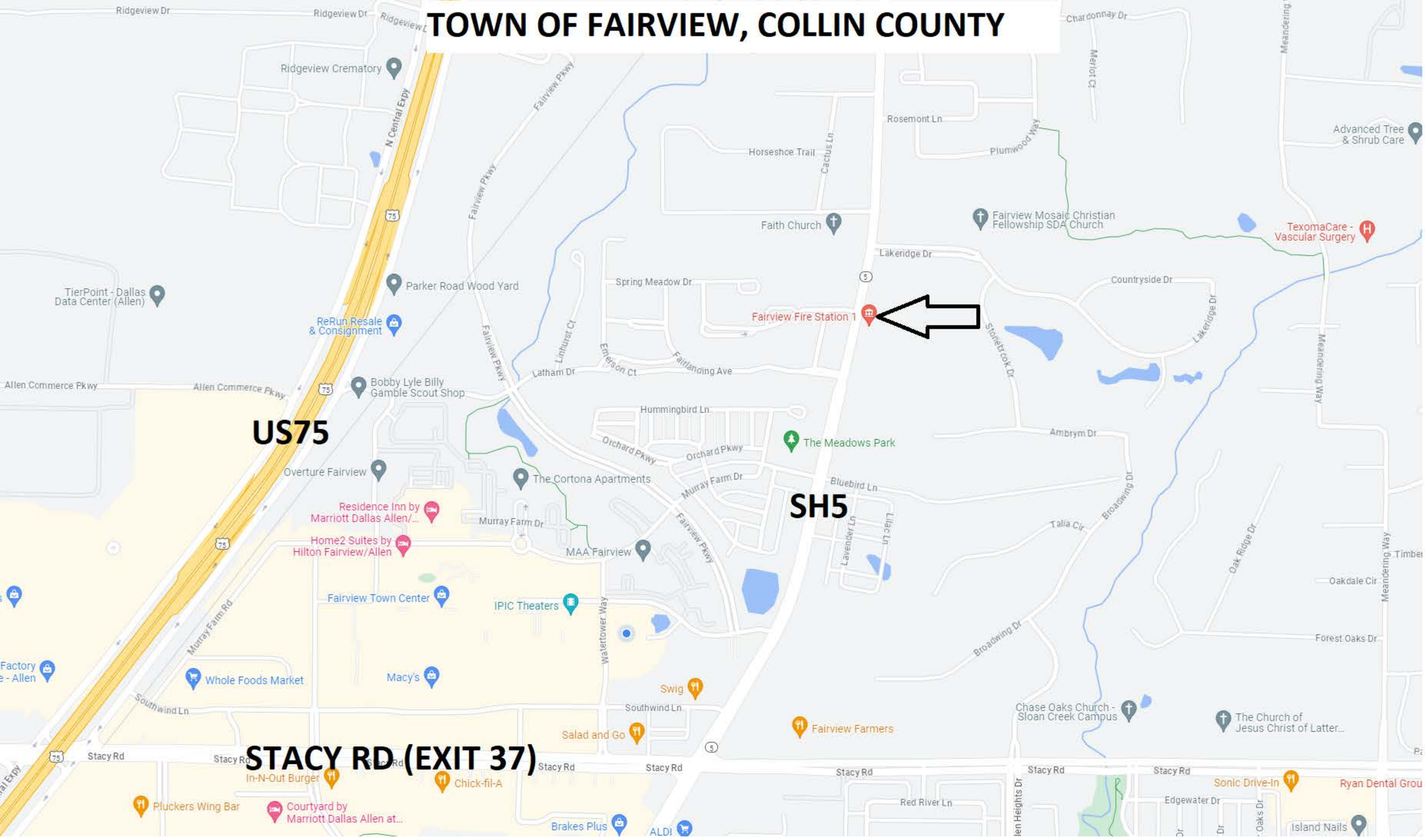
TOWN OF FAIRVIEW

FIRE STATION NO. 1
MONUMENT WALL

MARCH 2024

372 TOWN PLACE, FAIRVIEW, TX 75069

PREPARED BY:
JAMES CHANCELLOR, PE
TOWN ENGINEER
CONTACT INFO: 972-886-4235, JCHANCELLOR@FAIRVIEWTEXAS.ORG


TOWN OF FAIRVIEW, COLLIN COUNTY
US75
SH5
STACY RD (EXIT 37)
Ridgeview Dr
Ridgeview Crematory
N Central Expy
Fairview Pkwy
Horseshce Trail
Cactus Ln
Rosemont Ln
Chardonnay Dr
Merlot Ct
Plumwood Way
Advanced Tree & Shrub Care
Faith Church
Fairview Mosaic Christian Fellowship SDA Church
TexomaCare - Vascular Surgery
Lakeridge Dr
Countryside Dr
Spring Meadow Dr
Fairview Fire Station 1
Parker Road Wood Yard
TierPoint - Dallas Data Center (Allen)
ReRun Resale & Consignment
Linhurst Ct
Emerson Ct
Fairlanding Ave
Latham Dr
Stonebrook Dr
Meandering Way
Allen Commerce Pkwy
Bobby Lyle Billy Gamble Scout Shop
Hummingbird Ln
Ambrym Dr
The Meadows Park
Orchard Pkwy
Overture Fairview
The Cortona Apartments
Murray Farm Dr
Bluebird Ln
Residence Inn by Marriott Dallas Allen/...
Home2 Suites by Hilton Fairview/Allen
MAA Fairview
Lavender Ln
Talia Cir
Broadwing Dr
Oak Ridge Dr
Fairview Town Center
IPIC Theaters
Watertower Way
Oakdale Cir
Forest Oaks Dr
Whole Foods Market
Macy's
Swig
Southwind Ln
Salad and Go
Fairview Farmers
Chase Oaks Church - Sloan Creek Campus
The Church of Jesus Christ of Latter...
Stacy Rd
In-N-Out Burger
Chick-fil-A
Pluckers Wing Bar
Courtyard by Marriott Dallas Allen at...
Brakes Plus
ALDI
Red River Ln
Sonic Drive-In
Ryan Dental Grou
Edgewater Dr
Island Nails


FIRE STATION #1
SITE
Greenville Dr
S State Hwy 5
Parkvillage Ave

TOWN OF FAIRVIEW

NOTICE TO CONTRACTORS

