and materials with electrical connections, secondary wiring of transformer, transformer enclosures, electric motor frames, electric

raceway and related equipment, shall be effectively and permanently grounded in accordance with pertinent Sections of Article 250 of NEC. Resistance to ground shall not exceed 25 ohms.

- B. All raceways shall have an approved size insulated (green in color) copper grounding type conductor installed in raceway.
- C. Where raceways connect to a concentric K.O. provide grounding locknut or bushing and bond wire extended and bonded to enclosure, size as per NEC.

1.1 DITCHING, EXCAVATION AND BACKFILLING

- A. Perform all ditching, excavation and backfilling required for the electrical work. The conditions governing the excavation for electrical facilities shall be in accordance with the specification.
- B. Extreme care shall be taken in establishment of the exact depths and routing of underground electrical facilities so not to conflict or damage existing or new underground water, sewer, heating or other service lines. Provide and maintain all sheathing, bracing and proper guards for prevention of accidents.

1.2 FUTURE WORK

- A. Where provisions are made for future work the installation shall be made so that a minimum amount of work would be required to accomplish the future work; e.g., future conduit stubouts from a distribution section, panel, etc., shall be arranged so that future conductors may be installed without the removal of the interiors, components and conductors, etc. Coordinate and install servicing, operating and removal space for all equipment.
- B. Mark underground stub out with concrete monuments (8" x 8" x 8") installed 4" below finished grade, over but not in contact with capped ends. Identify capped empty raceway with linen tags located inside of raceway ends.

1.3 FINAL INSPECTION TESTS

- A. Furnish all meters, cable, connections, apparatus, etc., necessary for making tests under this Section, subject to Architects's approval.
- B. Test system for shorts and grounds. Faulty wiring shall be removed and replaced. After system is connected complete, test for insulation resistance. Resistance lower than outlined in the NEC, manufacturer's data, etc., shall be removed and replaced. Any device, apparatus or fixture under this contract showing substandard readings shall be removed and replaced as directed by the Architect.
- C. All equipment shall be tested by taking ampere readings per phase, speed by means of direct reading tachometer, full load and no load voltage with 1/2% voltmeter. Record all readings and deliver to Architect for review.

END OF SECTION



SECTION 31 01 00

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Building pad excavating and backfilling.
 - 2. Trenching, backfilling and compacting for building and site utilities.
 - 3. Finish grading.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Subslab vapor retarder membrane.

1.02 DEFINITIONS

- A. Native or natural soils: Undisturbed soils present at site in their natural state or conditions. Materials which are essentially free of vegetation or organic matter and do not include trash or other deleterious materials.
- B. Existing fill soils: Materials present at site that have been disturbed, possibly transported, and are not in their natural undisturbed state.
- C. Imported fill soils: Materials transported onto site.
- D. Granular material: A sandy type of soil whose particles are coarser than cohesive material and which do not stick to each other.
- E. Finished Grade: Required final grade elevation.
- F. Building Perimeter: The extreme outer edge of footing. This location of the building perimeter is to be used in determining the required lateral extent of engineered fill.
- G. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.03 SUBMITTALS

- A. Test Reports:
 - 1. Submit test results for imported fill materials to be used (if required), directly to the testing laboratory with a copy to Architect in accordance with Section 01 45 00.
 - 2. Test results shall clearly indicate:
 - a. Types of materials and composition.
 - b. Hardness
 - c. Compactability.
 - d. Presence of organic contaminants, whether or not below EPA action levels.
 - e. Presence of hazardous and/or regulated wastes and contaminants, whether or not below EPA action levels.
 - f. Suitability for proposed usage.
 - 3. Testing laboratory shall notify Architect of non-conforming fill material submittals.
- B. As-Built Drawings:



1. Maintain previously recorded utilities and accurately record location of:
 - a. Newly encountered utilities remaining.
 - b. Rerouted utilities.
 - c. New utilities by horizontal dimensions, elevations or inverts, and slope gradients.
 2. Submit in accordance with Section 01 77 00.
- C. Product Data: Submit product data for each type of plastic warning tape.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable Federal, State and local ordinances, including MAG Specifications. Where geotechnical report, General Structural Notes, or notes on drawings state more restrictive requirements, the requirements of the geotechnical report, General Structural Notes, or notes on drawings shall govern.
- B. Staking: Staking shall be performed by a Civil Engineer or Land Surveyor currently registered in the state where the Project is located. One person only shall be responsible for staking the Project, however, additional staff may be used (under direct supervision of responsible person) for larger projects.
- C. Observation of Geotechnical Engineer: Every phase of the earthwork shall be performed under observation and testing directed by the Geotechnical Engineer.

1.05 SITE CONDITIONS

- A. Soil Report:
 1. Soil report provided by the Owner for design of this Project was prepared by Speedie and Associates, 3331 East Wood Street, Phoenix, AZ (602) 997-6391, is included in the Project Manual as Section 00 31 32 - Geotechnical Report.
 2. Neither the Owner or Architect guarantees the accuracy of the report nor the continuity of the soil conditions indicated at boring locations.
 3. Portions of the soil report incorporated, either by reprint or reference, into these Specifications are those which relate to the quality of materials and workmanship and become a part of the Contract Documents. Quantities of excavation and fill materials shall be as indicated on Drawings, or as required by actual conditions as depicted by the soil borings presented in the Soil Report.
- B. Existing Conditions:
 1. Bidders are expected to visit the site to form their own conclusions as to the character of the Work under this Section.
 2. Due to previous site development, special attention shall be given to locating and removing existing subsurface remnants of former facilities, backfilled zones, and soils disturbed by demolition operations.
- C. Physical Requirements for Proper Installation or Application: Place, spread or roll fill materials during favorable weather conditions. When the Work is interrupted by rain, do not resume fill operations until evidence is furnished which establishes that moisture content and density of the previously placed fill are as specified.
 1. Surface drainage: Provide and maintain positive surface drainage during excavation. Prevent infiltration of water into utility or foundation excavations from whatever sources as may exist.
 2. Dust control: Comply with requirements of governing authorities. Use whatever means necessary to control dust on and near the Work and on and near off-site borrow, storage and spoil areas, if such dust is caused by the Contractor's



operations during performance of the Work, or if resulting from the conditions in which the Contractor leaves the site. Thoroughly moisten surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other Work on the site.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill and Backfill: In accordance with Soils Report.
- B. Under-Slab Fill (Base Material): Aggregate Base (ABC) conforming with material requirements of MAG Section 702.
- C. Pipe Bedding Fill: Material used for pipe bedding shall comply with MAG Section 601.4.1
- D. Warning Tape:
 - 1. Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.
 - 2. Provide detectable warning tape with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2'-6" deep for non-metallic utility pipes, conduit or other underground services outside of building line.
 - 3. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify survey data. Stake out work and verify as to location and elevation. Carefully maintain bench marks, monuments, and other reference points; if disturbed or destroyed, replace as directed.
- B. Site preparation to be in accordance with Soils Report requirements.
- C. Soils disturbed by the demolition and clearing operations shall be removed and stockpiled on-site for future use as Engineered Fill, unless directed otherwise.
- D. Existing Utilities:
 - 1. Identify known below grade utilities. Stake and flag locations.
 - 2. Identify and flag above grade utilities.
 - 3. Maintain, re-route, extend and protect as required existing utilities remaining which pass through Work area as indicated.
 - 4. Notify utility company to remove and relocate utilities obstructing the Work.
 - 5. Pay costs for this Work, except that covered by utility company.
- E. Unknown Utilities and Concealed Conditions:



1. Upon discovery of unknown utility or concealed conditions which are unrecorded on the Contract Documents, discontinue affected Work and notify Architect in writing.
2. Shall additional work be required to remove, maintain, re-route, extend or protect unknown utilities or other conditions, the Contractor will be paid for the Work in accordance with the provisions of the General Conditions.

3.02 SUBGRADE

- A. Prepare subgrade at building areas to proper elevation to receive under-slab fill.
- B. Prepare subgrade at paved areas to proper elevation to receive base course materials.
- C. Grade as required to bring entire remainder of site to finished grade as indicated on drawings.

3.03 EXCAVATION - GENERAL

- A. Excavate for foundations and footings to provide vertical walls and corners square. Keep entire excavation free from loose material. Conform to dimensions and elevations indicated with allowances for erection of forms, shoring, waterproofing, and inspection of footings.
- B. Material to be excavated shall be non-classified and shall include earth or other materials encountered in excavating.
- C. The use of explosives will not be permitted.
- D. Drawings show predetermined elevations or depths for bottoms of footings. Shall additional depth of excavation be necessary, the Contractor will be paid for the Work in accordance with the provisions of the General Conditions.
- E. Shore and brace excavations if necessary to prevent cave-ins. Remove shoring before backfilling is completed, but not until permanent supports are in place.
- F. If excavation is carried below depth indicated, backfill with properly placed and compacted fill material (material as specified) over properly prepared subgrade, or increase foundation depth as required without extra compensation.
- G. After opening, footing excavations shall be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface runoff water shall be drained away from the excavations and not be allowed to pond. If it is required that footing excavations be left open for more than one day, they shall be protected to reduce evaporation or entry of moisture.
- H. Remove excess excavated material from the grounds and legally dispose of same.
- I. Protect utility services uncovered by excavation.
 1. Remove abandoned utility service lines from areas of excavation; cap, plug or seal such lines and identify at grade.
 2. Accurately locate and record abandoned and active utility lines rerouted or extended, on Project Record Documents.

3.05 EXCAVATION - UTILITIES



- A. Trenching:
1. General:
 - a. Perform trenching required for the installation of items where the trenching is not specifically described in other Sections of these Specifications.
 - b. Excavate for underground utilities, including water, steam, condensate, natural gas pipe lines, fire protection lines, sewers, electrical lines, cables, ducts and other electrical items.
 2. Width:
 - a. Make trenches open vertical construction with sufficient width to provide free working space at both sides of the trench and around the installed item as required for caulking, joining, backfilling, and compacting.
 - b. Provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted. Exceptions to these clearances will occur at encasement or special construction.
 3. Depth:
 - a. Trench as required to provide the elevations shown on the Drawings.
 - b. Where elevations are not shown on the Drawings or specified in other sections of the specifications, trench to sufficient depth to give a minimum of 18" of fill above the top of the pipe, measured from the adjacent finished grade.
 - c. Where the bottom of excavation is found to be soft and cannot support the pipe, the depth shall be extended until solid bearing is reached. Backfill to pipe foundation grade with granular material or earthfill and thoroughly compact to assure a firm foundation for the pipe.
 - d. Where excavation is in rock, or caliche, cut to depth of at least 8 inches below pipe invert elevations.
 4. Trench Bottoms:
 - a. Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit.
 - b. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
 - c. Remove stones and sharp objects to avoid point loading.
 - d. For pipes or conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - e. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 5. Do not disturb any portion of or remove support from a piping system that has thrust blocks or other constraints against movement while the system is in service.
 6. Correction of faulty grades: Where trench excavation is inadvertently carried below proper elevations, backfill with pipe bedding material and compact to provide a firm and unyielding subgrade or foundation without additional compensation.
 7. Trench bracing:
 - a. Properly brace and support trenches in accordance with requirements of governing authorities.
 - b. Brace, sheet, and support trench walls in such a manner that the ground alongside the excavation will not slide or settle, and that existing improvements of every kind, whether on public or private property, will be protected from damage.



- c. Arrange bracing, sheeting, and shoring so as not to place stress on portions of the completed Work until the general construction thereof has proceeded far enough to provide sufficient strength.
- 8. Repairs and replacement: In the event of damage to such improvements, immediately make repairs and replacements necessary to the approval of the Architect without additional compensation.
- 9. Removal of trench bracing: Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse and caving of the excavation faces being supported.
- 10. Grading and stockpiling trenched material: Control the stockpiling of trenched material in a manner to prevent water running into the excavations. Do not obstruct surface drainage, but provide means whereby storm water is diverted into existing gutters, other surface drains, or temporary drains.
- B. Crossing Protection
 - 1. Provide adequate temporary crossover for pedestrian and vehicular traffic including guard rails, lamps and flags, as required by agencies having jurisdiction and as directed.
 - 2. Remove provisions for crossing protection when they are no longer needed.
- C. Underpinning: Where excavation work is required under or adjacent to existing footings, under-pin as required to prevent damaging existing construction.

3.06 FOUNDATION FOR PIPES

- A. General: Grade the trench bottoms to provide a smooth, firm, and stable foundation free from rock points throughout the length of the pipe.
- B. Foundation material: Place a minimum of 6" of the specified pipe bedding fill material in the bottom of the trench.
- C. Subsurface conditions: In areas where soft, unstable materials are encountered at the surface upon which cohesionless material is to be placed, remove the unstable material and replace it with material approved by the Architect. Make sufficient depth to develop a firm foundation for the item being installed.
- D. Overexcavation: If the need for such overexcavation has been occasioned by an act or failure to act on the part of the Contractor, make the overexcavation and replacement without additional compensation.
- E. Bearing: At each joint in pipe, recess the bottom of the trench as required into the firm foundation in such a manner as to relieve the bell of the pipe of all load and to ensure continuous bearing of the pipe barrel on the firm foundation.
- F. Shaping: Accurately shape pipe subgrade and fit the bottom of the trench to the pipe shape. Use a drag template shaped to conform to the outer surface of the pipe if other methods do not produce satisfactory results.

3.07 BEDDING FOR PIPES

- A. General: Place the specified pipe bedding fill material in the trench, simultaneously on each side of the pipe for the full width of the trench, to a maximum depth of 3 feet and a minimum depth of one foot above the outside diameter of the pipe barrel. Water consolidation shall not be allowed



- B. Densification: Take special care to provide firm bedding support on the underside of the pipe and fittings for the full length of the pipe.
- C. Alternate bedding: Other bedding procedures and materials may be used if prior written approval has been obtained from the Civil Engineer through the Architect.