1. Sealed bids (proposals) addressed to the Town of Fairview (Town), 372 Town Place, Fairview, Texas 75069, will be received at Town Hall until 2:00 p.m., March 26th, for

FIRE STATION #1 MONUMENT WALL

At such time bids will be publicly opened and read aloud.

2. The work consists of furnishing all labor, equipment and materials (except as otherwise specified), and performing all work necessary for:

- 390 SF of brick pavers with foundation
- Architectural curved wall on a concrete foundation with piers
- Construction of a concrete pedestal for a bronze statue (by others)
- Replacement of 525 sq. ft. of concrete sidewalk
- Electrical conduit (electrical work by others)

3. Plans and Specifications for the work may be downloaded at www.fairviewtexas.org under the Engineering tab, Bid tab.

TOWN OF FAIRVIEW, TEXAS

James Chancellor, PE
Town Engineer

INSTRUCTIONS TO BIDDERS

1. Each proposal shall be legibly written or printed in ink, on the proposal form provided in this bound copy of proposed Contract Documents. No alterations in proposal, or in the printed forms thereof, by erasures, interpolations, or otherwise will be acceptable unless each such alteration is signed or initialed by the Bidder; if initialed, the Town may require the Bidder to identify any alterations so initialed. No alteration in any proposal, or in the proposal form on which it is submitted, shall be made by the person after the proposal has been submitted by the Bidder. Any and all addenda to the Contract Documents on which a proposal is based, properly signed by the Bidder, shall accompany the proposal when submitted. The Bidder may withdraw their proposal any time prior to the bid opening date and time stipulated in the Notice to Contractors.

Each proposal submitted shall be enclosed in a sealed envelope, addressed to the Town of Fairview, 372 Town Place, Fairview, Texas 75069, identified on the outside with the words "FIRE STATION #1 MONUMENT WALL" and identifying the Bidder. Proposals shall be delivered to the Town Engineer by 2:00 p.m. , March 26th , 2023, at such time bids will be publicly opened and read aloud. **Facsimile Transmittals Will Not Be Accepted.**

All bids will be tabulated for the Town Council by the Town Engineer. The Town Council will determine the lowest responsible bid, after considering the recommendations of the Town Engineer, determine whether such bid is that of a responsible Bidder, and award a contract to the Contractor determined to be the lowest responsible Bidder. The Fairview Town Council will authorize the Town Manager to enter into a contract with said Contractor.

2. Each Proposal shall be accompanied by either a cashier's check, a certified check, or an acceptable bid bond in an amount of not less than five percent (5%) of the proposed bid price, made payable without conditions to "Town of Fairview, Texas", and the amount of the said proposal Guarantee may be retained by and forfeited to the Town as liquidated damages if the proposal covered thereby is accepted and a contract based thereon is awarded and the Bidder should fail to enter into a contract in the form prescribed, with legally responsible sureties, within the ten (10) days after such award is made by the Town.

The proposal guarantee deposit of the unsuccessful Bidders will be returned if and when their proposals are rejected. The proposal guarantee deposit of the Bidder to whom a contract is awarded will be returned provided, and when, said successful Bidder executes a contract and files satisfactory bonds as hereinafter stipulated. The proposal guarantee deposit of the second and third lowest responsible Bidders may be retained for a period of not to exceed sixty (60) days pending the execution of the contract and bonds by the successful Bidder.

3. Accompanying the proposal, each Bidder shall furnish an experience list of similar work along with such other information as will tend to show the Bidder's ability to prosecute the required work. The Bidder shall have a minimum of three years experience and successful history in the

performance of similar work. The Town may make such investigations as they deem necessary to determine the ability of the Bidder to perform the work. The experience list is not required for those Bidders who have performed similar work for the Town of Fairview within the past 5 years.

4. Each Bidder shall carefully examine the Specifications, and other Contract Documents, shall visit the site and fully inform themself of all conditions affecting the work or the cost thereof, and shall be presumed to have done so and their bid shall be based upon their own conclusions from such examination. Each Bidder shall inform themself concerning all Federal, State, and local laws, ordinances or regulations which may in any manner affect their proposed construction operations, or those engaged or employed on the work or the material or equipment. Should a Bidder find discrepancies in, or omissions from, the Plans, Specifications or other Contract Documents, he should at once notify the Town Engineer and obtain clarification or interpretation prior to submitting any bid.

Any interpretation of the proposed Contract Documents will be made only by addendum duly issued and a copy of such addendum will be mailed or delivered to each person obtaining a set of such documents from the Town Engineer. The Town will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

5. Each Bidder to whom a contract for the work is awarded will be required to furnish surety as follows:

Performance Bond: A contract bond to the Town, in an amount equal to 100 percent (100%) of the not to exceed contract price.

Payment Bond: A payment bond to the Town, in an amount equal to 100 percent (100%) of the not to exceed contract price.

The bonds shall be executed in three (3) counterparts on the forms bound herein, signed by an acceptable surety company authorized to do business in the State of Texas as required by Article 5160 V.A.T.C.S.

Attorneys-in-fact who sign the bonds must file with each bond a certified and effective dated copy of their power of attorney.

Certificates of Insurance: Satisfactory certificates of insurance shall be filed with the Town in accordance with the GENERAL CONDITIONS and SUPPLEMENTARY CONDITIONS in the Contract Documents.

6. The Bidder's attention is directed to Texas House Bill 11 (72nd Legislature, 1st C.S.) which amended the Texas Tax Code Section 151.311. This amendment provides that by the CONTRACTOR entering into a separated contract, The CONTRACTOR will become a seller of materials purchased for the project, which will obviate paying taxes, on materials incorporated into the project.

7. No Bidder may submit more than one proposal. Two proposals under different names will not be received from one firm or association.

8. No Bidder may withdraw their proposal for a period of sixty (60) days after the date and hour set for the opening herewith. A Bidder may modify or withdraw their proposal at any time prior to the expiration of the period during which proposals may be submitted, by written request of the same persons or person who signed the Proposal.