3.08 UNDER-SLAB FILL

- A. Slab-on-grade interior floor slab system shall be supported by Engineered Fill as previously recommended and/or competent native soil may be utilized for the proposed slab-on-grade. The proposed slab-on-grade be underlain by at least 4 inches of properly compacted Aggregate Base Course (ABC) constructed in general accordance with Maricopa Association of Governments (MAG) Specification 702.
- B. Place under-slab fill to the thickness and grade indicated, smooth and even, free of voids. Compact to specified density. Grade to a tolerance of 1/4 inch in 10 feet.

3.09 BACKFILLING - GENERAL

- A. After completion of the foundations, walls and other construction, and removal of forms, clean the excavations of trash and debris.
- B. Place the backfill symmetrically against each side of the walls to prevent eccentric loading. Place backfill in horizontal 6 inch (150mm) layers with the proper moisture content for the required degree of compaction.

3.10 BACKFILLING - UTILITIES

- A. Backfill pipe and conduit trenches in a manner to prevent disturbance to the pipes or conduits. Fill under and around pipes thoroughly to a point approximately 12 inches above the top of the pipe and compact. Backfill remainder of trench in 6 inch layers and compact.
- B. Backfill utility trenches in accordance with MAG Section 601
 - 1. Delete references to compaction methods specified in paragraph 6.01.2.5 and 6.01.4.4 of MAG Section 601 and insert the following:
 - a. The compacted density of the trench backfill shall be 95% of ASTM D-1557(Method A or D) with the percent of density adjusted to compensate for the rock content larger than that which will pass a #4 sieve, by the method provided in the City of Phoenix Chart, Detail No. 35.
 - b. At least one density and moisture content test shall be taken in per 500 lineal feet of trench backfill per layer of backfill. The test must be made prior to any additional formation of backfill
 - 2. Revise paragraph 6.01.4.3, Backfill, as follows: "All backfill shall be granular material. Water settling is not permitted. Backfill for electrical direct burial or concrete encased duct in paved areas under roadway shall be wet sand slurry.
- C. Backfilling prior to approvals: Do not allow or cause portions of the work performed or installed to be covered up or enclosed by work of this Section prior to required inspections. Shall any of the work be so enclosed or covered up before it has been inspected, uncover such work at no additional compensation.
- D. Backfill simultaneously on both sides of utility to prevent displacement.



- E. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.
- F. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SUBGRADE PREPARATION AND GENERAL SITE GRADING

- A. General: Provide in accordance with Soil Report Requirements.
- B. Utilize mechanical compaction equipment in grading operations. In no case shall water settling or "jetting" be employed. Vibratory compaction equipment employed shall be subject to the approval of the Architect to ensure that vibrations will not be created that will affect existing construction or slopes.
- C. Water shall not be allowed to collect in the foundation excavation, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas shall be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site drainage shall be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. The grades shall be sloped away from the building and surface drainage shall be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

3.12 FINISH GRADING

- A. After construction and final clean-up of exterior, and removal of debris, grade building site to slopes and elevations directed.
- B. Leave graded areas raked smooth.
- C. Remove excess material from the site.

3.13 FIELD QUALITY CONTROL

- A. Earthwork, footings depths, and excavations for foundations shall be inspected by the Geotechnical Engineer to verify allowable soil bearing and low settlement and swell potential, and to make any additional recommendations.
- B. Tests: Inspection and testing of earthwork shall be performed by a testing laboratory in accordance with Section 01 45 00.
 - 1. Provide free access to Work and cooperate with appointed firm.
 - 2. Tests of materials may be performed to ensure conformance with specified requirements.
 - 3. Provide one field density test of under-slab fill for every 2,000 square feet of building area.
 - 4. Provide two field density tests of backfill at locations and elevations directed.
 - 5. Soil compaction which does not meet the specified requirements shall be recompacted and reworked as directed by the Geotechnical Engineer through the Architect.



3.14 PROTECTION

- A. Protect newly graded areas from traffic and erosion, keep areas free of trash and debris. Repair and establish grades in any areas settled, rutted or eroded.

END OF SECTION



SECTION 31 31 00 - SOIL TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Treatment of site and areas as indicated to remove vegetation growth.

1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.
- C. Product Data: Submit label indicating Manufacturer's chemical analysis of treatment materials prior to application. Submit evidence of EPA approval and State registration.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 45 00 – Testing Laboratory Services
- C. Section 01 77 00 – Closeout Procedures
- D. Section 32 90 00 – Planting
- E. Section 32 91 13 – Inert Materials
- F. Section 32 92 23 – Sodding

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Registered applicator with 5 years' experience and licensed by the applicable agency in the state where the project is located.
- B. Regulatory Requirements: Chemicals shall be approved for use and registered by Environmental Protection Agency (EPA), the applicable agency in the state where the project is located, owner and their maintenance program.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Conform to Manufacturer's instructions and Governmental Agencies' requirements.
- B. Deliver materials to Project in original sealed and labeled containers of Manufacturer.

1.6 SITE CONDITIONS

- A. Do not apply chemicals in inclement weather or when there is a possibility of rain.

1.7 WARRANTY

- A. Upon completion of soil treatment, and as a condition of final acceptance, provide Owner with written unlimited warranty providing:
 1. Application was made at concentration, rate, and method in compliance with



Specifications contained herein.

2. Warrants effectiveness of the soil treatment against subterranean termite infestation for a period of not less than 5 years from acceptance and completion date of Project.
3. Warrants effectiveness of soil treatment against vegetation growth for a period of six (6) months.

B. Upon evidence of vegetation growth re-treat at no cost to Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Vegetation Treatment
 1. Chemical Control: Roundup or Doomsday or Mesa approved product.
 2. Pre-Emergent: Surflan, Dacthal or approved equal.
- B. Mix solutions in accordance with Manufacturer's directions to highest concentration allowable by label.

PART 3 - EXECUTION

3.1 APPLICATION - VEGETATION CONTROL

- A. Apply chemical to on-site landscape areas and landscaped portions of public street right-of-ways of site.
- B. Chemical Control: Prior to planting operations, provide 2 applications over unwanted vegetation.
- C. Pre-emergent: Post landscape planting operations. Comply with manufacturers label for application and protection of existing landscape planting.

3.2 FIELD QUALITY CONTROL

- A. Tests: Chemical analysis tests shall be made of materials used on the basis of one test for each 10,000 square feet of treated area. Samples and test may be taken of both concentrates and the dilute materials as being applied. See Section 01 45 29 – Testing Laboratory Ser for provisions covering payment for testing.

3.3 PROTECTION

- A. Adjacent property, trees and plants shall be protected from injury and damage as result of operations in this Section.

END OF SECTION



SECTION 31 31 16

TERMITE CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Soil treatment.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include the EPA-Registered Label for termiticide products.

1.03 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of termite control product.
- C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Termiticide brand name and manufacturer.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes used, and rates of application.
 - 6. Areas of application.
 - 7. Water source for application.
- D. Sample Warranties: For special warranties.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

1.05 FIELD CONDITIONS

- A. Soil Treatment:
 - 1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
 - 2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.06 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
 - 1. Warranty Period: Five years from date of Substantial Completion.



PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

- A. Obtain termite control products from single source from single manufacturer.

2.02 SOIL TREATMENT

- A. Termiticide: EPA-Registered non-repellent termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.
 - 1. Product: Provide one of the following:
 - a. BASF Corporation; Termidor.
 - b. Bayer Environmental Science; Premise Pro.
 - c. Ensystex, Inc.; Prother WSP.
 - 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
 - 1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.03 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.
 - 1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
 - 3. Crawlspace: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.



4. Masonry: Treat voids.
5. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.

B. Post warning signs in areas of application.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.04 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION



SECTION 32 84 00

PLANTING IRRIGATION

PART 1 – GENERAL

1.1 SUMMARY:

- A. Work Included: Provide a provision for an underground irrigation system including the following:
 - 1. Trenching, stockpiling, excavation of materials, and refilling trenches.
 - 2. Complete systems including but not limited to piping, pump station, backflow preventer, assemblies, valves, fittings, heads, controller wiring, and final adjustments to ensure efficient coverage as determined by Consultant.

1.2 REFERENCES:

- A. Perform Work in accordance with requirement of Conditions of the Contract and Division 01- General Requirements as well as provisions of all applicable laws, codes, ordinances, rules and regulations. Conform to requirements of reference information listed below, except where more stringent requirements are shown or specified in Contract Documents.
 - 1. American Society for Testing and Materials (ASTM) - Specifications and Test Methods specifically referenced in this section.
 - 2. Underwriters Laboratories (UL) - UL wires and Cables.

1.3 QUALITY ASSURANCE:

- A. Installer Qualifications: Installer shall have had considerable experience and demonstrated ability in the installation of irrigation system(s) of specified type(s) in a neat, orderly, and responsible manner in accordance with recognized standards of workmanship.
- B. Special Requirements:
 - 1. Tolerances - Specified depths and separations of pressure supply lines and laterals and pitch of pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment and repair of finished grade treatment.
 - 2. Coordination with Other Contracts - Protect, maintain, and coordinate Work with Tasks under other sections.
 - 3. Damage to Other Improvements - Contractor shall replace or repair damage to grading, soil preparation, seeding, sodding, or planting done under other Sections during work associated with installation of irrigation system at no additional cost to the Owner.
 - 4. Work involving substantial plumbing for installation of pump station, backflow preventers, copper service, and related work shall be executed by licensed and bonded plumber(s), performed in accordance with all prevailing codes and regulations.
 - 5. Work involving connection to, installation, or extension of 120-volt or greater electrical service shall be executed by a licensed and bonded electrician, performed in accordance with all prevailing codes and regulations.
- C. Irrigation Control System Procedures:
 - 1. Contractor shall be responsible to provide and install all specified control equipment to result in a complete and working system, whether or not all appurtenances are shown on plans. System shall include controllers; all grounding and surge protection; master valves; and weather communication source.



1.4 SUBMITTALS:

- A. Submittals: Prepare and make submittals in accordance with conditions of the Contract prior to installation.
- B. Construction Record Drawings:
 1. Contractor shall draw lateral piping, controller station numbers, and all other record information on the Field Record. The Field Record plan(s) shall be available at the Project Site for review. Upon completion of Project, Contractor shall submit Field Record Plan for review, prior to final acceptance.
 2. Dimension from two permanent points of reference, (building corners, sidewalks, road intersections, or permanent structures), location of the following items:
 - a. Routing of pressure supply lines (dimension every 100 feet along the routing).
 - b. Electric control valves.
 - c. Control wire routing (if not with pressure supply line).
 - d. Record plans shall be to same scale and in the same format as designed plans.
 3. Prior to scheduling walk-through for substantial completion, Contractor is to submit all Field Record information to the Owner for approval.
 4. Contractor shall also provide both a hard copy and Electronic Form version of the Controller Data Sheets to the Consultant.
- C. Controller Charts: Do not prepare controller charts until record (as-built) drawings have been approved by the Consultant.
 1. Provide controller chart, automatic controller.
 - a. Controller drawing may be same size reproduction of the record drawing, if scale permits fitting them inside the controller door without folding drawing. If photo reduction prints are required, keep reproduction to maximum size possible to retain full legibility. Chart may also be Controller Data Sheet as for central-satellite systems, if approved by Consultant.
 - b. Controller chart shall be bond print of actual as-built system, showing area covered by that controller; or Controller Data Sheet showing information on each station, and with complete description of each station's location.
 - c. Identify area of coverage of each remote control valve, using a distinctly different pastel color for each zone. Highlight heads, lateral piping, and control valves.
 - d. Following review of controller drawings by Consultant, hermetically seal each chart between two layers of 20 mm thick clear plastic.
 - e. Controller chart shall be completed and approved by Consultant prior to final completion walk-through of irrigation system.
 - f. Attach approved controller chart to inside of each controller door using self adhesive Velcro strips.
 2. Following installation of each controller, contractor shall record all station data on a "Data Sheet" provided by the Consultant. This data shall include the type and quantity of irrigation devices on each station, nozzle type, arc, area of control (turf, trees, shrubs, etc), valve size, gpm, location, etc. as shown on the Data Sheet.
 3. Prior to final walk-through for each area of the project, Contractor shall confirm that the following has been accomplished:
 - a. Construction record drawings per 1.04.1.
 - b. Data Sheets for Controllers.
- D. Operational Manual: Submit 3 sets of Operations Manual to Consultant for approval, prior to scheduling the final completion walk-through. Manual is to include the following in a 1 x 3 ring binder:
 1. Index sheet stating project name, and listing Contractor name, address, phone number, and contact person. Include same information for Primary Sub-Contractors.
 2. Manufacturer cut sheets for all material components of irrigation system. Highlight or



circle specific models or items.

1.5 DELIVERY, STORAGE and HANDLING:

- A. Deliver, unload, store and handle materials, packaging, bundling, products, in dry conditions, or a weatherproof manner, to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism.
- B. Deliver in original unopened packaging containers prominently displaying manufacturer name, volume, quantity, contents, instructions, and conformance to local, state, and federal law. Remove and replace cracked, broken, or contaminated items or elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or job site damage.
- C. Handling of PVC Pipe: Exercise care in handling, loading and storing of PVC pipe. All PVC pipe shall be transported in a vehicle, which allows the entire length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be removed and replaced with new piping.

1.6 JOBSITE CONDITIONS:

- A. Protection of Property:
 - 1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work in this Section. In the event damage does occur, all damage to inanimate items shall be completely repaired or replaced to the satisfaction of the Owner. All injuries to living plants shall be repaired by the Owner, and all costs of such repairs shall be charged to and paid by the Contractor.
 - 2. Protect buildings, walks, walls, and other property from damage. Flare and barricade open ditches. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to the Owner. Restore disturbed areas to original condition.
- B. Existing trees:
 - 1. All trenching or other Work under limb spread of any and all evergreens or low branching deciduous material shall be done by hand or by other methods so as to prevent damage to limbs or branches.
- C. Protection and Repair of Underground Lines: Request proper utility company to stake exact location (including depth) of all underground utilities. Take whatever precautions necessary to protect these underground lines from damage. In the event damage does occur, all damages shall be repaired by Contractor unless other arrangements have been made.
- D. Replacement of Paving and Curbs: Where trenches and lines cross existing roadways, paths, curbing, etc., damage to these shall be kept to a minimum and shall be restored to original condition.