9. The Town reserves the right to accept the bid which, in its judgment is the lowest responsible bid; to reject any or all bids; and to waive irregularities or informalities in any bid submitted. Bids received after the specified time of closing will be returned unopened. Conditional or qualified bids will not be accepted.

10. None of the Instructions to Bidders, Proposal, Performance Bond, Payment Bond, Contract Agreement, General Conditions, Special Conditions or Specifications shall be removed from the bound copy of the Contract Documents prior to filing the proposal contained therein.

11. Each Bidder shall sign their proposal, using their usual signature and giving their full business address. Bids by partnerships shall be signed with the partnership name followed by the signature of one of the members of the partnership or by an authorized representative and designation of the person signing. Bids by corporations shall be signed with the name of the corporation, followed by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The names of all persons signing should also be printed below the signature. A bid by a person who affixes to their signature the word "President", "Secretary", "Agent", or other designation, without disclosing their principal, may be held to be the individual signing. When requested by the Town, satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.

12. The Notice of Award shall be accompanied by the necessary Contract Agreement and Bond forms. The Bidder to whom the Contract is awarded will be required to execute the Contract Agreement and obtain the Performance and Payment Bonds and Certificates of Insurance within ten (10) calendar days from the date when notice of Award is delivered to the Bidder. In case of failure of the Bidder to execute the Contract Agreement, the Town may at its option consider the Bidder in default, in which case, the bid security accompanying the Proposal shall become the property of the Town.

13. The Town, within ten (10) days of receipt of acceptable Performance Bond, Payment Bond, Certificates of Insurance and Contract Agreement signed by the Bidder to whom the contract was awarded, shall sign the Contract Agreement and return to the Bidder two (2) executed copies of the Contract Agreement. The Bidder may withdraw their signed Agreement should the Town not execute the Agreement within the stated period by written notice to the Town.

14. The Notice to Proceed shall be issued within ten (10) days of the execution of the Contract Agreement by the Town. The time may be extended by mutual agreement between the Town and Contractor. If the Notice to Proceed has not been issued within the specified time or mutually

agreed upon extension, the Contractor may terminate the Contract Agreement without further liability on the part of either party.

15. Attention is called to the fact that not less than the federally determined prevailing wage rate, as issued by the U.S. Department of Labor, must be paid on this project.

16. The Town intends to award the Contract to a Bidder that will be doing a substantial portion of the work rather than through subcontracts. The Bidder must complete the item in the Proposal regarding the amount of work to be done by the Prime Contractor. The Town reserves the right to consider this breakdown in awarding the Contract.

17. Each Bidder shall list all subcontractors they propose to use on this project for which the amount of the subcontract is in excess of $10,000. The list shall include the name and address of the subcontractor, the work they will be performing and the amount of the subcontract. The Bidder shall also complete a Statement of Qualifications and Experience for each subcontractor. The Contractor shall not change subcontractors or enter into contract with subcontractors not listed without prior approval by the Town. The Town reserves the right to refuse any or all requests for changes.

FIRE STATION #1 MONUMENT WALL
PROPOSAL

THIS BID IS SUBMITTED TO:

Honorable Mayor and Town Council
Town of Fairview
372 Town Place
Fairview, Texas 75069

The Undersigned Bidder proposes to complete the generally described work as shown in these Specifications for the following unit prices and total price. The Bidder understands that units may change in the field and that the unit prices shown here will be honored and that the final price will be based on the actual measured or approved field quantities.

	BID ITEM		QUANTITY	UNITS	UNIT PRICE	PRICE
1	Mobilization		1	LS		
2	Site Prep incl. grading/excavation		1	LS		
3	Concrete sidewalk (remove/replace)		525	SF		
4	Brick pavers w/concrete subbase		390	SF		
5	Monument wall foundation (with piers)		1	LS		
6	Pedestal foundation (with pier)		1	LS		
7	Monument wall		1	LS		
8	Pedestal		1	LS		
9	Set statue (bronze statue by others)		1	LS		
10	Install Maltese (by others)		1	LS		

11	Install electrical conduit under		2	EACH		
	5 ft wide sidewalk (2 locations)					
	2" diam, 8 ft length each					
	(electrical work by others)					
12	2 year maintenance bond		1	EACH		

TOTAL BASE BID $ _____

Note: Substantial Completion is 45 calendar days to meet the date for a scheduled ceremony. Final Completion in 60 days. The bronze statue and Maltese have already been ordered.

1. The Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the Town in the form included in the Contract Documents to complete the Apple's Crossing & Monarch Connector Trails as specified or indicated in the Contract Documents for the Contract Price in this Bid and in accordance with the Contract Documents.

2. Bidder accepts all of the terms and conditions of the notice to Contractors, including without limitation those dealing with the disposition of Bid Security. This Bid will remain open for sixty (14) days after the day of Bid opening. Bidder will sign the Agreement and submit the Contract Security, Certificate of Insurance and other documents required by the Contract Documents within ten (7) days after the date of Town's Notice of Award.

3. In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

(a) Bidder has examined, and hereby acknowledges receipt of, copies of all the Contract Documents and the following addenda:

ADDENDUM NO:	DATE
_____	_____
_____	_____
_____	_____

(b) Bidder has examined the site and locality where the Work is to be performed, the legal requirements (Federal, State and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as Bidder deems necessary.

(c) Bidder intends to perform a substantial portion of the work himself in accordance with the following approximate breakdown based on percentage of Base Bid:

Portion of Work by Bidder _____ %

Portion to be Sub-Contracted _____ %

Subcontractor Information

Name	Type of Work	Amount

5. The following documents are attached to and made a condition of this Bid:

(a) Required Proposal Guarantee (cashier's check, certified check, or bid bond).

(b) Statement of Bidder's Qualifications and Experience.

(c) Statement of Subcontractors' Qualifications and Experience.

6. The terms used in this Bid which are defined in the General Conditions of Agreement included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

Submitted on _____, 20____.

Individual
Partnership
_____Corporation
Firm Name

By:_____
Typed or Printed

SIGNATURE_____

TITLE_____

ADDRESS_____

_____

TELEPHONE_____

TOWN OF FAIRVIEW
FIRE STATION #1 MONUMENT WALL

CONTRACTOR _____

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Note: Demonstrate a minimum of three (3) years experience. Bidders who have performed similar work for the Town of Fairview within the past five (5) years are not required to complete this information.

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST: COMPLETION DATE:

DESCRIPTION:

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST COMPLETION DATE:

DESCRIPTION:

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST: COMPLETION DATE:

DESCRIPTION:

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST: COMPLETION DATE:

DESCRIPTION:

DUPLICATE THIS FORM IF THERE IS MORE THAN ONE SUBCONTRACTOR

TOWN OF FAIRVIEW
FIRE STATION #1 MONUMENT WALL

SUBCONTRACTOR _____

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Note: Demonstrate a minimum of three (3) years experience. Subcontractors who have performed similar work for the Town of Fairview within the past five (5) years are not required to complete this information.

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST: COMPLETION DATE:

DESCRIPTION:

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST COMPLETION DATE:

DESCRIPTION:

NAME OF PROJECT:

OWNER:

TOTAL CONTRACT COST: COMPLETION DATE:

DESCRIPTION:

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,_____ _____as Principal, and _____ _____ as Surety, are hereby held and firmly bound unto the Town of Fairview, Texas as Owner in the penal sum of_____ _____(5% of the proposal as submitted) for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, 2024.

The Condition of the above obligation is such that whereas the Principal has submitted to the Town of Fairview, Texas a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the construction of various drainage improvements in the Town of Fairview.

NOW THEREFORE,

(a) If said Bid shall be rejected, or

(b) If said Bid shall be accepted and the principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a Bond for his faithful performance of said contract, and Certificates of Insurance and shall in all other respects perform the agreement created by the acceptance of said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect: it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____L.S.
Principal

_____
Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended and be authorized to transact business in the State of Texas.

TOWN OF FAIRVIEW

FIRE STATION No. 1 MONUMENT WALL

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 2024, by and between the Town of Fairview, Collin County, Texas, Party of the First Part, hereinafter referred to as the "Town", and _____ Party of the Second Part, hereinafter referred to as the "Contractor" for Construction of various drainage improvements including furnishing all labor, equipment and materials (except as otherwise specified) and performing all work necessary for the construction.