1.7 WARRANTY / GUARANTEE:

- A. Contractor shall warrant materials against defects for a period of one year from the date of Substantial Completion. Contractor shall guarantee workmanship for similar period. Contractor shall be responsible for coordinating material warranty items with the manufacturer / distributor.
- B. Settling of backfilled trenches which may occur during guaranty period shall be repaired by Contractor at no expense to the Owner, including complete restoration of damaged property.



- C. Expenses due to vandalism before substantial completion shall be borne by Contractor.
- D. Owner or representative maintenance company will maintain turf and planting areas during warranty period, so as not to hamper proper operation of the irrigation system.

1.8 MAINTENANCE:

- A. Furnish the following maintenance items to Owner prior to final Acceptance:
 - 1. 2 sets of special tools required for moving, disassembling, and adjusting each type of sprinkler head and valve supplied on this project.
 - 2. 2 keys for each automatic controller.

1.9 EXTRA STOCK:

- A. In addition to installed system furnish the following items to Owner:
 - 1. 4 per 100 installed drip emitters of each type used.
 - 2. 2 pop-up heads of each type used.

PART 2 – PRODUCTS

2.1 MATERIALS:

- A. General piping:

Note: All piping for reclaimed water systems shall be purple colored, or wrapped with reclaimed "sock" or reclaimed marking tape, and main lines shall have detectable reclaimed marking tape in trench 12" above top of pipe continuously.

- 1. Pressure Supply Lines (downstream of Pump Station) - Sch. 40 PVC, Solvent Weld Belled End for 2-1/2" or smaller, and rubber-ring joint for 3" and larger with ductile iron fittings and taps.
- 2. Non-pressure lines - Sch. PVC, Solvent Weld Belled End.
- 3. Drip Piping - 3/4" Sch. 40, Solvent Weld unless otherwise specified on plans.
- 4. Emitter Tubing - by emitter manufacturer.

- B. Plastic Pipe and Fittings:

- 1. Identification Markings:
 - a. All pipe to be identified with following indelible markings:
 - a) Manufacturer's Name.
 - b. All fittings including valve taps for rubber-ring pipe shall be cast or ductile iron, rubber-ring for PVC.
- 2. Solvent Weld Pipe - Manufactured from virgin polyvinyl chloride (PVC) compound in accordance with ASTM D2241 and ASTM D1784; cell classification 12245-B, Type 1, Grade 1.
 - 1. Fittings - Standard weight, Schedule 40, injection molded PVC; complying with ASTM D1784 and D2466, cell classification 12454-B.
 - a) Threads - Injection molded type (where required).
 - b) Tees and ells - Side gated.
 - 2. Threaded Nipples - ASTM D2464, Schedule 80 with molded threads.
 - 3. Joint Cement and Primer - Type as recommended by manufacturer of pipe and fittings.

- C. Low Pressure / Volume Systems:



1. Emitters as indicated on drawings.
2. Drip Piping - manufactured of polyvinyl chloride compound conforming to ASTM D2241 and ASTM D1784, Type 1, Grade 1.
3. Fittings - Schedule 40 PVC, or as recommended by piping manufacturer.
4. Drip Valve Assembly - Type and size shown on drawings.
 - a. Wye Strainer - Plastic / Fiberglass construction with 150 mesh nylon screen and blow out assembly.
 - b. Control Valve - 2-way, solenoid pilot operated type made of synthetic, non-corrosive material; diaphragm-activated and slow closing. Include freely pivoted seat seal; retained (mounted) without attachment to diaphragm.
 - c. Pressure Regulator - Plastic / Fiberglass construction, preset type with pressure setting per drawings.

D. Copper Pipe and Fittings:

1. Copper Pipe - Type K hard tempered.
2. Fittings - Wrought copper, solder joint type.
3. Joints - Soldered with solder, 45% silver, 15% copper, 16% zinc, and 24% cadmium and solids at 1125 F and liquids at 1145 F.

E. Brass Pipe and Fittings:

1. Fittings - Medium brass, screwed 125 pound class.
2. Brass Pipe - 85% red brass, AMSI Schedule 40 screwed pipe.

F. Valve Boxes:

1. Note: All box covers for reclaimed water systems shall be purple colored, and marked for reclaimed. Nominal pipe size.
2. Schedule or class.
3. Pressure Rating.
4. NSF (National Sanitation Foundation) seal of approval.
5. Date of extrusion.

Otherwise, valve box color to be selected based upon a review of the location and adjacent material by Owner and Landscape Architect prior to installation.

1. Drip Line Blow-out Stubs, and Wire Stub Box - Carson #910-12.
2. 1-inch through 2-inch Control Valves - Carson #1419-13B.
3. Drip Valve Assemblies - Carson #1419-13B.
4. Control Wiring Splices - Carson #910-12.
5. Main Line Gate Valves - Carson #910-12.
6. Air-Relief Valves - Carson #1419-13B.
7. Manual Drain Valves - Carson #1419-13B.
8. Master Control Valve - As shown on detail.

G. Electrical Control Wiring:

1. Low Voltage:
 - a. Electrical Control Wire - Hunter two-wire.
 - b. If multiple controllers are utilized, a different two wire for each controller.
2. High Voltage: Type required by local codes and ordinances, of proper size to accommodate needs of equipment serviced.

H. Sprinkler Heads: As shown on drawings. Use Purple caps or nozzles for Reclaimed Water use.



- I. Electric Control Valves: As noted on drawings. Purple handles for Reclaimed Water use. Install pressure regulating devices where specified on plans.
- J. Pipe Bedding Material: Construction grade sand approved by Consultant.
- K. Automatic Controller: As shown on drawings. Provide two (2) remote control units (compatible as specified by Owner) as part of the work.
- L. Manual Drain Valve: As shown on drawings.
- M. Air-Relief Valve: As shown on drawings.
- N. Master Control Valve: As shown on drawings.
- O. Pump Station: As shown on drawings.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Examine areas and conditions under which Work of this Section is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Grading operations, with the exception of final grading, shall be completed and approved by Owner prior to staking or installation of any portion of irrigation system except sleeving.

3.2 PREPARATION:

- A. Staking Shall Occur as Follows:
 - 1. Mark with powdered lime or marking paint routing of pressure supply lines, and flag heads and control valve locations for first series of zones for approval.
- B. Sleeving: Install sleeving under all asphalt paving and concrete walks, prior to the installation of concrete or paving operations, to accommodate piping and wiring. Compact backfill around sleeves to 95% Standard Proctor Density within 2% of optimum moisture content in accordance with ASTM D1557.
- C. Trenching: Trench excavation shall follow, as much as possible, layout shown on Drawings. Dig trenches straight, and support the pipe continuously on the bottom of trench. Trench bottom shall be clean and smooth with all rock and organic debris removed. Pressure supply line trenches shall be over-excavated as required to allow for bedding material. Trench depth shall be uniform as required to meet minimum depth requirements for the type of piping being installed.
 - 1. Clearances:
 - a. Piping smaller than 3 inches - Trenches shall have a minimum width of 7 inches. 12 inches for 3" and larger pipe.
 - b. Line clearance - Provide not less than 6 inches of clearance between each line, and not less than 12 inches of clearance between lines of other trades.
 - c. For Reclaimed Water systems, 2-foot vertical (below) and 6-foot horizontal separations from potable lines are required per MAG and industry standards.
 - 2. Pipe and Wire Depth:
 - a. Pressure Supply Piping - 24 inches from top of pipe (30 inches where 6" and larger pipe is on project).



- b. Non-pressure piping - 12 inches from top of pipe.
- c. Two-wire - Side and bottom of pressure supply line.
- d. Drip Piping - 12 inches from top of pipe.
- e. Emitter tubing - 12 inches from top of pipe (non slope plantings). 4 inches from the top of pipe (slopes 2:1 of greater).

3.3 INSTALLATION:

- A. Other Equipment: Locate other equipment as near as possible to location designated on construction drawings. Deviations shall be approved by Consultant prior to installation.
- B. PVC Piping:
 - 1. Snake pipe in trench as much as possible to allow for expansion and contraction.
 - 2. When pipe laying is not in progress, or at end of each day, close pipe ends with tight plug or cap. (Perform work in accordance with good practices prevailing in piping trades).
 - 3. Coordinate pressure supply line installation with required bedding operations. Concrete thrust blocks or steel joint restraints shall be utilized for all rubber-ring joint fittings per industry standards. In sandy soil, mechanical joint fittings shall be used with thrust blocks.
 - 4. Stake all above-grade PVC piping per details.
 - 5. Use 45-degree ells when making perpendicular crossings of above-grade PVC piping, to depress bottom pipe.
 - 6. Lay pipe and make all plastic-to-plastic joints in accordance with manufacturer's recommendations.
- C. Drip Piping:
 - 1. Install fitting connections per manufacturer's recommendations.
 - 2. Use threaded risers and Sch. 40 or Sch. 80 fittings per details when making connections in drip piping for emitters and fittings.
 - 3. Install drip line blow-out stubs at all dead ends of drip piping.
 - 4. Any deviations from drip pipe routing shown on drawings must be approved by Consultant prior to installation.
- D. Control Wiring:
 - 1. Low Voltage Wiring (Two Wire):
 - a. Bury control wiring between controller and electric valves in pressure supply line trenches, with wires consistently located to one side of pipe, on top of initial pipe bedding, or in separate trench.
 - b. Provide an expansion loop at pressure supply line angle fittings, every electric control valve location (in valve box), and at minimum 500 feet intervals. Form expansion loop by wrapping wire at least 8 times around a 1-inch pipe and withdrawing pipe.
 - c. Make splices and electric control valve connections using DBY connectors or similar dry splice method.
 - d. Install two wire splices not occurring at control valve in a separate splice valve box.
 - 2. High Voltage Wiring for Automatic Controller:
 - a. Provide 120-volt power connection to automatic controller.
- E. Automatic Controller:
 - 1. Install controller in accordance with manufacturer's instructions as detailed and where shown on Drawings.
 - 2. Connect remote control valves to controller in numerical sequence as shown on



- Drawings.
3. Final location of controller shall be approved by Consultant prior to installation.
 4. Each controller shall have a dedicated separate ground wire and surge protection.
 5. Above-ground conduit shall be rigid galvanized steel with appropriate fittings. Below-ground conduit shall be Schedule 40 PVC.
- F. Drip Valve Assemblies: Install drip valve assembly as detailed.
- G. Drip Emitters: Install drip emitters as detailed.
- H. Valve Boxes:
1. Install one valve box for each type of valve installed as detailed flush with grade for all sodded areas, and above-grade for all seeded areas.
 2. Valve box extensions are not acceptable, except for master valve.
 3. Install gravel sump after compaction of all trenches. Valve box to rest on gravel sump. Place final portion of gravel inside valve box after valve box is backfilled and compacted.
 4. Install "Christy" stainless steel or 2.5" x 5" plastic valve label tags for each valve box (1-800-258-4583). Entire controller & station number shall be printed on each tag. Letter and number size shall be no smaller than 1/8 inch and no greater than 1/4 inches. Label each valve box as follows:
 - a. Control valves - Controller letter and station number.
 - b. Quick Coupler Valves - Label "QCV."
 - c. Wire Splices - Label wire splices with the letters "W.S."
 - d. Drip Piping Blow-out Stubs - Controller letter and station number of each drip piping blow out.
 - e. Gate Valves - Label with letters "GV" typical.
 - f. Air-Relief Valves - Label with letters "ARV" typical.
 - g. Manual Drain Valve - Label with letters "MDV."
 5. Valve box color to be selected based upon a review of the location and adjacent material by Owner and Landscape Architect prior to installation. These guidelines are typical of all installations unless water source is effluent. In that case all valve boxes no matter the location are to be purple in color and meet all applicable codes and ordinances.
- I. Pump Station: Install as detailed on Drawings.
- J. Electric Control Valves:
1. Install top of cross handle a maximum of 3 inches below finished grade where shown on Drawings and as detailed.
 2. When grouped together, allow a minimum of 12 inches between valve box sides.
 3. Space control valves accordingly.
 4. Install each remote control valve in a separate valve box.
 5. Install valve boxes flush with grade.
 6. When parallel to roadway, sidewalk or other permanent element or structure, control valve and box are to be installed perpendicular to element or structure, spaced equally.
 7. For athletic areas such as football fields where concrete curbs exist, place the electric valves within one foot of the curb (no further into the playfield).
- K. Main Line Gate Valves: Install as detailed on Drawings.
- L. Air-Relief Valves: Install as detailed on Drawings.
- M. Control Wiring:
1. All control wiring to be laid to bottom and side of pressure supply line trench. Separate



wire trenches will not be allowed unless approved by Consultant prior to installation.

N. Backfilling: Do not begin backfilling operation until required system tests have been completed. Backfill shall not be done in freezing weather except with prior written approval by Consultant. Leave trenches slightly mounded to allow for settlement after backfilling is complete. Trenches shall be finished graded prior to walk-through of system by Consultant.

1. All pressure supply lines shall be bedded with construction grade sand 4 inches below invert of pipe, to 6" above top of pipe and width of trench when site conditions are rocky or otherwise unfavorable.
2. Materials: Excavated material is generally considered satisfactory for backfilling purposes after completing bedding requirements. Backfill materials shall be free of rubbish, vegetative matter, frozen materials, and stones larger than 2 inches in maximum dimension. Do not mix subsoil with topsoil. Material not suitable for backfill shall be hauled away. Contractor shall be responsible for providing suitable backfill if excavated material is unacceptable, or not sufficient to meet backfill, compaction, and final grade requirements.
3. Do not leave trenches open for a period of more than 48 hours. Open excavations shall be protected in accordance with OSHA regulations.
4. Compact backfill to 90% maximum density in 6" lifts, determined in accordance with ASTM D155-7 utilizing the following methods:
 1. Mechanical tamping.
 2. Puddling or ponding and/or jetting is prohibited within 10'-0" of building or foundation walls.

O. Piping Under Paving:

1. Provide for a minimum cover of 24 inches between the top of the pipe and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphalt concrete or concrete paving. Provide sleeving as required by municipality, or as shown on plans.
2. Piping shall be bedded with construction grade sand - 6 inches below pipe to 6 inches above pipe and the width of the trench.
3. Compact backfill material in 6-inch lifts at 95% maximum density determined in accordance with ASTM D1557 using manual or mechanical tamping devices.
4. Set in place, cap, and pressure test all piping under paving, in presence of Consultant or Owner prior to backfilling and paving operations.
5. Piping under existing walk or concrete pavement shall be done by jacking, boring, or hydraulic driving, but where cutting or breaking of walks and/or concrete is necessary, it shall be done and replaced at no cost to the Owner. Obtain permission and prior approval from Owner to cut or break walks and / or concrete.

3.4 FIELD QUALITY CONTROL:

- A. Flushing: After piping, risers, and valves are in place and connected, but prior to installation of emitter heads, quick coupler valves, and air relief valves, thoroughly flush piping system under full head of water pressure from dead end fittings. Maintain flushing for 5 minutes through furthestmost valves. Cap riser after flushing.
- B. Testing: Conduct tests in presence of Consultant. Arrange for presence of Consultant a minimum of 48 hours in advance of testing. Supply force pump and all other test equipment.
 1. After backfilling, and installation of all control valves & quick coupler valves, fill pressure supply line with water, and pressurize to 40 PSI over the designated static pressure or 120 PSI, whichever is greater, for a period of 2 hours.



2. Leakage, Pressure Loss: Test is acceptable if no leakage or loss of pressure is evident during test period.
3. Leaks: Detect and repair leaks.
4. Retest system until pressure can be maintained for the duration of the test.
5. Before final acceptance, pressure supply line shall remain under pressure for a period of 48 hours.

C. Walk-Through for Substantial Completion:

1. Arrange for Consultant's presence a minimum of 48 hours in advance of walk-through.
2. Entire System shall be completely installed and operational prior to scheduling of walk-through. All sodded areas are to be complete with head height and valve boxes adjusted accordingly.
3. Operate each zone in its entirety for Consultant at time of walk-through, and open all valve boxes.
4. Consultant shall generate a list of items to be corrected prior to Final Completion ("Punch List").
5. Furnish all materials and perform all Work required to correct all inadequacies due to deviations from Contract Documents, and as directed by Consultant.
6. During walk-through, expose all drip emitters and sprinklers under operations for observation by Consultant to demonstrate that they are performing and installed as designed; prior to placing of all mulch material. Schedule separate walk-through if necessary.

D. Walk-Through for Final Completion:

1. Arrange for Consultant's presence a minimum of 48 hours in advance of walk-through.
2. Show evidence to Consultant that Owner has received all accessories, charts, record drawings, and equipment as required before Final Completion walk-through is scheduled.
3. Operate each zone identified as deficient at substantial completion walk-through for Consultant to review at time of final completion walk-through to ensure correction of all incomplete items.
4. Items deemed not acceptable by Consultant shall be reworked to the complete satisfaction of Consultant.
5. If after request to Consultant for a walk-through for Final Completion of the irrigation system,
6. Consultant finds items during walk-through to be deficient, Contractor shall be charged for all subsequent walk-throughs. Funds will be withheld from final payment and/or retainage to Contractor, in amount equal to additional time and expenses required by Consultant to conduct and document further walk-throughs as deemed necessary to ensure compliance with Contract Documents.

3.5 ADJUSTING:

- A. Upon substantial completion of installation, fine-tune entire system by regulating valves, adjusting spray patterns and break-up arms/screws, and setting pressure reducing valves or throttling electric valve flow control stems to proper pressure settings to provide optimum and efficient coverage. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible. Heads of same type shall be operating at same pressure +/- 7%.
- B. If it is determined that irrigation adjustments will provide proper and more adequate coverage, make such adjustments prior to Final Acceptance, as directed, at no additional cost to Owner. Adjustments may also include changes in nozzle sizes, degrees of arc, and control valve throttling.



- D. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated.
- E. Areas which do not conform to designated operation requirements due to unauthorized changes or poor installation practices shall be immediately corrected at no additional cost to the Owner.

END OF SECTION



SECTION 32 90 00 - PLANTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Furnish all materials, supplies, equipment, tools and transportation, and perform all operations in connection with and reasonably incidental to complete installation of the planting, and guarantee/warranty as shown on the drawings and specified herein. Items of work specifically included are:
 - 1. Procurement of all applicable licenses, permits and fees.
 - 2. Fine grading and landscape grading.
 - 3. Soils and special soils.
 - 4. Plant material
 - 5. Geotextile fabrics.
 - 6. Maintenance & Warranty of project site.

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 45 00 – Quality Control
- C. Section 01 77 00 – Closeout Procedures
- D. Section 31 31 00 – Soil Treatment
- E. Section 32 84 00 – Landscape Irrigation
- F. Section 32 91 13 - Inert Materials
- G. Section 32 92 23 – Sodding

1.3 QUALITY ASSURANCE

- A. Referenced Standards
 - 1. American Standard for Nursery Stock (ASNS) by the American Association and Nurserymen .
 - 2. Arizona Nursery Association Tree specifications current edition.
 - 3. Maricopa Association of Governments (MAGS) spec section 795.7.
 - 4. Standard Methods of the Association of Official Agricultural Chemists.
 - 5. Arizona Nursery Association (ANA) “Grower’s Committee Recommended Tree Specifications”.
 - 6. ANSI Z60.1-86.



B. Qualifications

1. Requirement: Tree branch and root pruning shall be performed by an **ARIZONA LICENSED ARBORIST** throughout installation warranty period.
2. Herbicide and pesticide controls shall be recommended and applied under advisement of an Arizona licensed Pest Control Advisor

1.4 SUBMITTALS

A. Materials Lists.

1. Submit sources of all backfill amendments and plant materials.
2. Organic Pesticides/Herbicides treatment application records.
3. Photographs of all trees for review prior to Nursery visits.
4. Request for pre-planting review of plant materials and quantities.
5. Delivery tickets of bulk deliveries, including plants.
6. Tagged material records.

B. Analytical Tests.

1. Submit laboratory affirmation that compost, peat moss, topsoil comply with specifications. All soil components shall be tested by a testing laboratory for conformance with the specifications.
 - a. Submit soil analysis and recommendation for fertilization and additive recommendation of proposed topsoil and backfill to the Landscape Architect and to City Engineering Inspector at least Seven (7) days in advance of anticipated plantings.
2. Herbicide contamination is suspected due to new planting areas where asphalt will be removed. **A radish/rye grass growth test shall be performed. Submit soils analysis and recommendations.**
3. Compaction test: Submit laboratory affirmation that soil in planter areas in at-grade condition do not exceed 85% compaction.
4. Percolation Test: see section under Field Quality Control.

1.5 PRODUCT HANDLING

- A. Protect all materials used for construction from damage, deterioration, or loss of any kind while in storage and during construction.
- B. Store plant materials safely. Protect from drying and cold weather. Provide shade for sun-sensitive plants. Keep all plant roots moist, before, during and after planting.
- C. Each tree, shrub, groundcover, flat, container of fertilizer or other construction material shall be labeled by grower or manufacturer as a separate item. Bulk deliveries of mulch, granite, topsoil, etc. shall be accompanied by two delivery tickets. One delivery ticket shall be provided to the Owner's Representative.



- D. Provide protective covers to plant life during delivery; **trees and shrubs shall not be pruned prior to delivery** and/or bent or bind-tied in such a manner as to cause damage or destroy natural shape.
- E. Deliver materials after preparations for planting have been completed and plant immediately. If planting is delayed for more than six (6) hours after delivery, the Contractor shall set plant material in shade, protect from weather and mechanical damage and keep roots moist. Contractor is liable for replacement of damaged material with like material from the same supplier. The Contractor shall not remove container-grown stock, including ground cover, from containers until planting time.
- F. Provide bulk materials processed and blended off site when specified. These materials shall be delivered in clean, washed and covered trucks to eliminate contamination during transportation. On-site stockpiling locations shall be coordinated with the Owner and Construction Manager; stockpile shall occur in areas free of debris and away from drainage routes. All bulk material shall be covered with plastic or geotextile if material is to be stockpiled more than twenty-four (24) hours.
- G. Prior to delivery of any plants to the project site, the Contractor shall make the necessary arrangements with the Owner's Representative for and inspection of the plant material. Contractor shall submit photos of tree material 48 hours prior to Nursery Visit for approval by Landscape Architect. A maximum of three (3) Nursery Visits will be scheduled; any additional Nursery Visits outside of Original Design Scope when requested by the Contractor shall be paid for by the Contractor and be billed at \$175 per hour. Travel to non-local nurseries, out of the metropolitan Phoenix area, when requested by the Contractor, will be paid for by the Contractor and be billed at \$175 per hour.
- H. Any plants found to be unsuitable in growth or condition, or plants that are not true to the specification shall be removed and replaced with acceptable plants.
- I. The Contractor shall notify the Owner at least forty-eight (48) hours in advance for the inspection of the plant material at the off-site location. Prior to notification of the Owner, the Contractor shall physically verify that the plant material meet the size specified.
- J. Erect barriers and warning signs as necessary to prevent injury to the public and construction personnel.
- K. Deliver soil amendments in manufacturer's standard packaging.
- L. Deliver fertilizer uniform in composition, free-flowing, and suitable for application with approved equipment, delivered to the site in bags or other containers, each fully labeled and bearing the name and warranty of the producer.

1.6 REVIEWS

- A. All plant locations shall be staked or flagged for Owner's Representative and/or Landscape Architect approval prior to planting.
- B. Fine grading shall be reviewed and approved by Owner's Representative and/or Landscape Architect prior to planting.
- C. All plantings pots shall be inspected by Owner's Representative and/or Landscape Architect prior to planting. Contractor to request an inspection 48 hours in advance.



- D. Pre-maintenance review will be performed at substantial completion of all planting operations under this section, and Landscape Establishment period will begin at time of substantial completion.
- E. Final review will be performed at the end of Landscape Establishment period in accordance with these specifications and in accordance with Section 01 77 00 – Closeout Procedures.

1.7 ENVIRONMENTAL CONDITIONS

- A. Plants shall be planted only when weather and soil conditions permit, and in accordance with locally accepted practices, and as reviewed by Owner's Representative and/or Landscape Architect.
- B. Field-grown trees shall be planted in the same growing season in which they were dug.

PART 2 - PRODUCTS

2.1 SOILS/SOIL AMENDMENTS/FERTILIZERS

- A. Topsoil for "at grade" locations.
 - 1. Salvaged topsoil is acceptable for use as topsoil
 - 2. Imported, friable loam, free from any subsoil, roots, grasses, weeds, excessive amounts of stones and foreign matter, with an acidity reaction of 5.5 to 7.5 pH; containing a minimum of 4% and a maximum of 25% organic matter. Submit analysis and recommendations for amendment for use as backfill.
- B. Backfill Soil at At-grade planters and raised planters.
 - 1. Planting Media shall be mixed in the following proportions:
 - a. Trees, shrubs, ground covers; 22 c.f. sphagnum peat, 4 lbs soil sulfur, 3 lbs fertilizer mixture per c.y. or as recommended by soils tests.
 - b. Plant pit soil mixture shall consist of 4 1/2 parts. Natural fertile, friable soil and one part humus by volume, thoroughly mixed prior to backfilling in pits.
 - c. Mix pre-prepared garden soil mix with 1/3 part peat moss and 1/3 part perlite, vermiculite or pumice. Dunk peat moss in a bucket of water to soak it before mixing into the container mix
 - 2. Chemical additives shall be of agricultural grade, used as necessary to maintain a pH at 6.5 to 8.0.
 - 3. Planting tablets. 7 gram planting tablet designed for 12 months slow release. Tablets to contain 12-8-8 NPK, 20% humus, 4% humic acids, 3.5% sulfur, 2% iron and micronutrients. Place recommended tablet (s) between the bottom of the rootball but not higher than 1/3 of the way up the rootball. Space the tablets equally around the perimeter of the rootball approximately 2" from the root tips.
 - 4. Sulfur additive if required per soils analysis. Commercial quality, first grade, powdered elemental sulfur with 98% purity, free from lumps or caking. Prepared so that 50% passes through a 950 mesh screen. Deliver in unopened containers. Shall not contain filler or toxins in harmful quantities.



5. Phosphorus additive if required per soils analysis. Granular NPK 0-45-0 (triple superphosphate), agricultural quality, at a rate of one pound per 5 gallon shrub or one pound per three-foot height of plant in the planter.
6. Compost. Well-decomposed, free of weed seeds, available from commercial source. Individual plant components shall not be distinguishable.
7. Fertilizer Additives per soils test recommendations.
 - a. Fertilizer for trees, shrubs and ground cover shall be commercial type planting tablets.
 - b. Commercial bagged fertilizer for trees, shrubs, and ground cover shall be Ammonium Phosphate (16-20-0), pelleted form and contain a minimum of 16% nitrogen and 20% phosphoric acid.
8. Gypsum. Agricultural grade gypsum, a calcium sulfate product with 94.3% purity, with 90% passing through a 950 mesh screen.
9. Iron sulfate. Expressed as a metallic derived from sulfate-deepgreen. A minimum analysis of 20% pure, with 98% retained in a 10-mesh screen.
10. Activated charcoal. Commercial quality, first grade, powdered charcoal capable of dilution in water.
11. Manure is NOT acceptable.

2.2 WATER

Water is available on-site through the use of existing irrigation system. Coordinate need for irrigation water with Owner's Representative and/or General Contractor.

2.3 PLANT MATERIALS

- A. Plant material shall be a first-class representative of its species; healthy, well-branched, and well-proportioned in height and width relationships; free from diseases, injury, insects and weed roots, and conforming to the requirements of the Arizona Nursery Association "*Grower's Committee Recommended Tree Specifications*". Locally grown plant material will be preliminarily reviewed by the Owner's Representative and/or Landscape Architect in the growing field for general character and appearance. Photographs of plants from a non-local source shall be submitted to the Owner's Representative and/or Landscape Architect for preliminary review. Preliminary review is subject to the pre-planting review of plant material.
- B. Plant materials subject to local supplier availability at time of installation. No provisions included for temporary nursery (or other) to allow for extended reserve of planting materials
- C. Botanical and common names given in the plant list are in conformance with standard horticultural practice in the area. Plants are to be delivered to the site with tags bearing botanical names as indicated by the plant list, especially if cultivars are listed.
- D. Quantities as listed on the plans in the legend are for the convenience of the contractor only; actual counts are as indicated from the drawings.



- E. Container grown plants shall have been nursery-grown in the containers and shall have sufficient rootballs to hold the entire can soil mass together after container removal without being root-bound.

2.4 MATERIALS FOR STAKING TREES

- A. Tree stakes shall be as per plans and details.
- B. Webbing shall be 2" wide by 8" length minimum nylon webbing.
- C. Guy wire shall be galvanized malleable iron, 10-guage.
- D. Guy stakes shall be 30-inch minimum in length

2.5 PRE-EMERGENT HERBICIDE

- A. As recommended by Licensed Pest Control advisor for each type of planting area. Refer also to Soil Treatment Specifications.

2.6 GEOTEXTILE FABRIC

- A. Soil separator for structural soil
 - 1. Use geotextile fabric composed of strong rot-proof polymeric fibers oriented into a stable network such that the fibers retain their relative positions with respect to each other.
 - 2. Provide fabric free of any chemical treatment or coating that could significantly reduce permeability or could affect plant materials, and having no flaws or defects that could alter its properties.
 - 3. Use fabric with the following specifications:
 - 4. Puncture strength (ASTM D4833) 80 pounds minimum
 - 5. Grab Strength (ASTM D4632) 180 pounds minimum
 - 6. Burst Strength (ASTM D3786) 290 psi minimum
 - 7. Tear Strength (ASTM D2263) 80 pounds minimum

PART 3 - EXECUTION

3.1 INSPECTIONS AND REVIEWS

- A. Site Inspection.
 - 1. Site walkthrough with Owner's Representative and/or Landscape Architect. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Owner's Representative and/or Landscape Architect prior to beginning work.
 - 2. Verify final limit of work areas with Owner's Representative and/or Landscape Architect.
 - 3. Verify limits of special soils (structural soils) with Owner Representative and Landscape Architect.
 - 4. Coordinate maintenance of irrigation to existing plant materials if existing irrigation will be affected or interrupted.
 - 5. Verify materials to be removed from site. Flag locations for plant material protection fencing.



6. Flag locations for plant material protection fences.

B. Pre-installation

1. Conduct nutrient analysis and bioassay testing of existing soil as directed by Owner's Representative and/or Landscape Architect. Recommendations and results must be reviewed and approval given prior to commencement of planting.
2. Conduct soil compaction tests on all soils in place that will be used as planting medium. Soil in all planting area must be 85% proctor density or less. Submit test results to Landscape Architect for review.
3. All fertilizers, pre-mixed backfill mixes, mulches, and soil amendments will be reviewed at the site by the Owner's Representative and/or Landscape Architect before they are used in planting operations.
4. Owner's Representative and/or Landscape Architect will review plant material on-site before planting. Materials planted prior to review are subject to rejection. Reviews of materials may be sequenced by major planting areas to accommodate efficient planting operations. All rejected material must be removed from the site, and replacements reviewed before planting. Provide planting schedule or 48 hours notice to Owner's Representative and/or Landscape Architect.
5. If, in the opinion of the Owner's Representative and/or Landscape Architect, there is probable cause to suspect root damage, root binding, or disease conditions in the container stock plants, the Contractor will remove the container for the Owner's Representative and/or Landscape Architect before planting.
6. The Owner's Representative and/or Landscape Architect will review the staked location of all trees and shrubs before digging commences.
7. The Owner's Representative and/or Landscape Architect will review the location of all shrubs in their containers at the proposed locations before digging commences.
8. Verify locations of utilities, irrigation, and underground obstructions. Coordinate with Blue Stake and Owner's Representative and/or Landscape Architect as needed. Placement of electrical, irrigation, and other underground utilities will be reviewed by the General Contractor and Landscape Contractor prior to commencement of work. Conflicts will be brought to the attention of the Owner's Representative and/or Landscape Architect for resolution. Utility lines shall not be placed under or through rootballs.
9. Verify that rough and fine grading is complete and accepted by the Owner. Finish grade shall be as detailed or within 2-1/2" at all edges of curbs, walks, walls, and foundations to allow for inert material placement.

3.2 SITE PREPARATION

A. Landscape Area Grading

1. Protection of Existing Plants to Remain: Contractor is responsible for protecting all trees, shrubs and other plant materials, designated to remain within the project limits and off site for the duration of construction. Protection shall consist of temporary fencing to the canopy line of trees, edges of shrubs, or as designated by



Owner's Representative. Contractor shall replace any plant materials damaged or destroyed, to the satisfaction of the Owner.

2. Known underground and surface utility lines indicated on the drawings are for information only. The contractor is responsible for verifying all utility locations prior to commencing.
3. Landscape Contractor shall receive grade to within 0.1' of finish grade. Advise Owner's Representative and/or Landscape Architect of discrepancies in grade between drawings and site conditions. All planting areas shall be free of construction debris and/or toxic material and subgraded to a level to permit landscape construction. Trenches, foundation backfill or other filled excavations shall be compacted prior to the site being turned over to the Landscape Contractor.
4. All construction roads, parking areas, lay-down sites or other excessively compacted (greater than 85% Proctor density) earth in planting areas shall be loosened by the General Contractor. No soil preparation or planting shall begin before the General Contractor has completed site cleanup.
5. All soil shall be brought to grades as indicated anticipating the installation of soil conditioners, amendment, and inert materials. Grades not specifically indicated shall be governed as follows:
 - a. 2-1/2" max. below adjacent paving, curb, and mowstrip for shrub and groundcover areas receiving inert materials.
 - b. 1-1/2" max. below adjacent paving, curb and header for areas not receiving mulch.
6. All planting areas shall be smooth and even. Cultivate all areas so there are no humps or hollows, so that all areas drain as indicated. All flow lines, ditches, berms and swales, whether designated or not, shall be graded and maintained to allow free flow of surface water.
7. Contractor shall bear final responsibility for proper surface drainage of planted areas. Bring any discrepancies in the contract documents with site conditions or prior work done by other trades which Contractor feels precludes establishing proper drainage, to the attention of the Owner's Representative and/or Landscape Architect in writing.
8. Site preparation shall not disturb or destroy existing irrigation pipe, plants or other improvements. Contractor shall be responsible to replace or repair any damage that occurs to the satisfaction of the Owner's Representative and/or Landscape Architect.

B. Special Soils

1. Vegetable Garden Planting Soil
 - a. Install As Shown On Details And To Mixture As Indicated In 2.1 Soils/Soil Amendments/Fertilizers

C. Geotextile Fabrics

1. Filter Fabric for Perforated Drain Pipes



- a. Place wraps completely and pipe before backfilling, seam side opposite of drain holes.
- 2. Filter Fabric for Structural Soil separator.
 - a. Install as shown on details.

3.3 FIELD QUALITY CONTROL

- A. Soil compatibility tests: Perform topsoil compatibility tests for pH and chemical contamination prior to completion of rough grading.
- B. Topsoil installation: Do not work soil when moisture content is so great that compaction will occur nor when it is so dry that clods will not break readily. Apply water if necessary to bring soil to an optimum moisture content for filling and planting.
 - 1. All compacted soils will be treated as necessary to provide adequate aeration.
- C. Existing soil shall be graded to curb with 4:1 maximum slope or as indicated on drawings.
- D. Fine grade all planting areas. Provide incidental grading of all areas adjacent to curbs and sidewalks. Provide a finish grade 1-1/2" below curbs or sidewalks for areas receiving sod. Where new sod is placed adjacent to existing, keep soil 1/2" below existing grass to ensure new sod is level with existing grass. Provide a finish grade 2" below curbs or sidewalks for areas receiving decomposed granite.
- E. Stake locations for all trees and all shrubs for review by City, Owner's Representative and/or Landscape Architect prior to installation.
- F. Pits for container grown plant material shall be excavated twice the width and equal the depth of the rootball of the plant being planted. Scarify all sides of the pit.
- G. PERCOLATION TEST: Fill all planting pits that are not over-structure with water. Contact Landscape Architect if water does not percolate within 48 hours. Do not plant until proper measures have been taken.
- H. Remove plants from containers without disturbing the rootball. Set plants in pit, cradling and supporting the rootball. Position plant for the "best side" view and for minimum obstruction to traffic or adjacent pavement.
- I. Backfill pit with a blended mixture containing mix as indicated in Section 2.1/B. When the plant is set and the backfill has been water settled, the top of the rootball shall be flush with finish grade.
 - 1. Agriform tablets shall be placed approximately 6" below finish grade in this process in the quantity as follows:
 - a. 1 per 1 gallon plant
 - b. 2 per 5 gallon plant
 - c. 4 per 15 gallon plant
 - d. 2 per 1/2" of trunk diameter on boxed trees.
 - 2. An alternate method for the application of Iron-Sul for the planting of container plants would be to place:



- a. 1 handful divided equally in 6, 1 gallon plant pits
 - b. 1 handful divided equally in 4, 5 gallon plant pits
 - c. 1 handful in each 15 gallon plant pit
 - d. 2 handfuls in each 24" box plant pit
 - e. 4 handfuls in each 36" box plant pit
3. Apply before backfilling and setting of the plant, so rootball does not contact concentrations of Iron-Sul. Water settle all backfilled planters and pots.
- J. Apply vitamin B-1 root stimulator at the rate of 1 tablespoon per gallon.
- K. Stake or guy trees as detailed unless noted on plans, and as directed by Landscape Architect to properly support the plant material supplied.
- L. No pruning of newly planted trees shall occur without direction of the Landscape Architect. If deemed appropriate, prune each tree and shrub to preserve the natural character of the plant per American Standard for Nursery Stock, as published by the American Association of Nurserymen. Prune as directed by Landscape Architect to remove all suckers, deadwood, and broken or badly bruised branches.
- M. Mulch all plant pits, shrub beds, and ground cover beds with a 2" depth of mulch immediately after planting, except raised beds and planters containing soil mix and areas containing decomposed granite.
- N. Decomposed granite shall be applied and raked to the finished grade. Thoroughly water-settle the granite to dissipate the fines, roll entire surface.

3.4 PLANTING

- A. Establish Locations. Establish locations per 1.6 Reviews.
- B. Coordination
- 1. Coordinate as required with other trades to assure proper and adequate provision in the work of those for interface with the work of this Section. Coordinate schedules for installation of the work of this Section with schedules for other installations, to assure orderly progress of the total construction sequence.
- C. Planting Pits
- 1. See plans for size of planting pits.
 - 2. Roughen sides of the pit to remove any compacting or glazing. Loosen soil at bottom of pit to a minimum depth of four inches. Mix loosened soil with specified backfill.
 - 3. Prior to planting, a percolation test shall be run on all planting pits to determine if there is a problem drainage condition. Fill the planting pit half-full of water. Allow 24 hours to drain. If pit has not substantially drained, a test-case caisson shall be installed as per next paragraph, and retested for percolation. Owner's Representative and/or Landscape Architect shall be notified of each such failure to drain prior to caisson construction or planting.
 - 4. Where caliche is encountered in plant pits, depth and width of pit shall be increased by 1/3 over typical specifications. A liquid permerter, "Al-Kaliche" shall be incorporated per manufactures's recommendations.



5. If needed, caisson shall be constructed as follows. Caissons should be 12" deep by 8" diameter. Adjust depth of caissons if ground water or caliche is encountered. Pit shall be retested for percolation per #3 above. Report any necessary adjustments to Owner's Representative and/or Landscape Architect prior to commencing work.
6. Due to possible over compaction, if planting pit with caisson does not adequately drain, a system of perforated pipes wrapped in clean gravel trench shall be installed adjacent to all planting pits and daylighting at retention basin or connected to drainpipe.
7. If rock, underground construction, or other obstructions are encountered in excavation for plant materials or tilling operations, notify Owner's Representative and/or Landscape Architect. New locations may be selected or instruction may be issued to remove obstruction. Proceed with work only after approval of Owner's Representative and/or Landscape Architect.

D. Tree, Shrub, and Cactus Planting

1. Place backfill mix as specified in Soils Analysis Recommendations and as described in Section 2.4B into planting pit to depth such that the plant, when planted, **will be two to three inches above finish grade for trees** and at grade for shrubs. Do not plant root flare below finished soil level.
2. Backfill one-half of pit with backfill mixture and water thoroughly before placing any more backfill. Do not work wet soil.
3. Backfill the rest of the planting pit with backfill mixture and tamp to compact. Water in thoroughly. Do not work wet soil.
4. As per construction documents, stake trees in a vertical position. Stakes shall also be vertical, and placed so as to avoid rubbing trees branches. At direction of Owner's Representative and/or Landscape Architect, align stakes parallel to nearby hardscape.
5. Guy plants by driving stakes solidly into the ground.
6. Build watering saucers around the basin of each tree and shrub.
7. Do not plant cactus below root collar. Scars or puncture wounds to cactus, or missing pads due to planting may be cause for rejecting plant. Contractor shall replace at no cost to owner.

3.5 CLEAN-UP

- A. Remove all waste and debris; clean all pavement of soil and mulch created by this work from site.

3.6 ACCEPTANCE OF INSTALLATION

- A. At the completion of all landscape installation, the Contractor shall request in writing an inspection for substantial completion in which the Contractor and Owner's Representative shall be present. After this inspection, the Contractor shall prepare a "Punch List". Upon completion of all punch list items, the Owner's Representative shall re-inspect the project and issue a written statement of final acceptance and establish the beginning of the project warranty period.



- B. Landscape work may be inspected for acceptance in a limited number of phases agreeable to the Owner's Representative provided work offered for inspection is completed, including maintenance as required.
- C. For work to be inspected for partial or phased acceptance, the contractor shall provide a drawing outlining work completed and supply a written statement-requesting acceptance of the work completed to date.

3.7 PROJECT WARRANTY

The purpose of this guarantee/warranty is to insure that the Owner receives plant material of prime quality, planted and maintained in a thorough and careful manner. Sometimes plants have latent defects or diseases or are shocked in the process of transplanting. THEREFORE:

- A. The project warranty period shall begin upon written final acceptance of the project installation by the Owner's Representative.
- B. Tree & Cacti Warranty:
 - 1. The Contractor shall warrant that all trees and cacti will be alive and in good health for a period of one year after final acceptance except for defects resulting from neglect by the Owner, abuse, or damage by others.
 - 2. The Contractor shall be responsible to monitor the Owner's care and report any maintenance issues before problems occur.
 - 3. The Contractor shall remove and replace dead, unhealthy or girdled trees and cacti, or those that lose original form and size during the warranty period with material equal to that specified at no additional cost to the Owner. The Contractor shall replace any material that does not meet requirements within ten (10) days.
 - 4. All replacement trees and cacti shall be subject to an additional one (1)-year warranty period.
 - 5. This guarantee/warranty will not be enforced should the plant die due to vandalism, improper maintenance procedures carried out by the Owner involving over- or under- watering, over-fertilization, non-removal of braces causing girdling of trunks, fire, flood, hail, or other similar circumstances beyond the control of the Contractor.
 - 6. All replacements shall be of the same kind and size as the original described in the contract documents. Repairs and replacements shall be made at no expense to the Owner.
- C. Shrubs and Other Plantings Warranty:
 - 1. The Contractor shall warrant all other planting to be alive and in satisfactory condition for a period of ninety (90) days from date of final acceptance except for defects resulting from neglect by the Owner, abuse, or damage by others.
 - 2. The Contractor shall maintain all plant material in a healthy, sturdy condition during the warranty period.
 - 3. The Contractor shall remove and replace dead or unhealthy plants or those that lose original form and size during the warranty period with material equal to that



specified at no additional cost to the Owner. The Contractor shall replace any material that does not meet requirements within ten (10) days.

4. All replacement plants, including shrubs, cacti, groundcovers, vines and perennials, shall be subject to an additional ninety (90)-day warranty period.
5. This guarantee/warranty will not be enforced should the plant die due to vandalism, improper maintenance procedures carried out by the Owner involving over- or under- watering, over-fertilization, non-removal of braces causing girdling of trunks, fire, flood, hail, or other similar circumstances beyond the control of the Contractor.
6. All replacements shall be of the same kind and size as the original described in the contract documents. Repairs and replacements shall be made at no expense to the Owner.

3.8 MAINTENANCE PERIOD

- A. Maintenance shall begin immediately after each portion of lawn and with the planting of each plant and continue until project site is opened to public. Upon opening of site to public, the City of Chandler shall assume landscape maintenance responsibility.
 1. The Landscape Contractor, in order to protect his guarantee, shall give typewritten to the Owner, a complete maintenance instruction booklet in the care and feeding of the landscape prior to Final Acceptance.
 2. Contractor shall take every precaution to protect finished exterior surfaces from damage as result of his maintenance work and shall promptly report and repair any damage to the satisfaction of the Owner's Representative.
- B. Replacements must meet specifications, i.e., quality, size, form, species of plant material and planting procedures, to receive approval of replacement.
- C. To ensure warranty standards, the following maintenance procedures shall be executed during construction and for the full project maintenance period.
- D. Response Time: When environment dictates, work may require weekend, after hours or holiday schedules. The Contractor agrees to respond to a call per the following schedule:
 1. General Maintenance- Three (3) business days.
 2. Irrigation Issues- 24 hours or less depending on severity.
 3. Safety Issues (obstructions, etc.)- Immediately
- E. Maintenance Trees, Shrubs and Groundcovers
 1. Contractor shall be responsible for any and all replacement of any plant materials that are dead, are in an unhealthy or unsightly condition or that has lost natural shape resulting from dieback, excessive pruning or inadequate or improper maintenance.
 2. Replacements must meet specifications, i.e., quality, size, form, species of plant material and planting procedures, to receive approval of replacement.



3. Costs for replacements are assumed part of bid quotations and therefore will not result in an additional cost to the Owner.
4. The Contractor shall be responsible for watering all plantings and shall keep guy wires taut, raise tree rootballs that settle, and furnish chemicals and pesticides as necessary to keep the plantings free of disease and insects until the end of the maintenance period.
5. Insecticide Application: Furnish and apply chemicals and pesticides as necessary to keep the plantings free of disease and insects throughout the maintenance period.
6. Fertilization: All plants shall be in a moist (not dry or wet) condition prior to each application. Granular Fertilizer, as described in Part 2, shall be spread evenly over the entire area of the existing root zone. Upon application, granular fertilize shall be immediately watered in until completely dissolved.
 - a. Trees: Apply one (1) time per month in the months of February, April, August and October. Apply at the rate of one (1) pound actual nitrogen per 100 square feet of canopy per year. Individual applications to be determined by dividing the annual requirement by the number of applications.
 - b. Shrubs: Apply one (1) time per month in the months of February, April, August and October. Apply at the rate of one tenth (1/10) pound actual nitrogen per 10 square feet of canopy per year. Individual applications to be determined by dividing the annual requirement by the number of applications.
7. Weed Control: Project Area is to be maintained in a weed-free condition. All planting areas shall be kept clean bi-weekly of all noxious weeds and grasses.
8. Remove and replace trees, palm trees, shrubs, or other plants found to be dead or in an unhealthy condition. Remove rejected plants and materials promptly. Make replacements during the normal planting schedule. Replace all trees and shrubs where their health is in doubt, unless, in the opinion of Owner's Representative, it is advisable to extend warranty period. Remove all tree wrap paper, dead twigs and branches from tree and plant material at the end of the maintenance period. Keep planting beds free of weeds during maintenance period.
9. Pruning:
 - a. Trees: The objective in tree pruning shall be to preserve the structural integrity, design purpose and natural beauty of trees. Branch collars shall not be removed. Stubs shall not be allowed to remain. All pruning shall be done under direction of a Certified Arizona Arborist in accordance with the guidelines of the Western Chapter of the International Society of Arboriculture for duration of warranty period and throughout warranty period.
 - b. Shrubs: Pruning shall be done with hand pruners or lopping shears. HEDGE SHEARS SHALL NOT BE ALLOWED. Shrubs shall be selectively pruned to remove old seed heads and stems. Shrubs shall be pruned on a very limited basis, only to maintain natural appearance. Shrubs shall not be pruned into ball or geometric shapes. Shrubs and groundcovers shall be pruned to remove all frost-damaged foliage and branches as soon as new



buds appear. Shrubs shall be trimmed to prevent overhang at sidewalks and curbs.

10. Staking and Planting:

- a. Staking shall be inspected monthly. The goal is to wean trees from stakes. As trees are strong enough to stand on their own, stakes shall be removed.
- b. Stakes that are not judged to be ready for removal shall be maintained according to the detail in the Construction Documents. Rubber hose and wire encircling trunks shall be maintained so as not to cause girdling. Stakes and wire shall be maintained to prevent rubbing against trunks or branches. Materials for staking and/or restaking shall match original specification. The need for the stakes and guys to remain beyond the warranty period is to be determined at the end of the warranty period. Approval to remove the stakes and guys at that time will be determined by the Owner's Representative.

11. Maintenance of Decomposed Granite and Drainage Elements:

- a. All decomposed granite and retention areas shall be policed weekly for any debris and hauled off by the Contractor.
- b. All decomposed granite areas shall be raked or groomed on a bi-weekly basis.
- c. From time to time after heavy storms, erosion in the decomposed granite areas will occur. The Contractor shall rake these areas smooth. Where erosion is severe, the Contractor shall provide fill material and/or additional decomposed granite as required (color and size to match specifications). The Contractor may be entitled to additional compensation for significant work and no work shall commence without written approval by Owner's Representative.
- d. Graffiti: Any graffiti appearing on exteriors of walls, fences, gates, etc. must be brought to the attention of the Owner's Representative immediately.

F. Maintenance Acceptance.

1. If the Contractor's maintenance is unsatisfactory, the maintenance period shall be extended, at the Contractor's expense, until such time as all corrections are made and the work is inspected and approved by the Owner's Representative.
2. Arrange with the Owner's Representative to walk the site monthly during warranty period to review maintenance standards.
3. The Landscape Contractor shall notify the Owner's Representative five (5)-days prior to end of the maintenance period that a final inspection is requested. The Buyer shall make notations of any items not acceptable or requiring corrections and will notify the Landscape Contractor for immediate action. All corrections must be completed before the Subcontractor is released from the above maintenance requirement.

END OF SECTION



SECTION 32 91 13 - INERT MATERIALS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Furnish all materials, supplies, equipment, tools and transportation, and perform all operations in connection with and reasonably incidental to complete installation of the planting, and guarantee/warranty as shown on the drawings and specified herein. Items of work specifically included are:
 - 1. Procurement of all applicable licenses, permits and fees
 - 2. Fine grading and landscape grading
 - 3. Decomposed granite
 - 4. Stabilized decomposed granite
 - 5. Compacted decomposed granite
 - 6. Fractured Rip Rap
 - 7. Desert Pavement
 - 8. Structural Soil – refer to Structural Soil Specification

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 01 77 00 – Closeout Procedures.
- C. Section 31 31 00 – Soil Treatment.
- D. Section 32 84 00 – Landscape Irrigation.
- E. Section 32 90 00 – Planting.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.
- C. Submit two-pound samples of each color and size of decomposed granite in color and size specified on the plans. **Verify in writing to Owner's Representative that there is sufficient supply from single source to supply project.**
- D. Submit qualifications of SDG installer.

1.4 MOCKUPS

- A. Stabilized decomposed granite: 5' x 10' mockup in-situ per spec section prior to full installation shall be reviewed and approved by Landscape Architect prior to installation.
- B. Feathered, Fractured rip rap: 20' X 20' in-situ mockup of feathered rip rap in bio-swale, per detail and approved by Landscape Architect prior to installation.
- C. Desert Pavement: 10' x 20' in-situ mockup per drawing detail shall be reviewed and approved by Landscape Architect prior to full installation.



1.5 SITE CONDITIONS

A. Grade Control

1. Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

1. Use locally available materials and gradations that exhibit a satisfactory record of previous installations. Meet all other requirements as specified in Section 32 90 00.

B. Decomposed Granite

1. 1/2" screened decomposed granite top dressing color to be determined, or as noted on the plans and details. The decomposed granite shall not contain lumps or balls of clay, caliche, organic matter or calcareous coating.
2. Color shall be Rock Pros "Apache Brown". Confirm with Landscape Architect prior to ordering or placement. Provide sample for comparison to nearby soil color.

C. Stabilized Granite

1. Color to match dg (TBD)

D. Fractured Rip Rap

1. 3-6" fractured rip rap, match DG color.

E. Desert Pavement

1. In areas indicated, Desert Pavement is a 50/50 mix or 3-4" fractured rock and 1/4" minus.
2. Refer to layout in details.

PART 3 - EXECUTION

3.1 INSPECTIONS AND REVIEWS

A. Site Inspection

1. Site walkthrough with Owner's Representative. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Owner's Representative prior to beginning work.
2. Verify final limit of work areas with Owner's Representative.

B. Surface Preparation

1. General

- a. Remove loose material from compacted subgrade immediately before applying herbicide treatment.

2. Herbicide Treatment

- a. Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions, and as approved for use as a chemical per Arizona Certified Pest Control



advisor. Apply to compacted, dry subgrade prior to application of granite. As per Pest Control Advisor's instructions, irrigate enough to sprout potential weeds.

3. Remove weeds and dispose of off-site in a legal manner. Pest Control Advisor will determine if a second application is necessary, at no cost to Owner.
4. Finish grade to be 2" below top of decomposed granite.

3.2 DECOMPOSED GRANITE

- A. Wetted granite prior to placement over accepted subgrade to eliminate powdering and dry placement.
- B. Place 2" depth granite in the landscape areas as noted on the plans around plant material, feather away from the plant center, and thoroughly watered. Do not mix granite with, and protect from contamination by, on-site soil materials and other undesirable materials prior to installation any time during the installation operation.
- C. Granite, which in the opinion of the Architect has undesirable contaminants, shall be removed from the project.
- D. Take care not to harm plant material during placement of granite.

3.3 STABILIZED DG

- A. Install 2" depth per manufacturer's recommendations and drawing detail.

3.4 FRACTURED RIP RAP

- A. Install per detail in drawing set.

3.5 DESERT PAVEMENT

- A. Install per detail in drawing set.

3.6 CLEAN UP

- A. Remove all waste and debris; clean all pavement of debris created by this work from site.

END OF SECTION



SECTION 32 93 13 – SODDING - TURF GRASS VARIETY AND INSTALLATION

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.
- B. Landscaping shall conform to the provisions of the M. A. G. Standard Specifications and the City of Chandler. This specification is a supplement to MAG.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sod
 - 2. Hydrosprigging
- B. Related Sections:
 - 1. Section 31 10 00 – Site Preparation.
 - 2. Section 31 31 00 – Soil Treatment
 - 3. Section 32 90 00 – Planting.
 - 4. Section 32 84 00 – Landscape Irrigation.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Topsoil: Soil produced off-site by homogenously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- D. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- E. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- F. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- G. Subsoil: all soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- H. Surface soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.
- I. Sand: Sand that is imported for use as a plated soil profile.



1.4 SUBMITTALS:

- A. Product Data: For each type of product indicated.
- B. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this project.
- C. Qualification Data: For qualified landscape Installer.
- D. Product Certificates: For sand, soil amendments and fertilizers, from manufacturer.
- E. Material Test Reports: For sand, existing native surface topsoil and imported or manufactured topsoil.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf areas during a calendar year. Submit before expiration of required initial maintenance periods.
- G. Maintenance Plan: Maintenance plan for how sod will be maintained during maintenance period. Plan shall be submitted and approved prior to sod installation.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
 - 1. Professional Membership: Installer shall be a member in good standing with Arizona Contractors Association and the American Nursery and Landscape Association, Arizona Branch.
 - 2. Experience: Five years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the Arizona State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60
 - 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Landscape Architect.
 - 3. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 - 4. Report suitability of tested soil for turf growth.
 - a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including



aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

- D. Dirty Sand Analysis: Provide a sieve analysis of the sand it should comply with the Gradation provided within this specification.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Sprig and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.
- B. Seasonal conditions: **Hydro-seeding with Black Jack or Postcard Bermuda shall only be completed between March 1st and September 1st. Within this noted period of time, hydro-sprigging with Midiron Bermuda shall only be completed between June 1st and August 31st. Refer to section 3.4.C for additional hydro-sprigging specifications.**

If the contractor schedule for the turf installation is not during this time period, the contractor must install sod. Sod shall be Midiron Bermuda sod which may or may not be overseeded with perennial rye. The City of Chandler shall determine overseeded sod requirements at the time of sod submittal depending on installation schedule and weather conditions. No additional compensation will be paid for any extra material or labor necessary to install the sod.

Note that if the contractor installs overseeded sod, the contractor is responsible to guarantee that the sod will make a healthy transition from overseeded rye species to the Midiron Bermuda the following spring. If the turf fails to make an adequate transition between the species and seasons as determined by the City of Chandler, the contractor shall be responsible for turf replacement.

1.7 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than



the following periods:

1. Sod/Sprigged Turf: 3 months from date of written Landscape Acceptance.
 - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
- B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 SPRIGS

Warm-season grasses can be planted as individual sprigs that spread belowground as rhizomes or above ground as stolons. Creeping bentgrass, although a cool-season grass, is an exception and is commonly sprig planted.

- A. Sod Sprigs: Healthy living stems, rhizomes, or stolons with a minimum of two nodes and attached roots free of soil, of the following turfgrass species:
- B. Species: Hybrid Bermudagrass: "Midiron"

2.2 SOD

Healthy living material only certified Turfgrass sod complying with ASPA specifications for machine cut thickness, size, strength, moisture content and mowed height and free of weeds and undesirable native grasses will be used. Provide viable sod of uniform density, color, texture, strongly rooted and capable of vigorous growth and development when planted. Thatch thickness shall not exceed 1/4".

Types:

- A. Sand Sod: Grown on Sand. Species: Hybrid Bermudagrass: "Midiron"
- B. Soil Sod: Grown on Soil. Species: Hybrid Bermudagrass: "Midiron"

2.3 HYDROSEED

- A. BlackJack Seeded Bermudagrass or Post Card Bermudagrass Coated and unhulled high-quality Bermuda grass seed

2.4 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - a. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a



minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

- C. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- D. Sand: “Dirty Sand” natural or manufactured, and free of toxic materials.
- E. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

2.5 ORGANIC SOIL AMENDMENTS

- A. Compost: Compost shall consist of composted organic vegetative materials. Prior to being furnished on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the Landscape Architect for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the contractor’s equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of Compost Table below:

COMPOST TABLE	
Cation Exchange Capacity (CEC)	Greater than 50 meg/100 g
Carbon: Nitrogen Ration (C:N)	Less than 20:1
PH (of extract)	6 – 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10:1 ratio
Stability	Less than 100 mg O ² /kg compost dry solids - hour

Compost shall be applied to areas to be sprigged at the specified rate per acre prior to final tillage for incorporation into the soil sprigged. Unless otherwise specified, compost shall be applied to areas to be sprigged at 12 cubic yards per acre prior to final tillage for incorporation into the soil sprigged.

B. FERTILIZERS



1. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of percent nitrogen and 20 percent phosphoric acid.
2. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - a. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - b. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
3. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - a. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - b. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS

A. Topsoil: If required shall comply with ASTM D 5268, have a pH range of 5.5 to 7.4 percent organic material minimum, free of stones $\frac{1}{2}$ " and larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
2. Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

2.7 SAND

A. Sand for "Turf on Sand" areas identified on the plans shall be:

Common Name: Dirty Sand

Sieve	Average Retained
#4	5
#10	20
#18	20
#35 & #60 Combined	35
#100	25
#270	20
#270 PAN	8

Target KSat: The proposed range of KSat is 2 to 15. Since the greatest risk falls with the KSat running too low, the target will be 10. The City of Chandler will be advised if the range falls outside of 4 to 12.



2.8 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, straw of wheat, only. Rye straw and oat straw will not be accepted.
- B. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- C. Compost Mulch: Compost shall consist of composted organic vegetative materials. Prior to being furnished on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the Landscape Architect for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of Table 3:

TABLE 3	
Cation Exchange Capacity (CEC)	Greater than 50 meq/100 g
Carbon : Nitrogen Ratio (C : N)	Less than 20 :1
PH (of extract)	6 – 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10 :1 ratio
Stability	Less than 100 mg O ² /Kg compost dry solids – hour

Compost shall be applied to areas to be sprigged at the specified rate per acre prior to final tillage for incorporation into the soil sprigged. Unless otherwise specified, compost shall be applied to areas to be sprigged at 12 cubic yards per acre prior to final tillage for incorporation into the soil sprigged.

- D. Wood cellulose fiber mulch shall be from thermo-mechanically processed wood, processed to contain no growth germination inhibiting factors. The mulch shall be from virgin wood



manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form homogenous slurry. Paper products will not be considered as virgin wood. The wood fiber mulch shall have the properties shown in Table 2 below:

TABLE 2	
Virgin Wood Cellulose Fiber	90% min.
Recycled Cellulose Fiber	10% max.
Ash Content	0.8% +/-0.3%
PH	4.5 +/-1.0
Water Holding Capacity	10:1 (water:fiber) Min.

- E. Nonasphaltic Tackifier: Tacking agent shall be a naturally occurring organic compound and be non-toxic. It shall be a product typically used for binding soil and mulch in sprigging or erosion control operations. Approved types shall consist of mucilage or gum by dry weight as active ingredient obtained from guar or plantago. The tacking agent shall be labeled indicating the type and mucilage purity.

The contractor shall have the tacking agent swell volume tested by an approved testing laboratory using the USP method. The standard swell volume shall be considered at 30 milliliters per gram. Material shall have a swell volume of at least 24 milliliters per gram. Certified laboratory test results shall be furnished to the Landscape Architect for each shipment of homogenous consistency to be used on project areas or as directed by the Landscape Architect. Tacking agent rates shall be adjusted to compensate for swell volume variation. Material tested with lesser volume shall have the tacking agent rate increased by the same percentage of decrease in swell volume from the standard 30 milliliters per gram. Material tested with greater volume may reduce tacking agent rates by the same percentage of increase in swell volume from the standard 30 milliliters per gram. Tacking agent shall be pure material without other starches, bentonite, or other compounds that would alter the swell volume test results of mucilage, or the effectiveness of the tacking.

2.9 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.



PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydrospraying and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of **6 inches**. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply fertilizer recommended by soil testing lab directly to subgrade before loosening.
 - 2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 3. Spread planting soil or sand (see plans for soil or sand areas) to a depth of **6 inches** but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.



- a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 6 inches of subgrade by tilling. Spread remainder of planting soil.
- b. Spread sand on loosened subgrade. No driving on subgrade allowed. Work sand from edge.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply fertilizer as recommended by lab directly to surface soil before loosening.
 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off City of Chandler's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 HYDROSPRIGGING

Sod Sprigs: Healthy living stems, rhizomes, or stolons with a minimum of two nodes and attached roots free of soil.

Hydrosprigging Applications

- A. General: Prior to Hydrosprigging; The soil needs to be flocculated to a 6" depth before the sprigs are installed, any previously prepared turf areas compacted or damaged by interim rain, traffic, or other cause, shall be reworked to restore the ground condition previously specified. Hydrosprigging operations shall not take place when the wind velocity will prevent uniform distribution.
- B. Hydrosprigging: Mix specified sprigs, fertilizer, and fiber mulch in water, using equipment specifically designed for hydrosprig application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 1. Mix slurry with a nonasphaltic fiber-mulch manufacturer's recommended tackifier.
 2. Apply slurry uniformly to all areas to be sprigged in a one-step process. Apply



slurry at a rate so that mulch component is deposited at not less than 400-lb/acre dry weight, and sprig component is deposited at not less than the specified sprig- sowing rate

- C. Broadcast sprigs uniformly over prepared surface at a rate of 250 US bushels/acre.

This sprigging rate is June 1 to July 15, after this date the US bushel rate needs to be adjust to the following:

After July 15 to Aug. 15 —Up to 300 US Bushels/Ac
Aug. 15 to Aug. 31 —Up to 350 US Bushels/Ac

- D. Broadcast sprigs Equipment Calibration: The equipment to be used and the methods of Hydrosprigging shall be subject to the inspection and approval of the City of Chandler or its designated representative prior to commencement of operations. Immediately prior to the commencement of operations, the Contractor shall conduct Hydrosprigging equipment calibration tests in the presence of the City of Chandler or its designated representative.
- E. Application of Soil Amendments, Conditioners, and Fertilizer: Fertilizer shall be applied as part of the tillage operation to the depth of tillage, at the following rates: 12 pounds of 16-20-0 and 2 pounds of 21-0-0 per 1,000 square feet, Gypsum at the rate of 150 pounds per acre, ferrous sulfate (hydrated) at the rate of 125 pounds per acre, and decomposed wood derivative at the rate of 150 cubic yards per acre. Following fertilization, the treated areas are to be watered in thoroughly such that soils are wet to a minimum depth of six inches (6") at least once prior to Hydrosprigging planting operations.
- F. Sprinkler Heads shall be raised to the proper heights and as detailed prior to planting of Hydrosprigging.
- G. All sprigging operations of Bermuda Grass shall be completed by August 31. Any deviation from this date will require approval from the City.
- H. Sprigs will be harvested through a mechanical furrow/dethatching method and that will be the only accepted harvesting process. **A mechanical mowing sprig harvesting process will not be accepted.**

3.5 SODDING:

- A. Lay sod to form a solid mass with tightly fitted joints. Butt end and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod, remove excess to avoid smothering sod.
- B. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1.5 inches below the sod.

3.6 TURF MAINTENANCE

- A. Contractor shall develop and submit a minimum of three (3) months prior to any turf maintenance activities a turf maintenance plan. The plan shall be submitted to the City of Chandler for approval prior to any turf maintenance activities. The plan should include a



- month by month breakdown of turf maintenance activities showing but not limited to; fertilization schedules, watering/irrigation schedule, aeration program, mowing program, weed control (by type and season), insect/pest control treatments, and re-sprigging, or resodding efforts if required.
- B. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
 - C. Watering: If permanent irrigation system is not functioning contractor shall install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of sprig or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
 - D. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
 - 1. Mow bermudagrass variety Mid-Iron to a height of 1/2 to 1 inch
 - E. Turf Post-fertilization: Apply fertilizer after initial mowing and when grass is dry.
 - 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.
 - F. Turf Post-Insect Control: Apply pest control agents at appropriate seasonal schedules to control insects that may impact turf areas. All applications of any insecticide shall be applied by a licensed and bonded applicator per manufacturer instructions and materials approved in advance by City of Chandler staff.

3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Landscape Architect or City of Chandler representative:
 - 1. Satisfactory Sprigged Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. area and bare spots not exceeding 5 by 5 inches
 - 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, uniform, close



stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 100 percent over any 10 sq. ft. area and bare spots not exceeding 2 by 2 inches

3. Satisfactory Overseeded Sod Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 100 percent over any 10 sq. ft. area and bare spots not exceeding 2 by 2 inches. The contractor shall be responsible to replace any and all overseeded sod areas if the overseeded rye grass does not adequately transition back to a healthy vibrant stand of the base Bermuda species the following spring. Acceptability of the transition between species will be determined by City of Chandler staff.
 4. Level Turf Fields: At the end of the maintenance period, top-dress all turf areas with an approved leveling mix of organic compost and sand as determined by Landscape Architect or City of Chandler representative. Spread the leveling mix over the entire area to a depth of .25 to .50 of an inch. Rake into grass to spread out evenly over the site. Do not completely cover the blades of grass. Once top-dressing is completed, water grass. This process may need to be repeated.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.
 - C. All satisfactory turf areas will not be considered acceptable or complete until all turf surface areas have been leveled and all turf areas are top dressed with a City approved top dressing material.

3.8 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations.
- B. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.
- D. At the final project acceptance at the end of the warranty period, the Landscape Architect or Owner's Representative will make a final acceptance inspection of all planted areas. If at that time, there is any appearance of plant material insect or

fungus/pathogen infestation prior to the acceptance the Contractor is responsible to eradicate and treat for the specific issue and replace any and all damaged turf areas and plant materials.

3.9 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly



planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

- C. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION



SECTION 32 93 00 - STRUCTURAL SOIL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural Soil is a load bearing urban root zone mix for trees commonly referred to as Gap Graded Soil or Engineered Soil Mix. This specific mix allows for extreme air exchange and water flow and/or storage.

B. Related Sections:

1. Submittal Procedures
2. Installation/Planting

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D 422 – Standard Test Method for Particle-Size Analysis of Soils
2. pH & Nutrient levels as required by the agronomy testing laboratory recommendations

pH 1:1	<u>Soil Analysis: handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 28-30
Soluble Salts EC	<u>Soil Analysis: Handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 57-66
Available Ca, K, Na, Mg	<u>Soil Analysis: Handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 93-97
Available Cu, Fe, Mn, Zn	<u>Soil Analysis: Handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 130-133
Nitrate Nitrogen – (soil)	<u>Method of Soil Analysis</u> ASA, No 9, Part 2, 33-8 Pg 676-682 Sodium Bicarbonate Extraction
Phosphate – (soil)	<u>Soil Analysis: Handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 73-76 Olsen Bicarbonate Method
Boron	<u>Soil Analysis: Handbook of References Methods</u> Soil and Plant Analysis Council 1999. Pg 118-120
Sulfate Sulfur (hot-water)	<u>Soil Sampling and Methods of Analysis</u> 1993, Canadian Society of Soil Science Pg 646
Sodium Percentage ESP	<u>Agriculture Handbook 60</u> USDA (1954) Pg 102

3.

Soluble Salts: Arizona Department of Traffic (ADOT) Arizona 237b

3. Cation Exchange Capacity (CEC): Agriculture Handbook 60 USDA (1954) Pg 100-101
4. Carbon/Nitrogen Ratio (C:N): Analysis by Combustion. True Spec®
5. ASTM C 136 – Sieve Analysis of Fine and Coarse Aggregates
6. ASTM D 4791 – Flat and Elongated Particles in Coarse Aggregate



7. ASTM C 29/29M – Test method for Unit Weight and Voids in Aggregate
8. Combination of Methods for Air Filled Porosity
 - a. ASTM C 127 – Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
 - b. ASTM C 566 – Total Evaporative Moisture Content of Aggregate by Drying
9. ASTM D 5821 – Determining the Percentage of Fractured Particles in Coarse Aggregate
10. ASTM C 88 – Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
11. ASTM C 535 – Resistance to degradation of large-Size Coarse Aggregate by Abrasion and Impact in Los Angeles Machine
12. ASTM D 2434 – Test method for permeability of Granular Soils (Constant Head)
13. ASTM D 698 - Method C (Modified Version) - Laboratory Compaction Characteristics of Soil Using Standard Effort

1.3 SUBMITTALS

- A. Submit the following information in accordance with the requirements for the Submittal Procedures, except as modified herein
 1. Contractor's Structural Soil installation qualifications specific to this mix or on-site inspection/training report from the Structural Soil supplier: AZ Best LLC contact: Woody cell: 602.882.5904 or email: woody@azbestmaterials.com
 2. Contractors Site Specific Installation Procedure
 3. License and qualifications statement from the Structural Soil supplier
 4. Sample of Structural Soil mix (2 gallon bucket/container)
 5. Analysis and Test Reports of Clay Loam, Rock and Structural Soil mix. Testing submittal shall be completed in accordance with Section 1.02 References
 6. Product Data and Material Safety Data Sheets for Tackifier
 7. Product Data Sheets for Geotextile filter fabric Mirafi® 140N or equal, if required
 8. Supplier on-site installation inspection report (if applicable and immediately upon receipt)
 9. Material Delivery Quantity Completion Report from Structural Soil supplier (only upon completion of all Structural Soil delivery to project and prior to final acceptance)

1.4 QUALITY ASSURANCE

- A. The Structural Soil material supplier shall have five years with a minimum of 10 projects successfully completed supplying and training contractors and inspectors on projects of similar size
- B. The contractor installing the Structural Soil shall have a minimum of 5 projects successfully completed installing projects of similar size and can show past installation training completed on those projects with this specific design mix.
- C. If the installing contractor does not meet the quality assurance installation requirements, they must complete on-site training with the Structural Soil supplier at least two weeks prior to excavating.
 1. Training to include but is not limited to the following:
 - Review and demonstration of the Structural Soil mix
 - Discussion of soil composition, porosity, general uses and site specific review
 - Installation methods and quality control procedures
 - Equipment requirements



WEDDLE GILMORE ARCHITECTS

- Protection of stockpiled and/or installed material on-site from weather conditions and construction activities, including contamination
 - Percolation test, soils review discussion for project and/or high plasticity soils at sub grade
 - Existing and new utilities within the excavation limits
 - New tree elevation, centering and root pruning
 - Water application/irrigation
 - Storm water capture and storage
 - Question and answer discussion (Q&A session)
2. Training submittal from the Structural Soil supplier shall include the date on which the training took place, the trainer's name, the project name, trainees present, companies they represent and the items discussed
 3. The contractor is to coordinate the on-site training with the Owner's Representatives, any related contractors that must coordinate with this installation and all interested parties
 4. The contractor shall notify the Owner's Representative when the installation and compaction of the Structural Soil will take place to ensure the Owner's quality control inspections for compaction are coordinated with the installation schedule
 5. If the contractor was required to complete on-site training, then a representative from the supplier may be requested by the Owner's Representative to provide on-site review of the installation to confirm that the contractor fully understands the product, design intent and installation methodology. Any on-site inspection report received by contractor from the supplier/trainer, whether requested by the owner or not, must be forwarded immediately to the owners representative and will become part of the submittal process.
- D. The contractor must submit for approval, an installation procedure submittal specific to the project. The installation procedure must be approved by the Owner's Representative at least one week prior to excavating.
1. If the contractor is required to complete the on-site training with the Structural Soil supplier, (See section 1.04 Quality Assurance) then the site specific installation procedure must only be completed and submitted following the completion of the on-site training.
 2. The site specific installation procedure submittal will include but is not limited to the following information:
 - Proposed equipment for excavating, moving, compaction of existing soils and Structural Soil.
 - Address any issues with the existing and new underground utilities.
 - Sequencing of the Structural Soil installation, including; excavation, percolation tests, sub grade stabilization, underground utilities, planting, irrigation, hardscape, filter fabric, drain lines, tree elevations, tree centering, root pruning, on-site stockpile locations, contamination prevention, installed and stockpiled soil protection, final ground-cover, inspections and any additional requirements requested by the owners representative.

1.5 DELIVERY AND STORAGE

- A. Do not deliver or place soils with freezing or rainy/muddy site conditions. Deliver the material at a the properly saturated moisture content.
- B. Protect soils and mixes from excess water and from erosion at all times. Protect materials with specified geo-textile fabric or a plastic tarp to prevent contamination, soil separation from rainfall or construction activities.



1.6 SITE CONDITIONS

- A. The contractor shall inspect all areas to receive Structural Soil before starting work and shall report any defects to the Owner's Representative.
- B. Locate and confirm the location of all underground utility lines and structures prior to starting any excavation. Repair any underground utilities or foundations damaged by the contractor during the progress of this work. The cost of repairs or replacement shall be at the contractor's expense.
- C. The contractor shall review the engineer's soils report and perform percolation tests on the existing soil at the base/bottom of the excavated pits.
 1. The contractor shall notify the Owner's Representative immediately if the soils report shows high plasticity or the soil does not drain properly.
 2. If counter measures have been added on-site to stabilize the sub grade under asphalt, concrete, pavers or any other hardscape then the contractor will not install the Structural Soil without first confirming with the owners representative if counter measures should be taken to stabilize the sub grade within the excavated Structural Soil pits.
 3. If the contractor fails to notify the owners representative of any adverse sub grade conditions, then repairs or replacement shall be at the contractors expense.

1.7 STRUCTURAL SOIL MIX

- A. General: Provide a Structural Soil mix consisting of crushed stone, clay loam, soil tackifier and soil amendments that meets the applicable ASTM standards and other requirements specified:
 1. The basis for training and material of the Structural Soil is from AZ Best LLC contact: Woody cell: 602.882.5904 email: woody@azbestmaterials.com with mix to be locally supplied locally mixed or mixed on-site
 2. Submit to the Owner's Representative: samples, certificates, manufacturer's literature, certified test results for all raw materials and soil mix. Contractors and/or suppliers qualifications and/or training certificates. Do not excavate or deliver the Structural Soil mix until the Owner's Representative has approved the submittal information.
 3. Remove existing soils where shown on the plans and replace with the Structural Soil as outlined below. Coordinate with hardscape, underground utilities, irrigation, landscaping and any other trades impacted by the excavation and installation
 4. Submit 1 cubic foot sample for every 1000 cubic yards of material to be delivered, any time a material source has changed, or if required by the Owner's Representative. Record the samples with the material source, date of the sample, contractor's name and project name.
- B. Clay Loam: The soil shall contain no admixture of subsoil, stones greater than one-half inch, lumps, plants/roots, debris and any other extraneous material over one inch in diameter. It shall not contain toxic substances harmful to plant growth. Fertilizer and other required admixtures to the soil shall be as specified per the approved agronomy testing laboratory recommendations.
 1. The mechanical analysis for the clay loam, in accordance with ASTM D 422 is as follows.
Percentages of sand and clay vary to meet testing requirements:



<u>Textural Class</u>	<u>Percent of Total Weight</u>
Gravel	Less than 5 percent
Sand	20-45 percent
Silt	20-50 percent
Clay	20-40 percent
Organic Matter	2-5 percent

2. The chemical analysis shall meet or be amended to meet the following criteria:

- pH & Nutrient levels as required by the agronomy testing laboratory recommendations. (See section 1.02 References number 2)
- Soluble salts less than 1.0 milliohm per cm. (See section 1.02 References number 3)
- Cation Exchange Capacity (CEC) greater than 10. (See section 1.02 References number 4)
- Carbon/Nitrogen ratio less than 33:1 (See section 1.02 References number 5)

C. Crushed Stone: Crushed stone shall be an ADOT or MAG certified crushed stone. The gradation shall be in accordance with ASTM C 136

Aggregate Sieve Gradation for Structural Soil

Sieve Size	Percent Passing
2 ½-inch	100
2-inch	80-100
1 ½-inch	45-80
1-inch	0-20
¾-inch	0-5

1. Acceptable aggregate dimensions will not exceed 5:1 for any two dimensions, in accordance with ASTM D 4791.
2. Unit Dry Weight: Loose (80 pounds/cubic foot minimum, in accordance with ASTM C29/C29M).
3. Specific gravity: 2.45 to 2.75 dry bulk in accordance with ASTM C 127.
4. A minimum of 90 percent with 2 or more fractured faces in accordance with ASTM D 5821.
5. Results of aggregate soundness loss test: not exceeding 18 percent in accordance with ASTM C 88.
6. Losses from LA Abrasion tests not exceeding 40 percent in accordance with ASTM C 535.

D. Tackifier: Gelscape®



- E. Structural Soil Mixture: A uniformly blended mixture of crushed stone, clay loam, soil tackifier and recommended amendments.
 - 1. Air Filled Porosity: 35 percent by volume minimum, in accordance with combined ASTM methods C 127 and C 566.
 - 2. Permeability (Hydraulic Conductivity): minimum 6.2E-01 cm/sec (700 inch per hour minimum), in accordance with either ASTM D 2434 or ASTM D 5084.

PART 2 – EXECUTION

2.1 STRUCTURAL SOIL

- A. All Structural Soil mixing shall be performed at the producer/supplier's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing at the project site shall be permitted without the approved Structural Soil supplier and the owner's representative approval.
- B. Maintain adequate moisture content during the mixing process. Measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.
- C. Add soil amendments to alter soil fertility including fertilizers and pH adjustment at the time of mixing at the rates recommended by the agronomy testing laboratory.

2.2 SITE PREPARATION

- A. The contractor is to notify and coordinate installation of Structural Soil with the owner's representative. Typical cone (ASTM 1556) and nuclear testing methods (ASTM 2922 and 3017) are not accurate with this material, so special inspections are required to ensure the compaction of the Structural Soil is achieved. At the owner's direction a full time inspector may be instructed to visually inspect the installation process.
- B. Excavate the proposed sub grade to the depths, widths and slopes shown on the drawings. Any over-excavation shall be filled with Structural Soil with no additional cost to the owner. Filling any over-excavation with native materials is not permitted.
- C. Review engineer's soil report for high plasticity. Complete a percolation test and confirm sub grade drains properly. Contractor shall bring to the owner's representative any concerns with the sub grade prior to the installation.
- D. Do not proceed with the installation until all sub grade stabilization, walls, curbs, footings, subsurface drain lines, filter fabric and utilities in the area have been installed as needed. Postpone installation of site elements dependent on structural soil for support until after the structural soil has been installed and compacted.
- E. Protect adjacent walks, walls, utilities and other improvements from damage by the installation. Clean up all trash, soil or dirt spilled on any paved surface at the end of each day and as required.

Damage to any improvements or existing features to remain caused by the installation operations shall be repaired at the contractor's expense.
- F. Maintain all dust, silt and sediment control devices per required municipal governing regulations.

2.3 INSTALLATION



- A. Install all drain lines, drainage chimneys, filter fabric and/or stabilize sub grade as required.
- B. Install & compact in 6-inch lifts with a Vibra Plate compactor or 12-inch lifts with a 2 ton steel drum roller. Any alternate method of compaction must be approved in writing by the Owner's Representative.
- C. Bring the Structural Soil to finished grades as shown on the plans and details. Protect the material from contamination by toxic materials, trash, debris, water containing cement, clay silt or other materials that will alter the particle size distribution of the mix.
- D. Never dig through or move the Structural Soil without the proper moisture in the mix.
- E. Install a geotextile filter fabric (Mirafi® 140N or equal) if shown in the details.

2.4 FIELD QUALITY CONTROL

- A. Any reconfiguration of the excavation shall be approve by the Owner's Representative.
 - 1. As-builts are required for any deviation from the original configuration layout.
- B. Any reduction of Structural Soil volume requires approval in writing.
- C. Any changes without prior approval that will require corrective measures shall be at the contractor's expense.

2.5 FINE GRADING

- A. Prior to finish grading for the material, review the rough grade with the owner's representative.
- B. Adjust the finished grades as directed. Fill all dips with Structural Soil and remove any bumps in the surface.
- C. Review the finished grading with the owner's representative and make any corrections noted from this review.

2.6 CLEAN UP

- A. Do not wash or flood the area until after the geotextile filter fabric (Mirafi® 140N or equal) and finished materials (decomposed granite, compost, etc...) covering the Structural Soil are in place.

END OF SECTION

EXHIBIT D

GIS / GPS DATA DELIVERY REQUIREMENTS

N/A

EXHIBIT E

FEDERAL PROVISIONS

N/A