ARTICLE 1. It is hereby mutually agreed that for and in consideration of the payments as provided for herein to the Contractor by the Town, the said Contractor shall furnish all labor, equipment, and material (except as otherwise specified above) and shall perform all work necessary to complete the improvements in a good and substantial manner, ready for use, before the contract time expiration. The work shall be in strict accordance with this Contract, a copy of which is filed pursuant to law in the office of the legal representative of the Town.

ARTICLE 2. It is hereby further agreed that in consideration of the faithful performance of the work by the Contractor, the Town shall pay the Contractor the compensation due him by reason of said faithful performance of the work at stated intervals and in the amount certified by the Town Engineer, in accordance with the provisions of this Contract.

ARTICLE 3. It is hereby further agreed that, at the completion of the work and its acceptance by the Town, all sums due the Contractor by reason of alterations or modifications of the original Contract or by reason of "Extra Work" authorized under this Contract, will be paid the Contractor by the Town after said completion and acceptance.

ARTICLE 4. It is hereby further agreed that any reference herein to the "Contract" shall include all "Contract Documents" as the same are listed and described in Paragraph 1.9 of SECTION: GENERAL CONDITIONS bound herein, and said "Contract Documents" are hereby made a part of this Agreement as fully as if set out at length herein, and that this Contract is limited to the items in the Proposal as signed by the "Contractor" and included in the "Contract Documents".

ARTICLE 5. The Contractor agrees to perform all of the work described in the Contract Documents for the unit prices and total contract price as submitted in the Bid, in the total amount of _____ taking into consideration additions to or deductions from the Total Bid by reason of alterations or modifications of the original quantities or by reason of "Extra Work" authorized under this Agreement in accordance with the provisions of the Contract Documents. Contractor agrees to a substantial completion time of 45 days and final completion of 60 days from the date of the Notice to Proceed.

ARTICLE 6. The Contractor agrees that the sum of Three Hundred Dollars ($300.00) in Liquidated Damages will be deducted from the Contract price by the Town for each calendar day that the work remains incomplete beyond the Contract time for completion, or within such extra time as may have been allowed by an extension approved by the Town.

ARTICLE 7. The Contractor agrees to submit a Maintenance Bond prior to the release of final retainage for 100% of the value of the Contract Amount for a period of two years from the date of final acceptance.

IN WITNESS WHEREOF, the Party of the First Part and the Party of the Second Part, respectively, have caused this Agreement to be duly executed in day and year first herein written in three (3) copies, all of which to all intents and purposes shall be considered as the original.

ARBITRATION PROVISION:

THIS CONTRACT CONTAINS A BINDING ARBITRATION PROVISION WHICH MAY BE ENFORCED BY THE PARTIES.

CONTRACTOR, PARTY OF THE SECOND PART

By:_____

_____
(Office or Position of Signer)

OWNER, PARTY OF THE FIRST PART
TOWN OF FAIRVIEW, TEXAS

By:_____
Julie Couch, Town Manager

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENT THAT WE, _____ of _____, hereinafter referred to as the "Contractor" and _____ _____, a Corporation organized and existing under the laws of the State of Texas, and duly authorized to transact business in the State of Texas, as "Surety" are held and firmly bound unto the Town of Fairview, Texas (Owner), their successors and assigns, hereinafter called the "Owner", in the penal sum of _____ in lawful money of the United States of America, for the payment of which well and truly to be made to said Owner with the understanding that such designation shall be held and taken to apply to them or to their successors, lessees and assigns, as the circumstances not or to any time in the future under the terms hereof shall require, we, said Contractor and Surety, do hereby bind ourselves and our respective successors, lessees and assignees, jointly and severally, forever firmly by these present.

THE CONDITION OF THE ABOVE OBLIGATION, HOWEVER IS SUCH THAT:

WHEREAS, said Contractor has entered into a certain Contract in writing bearing date of the _____day of _____, 2024, and designated as construction of the FIRE STATION NO 1 MONUMENT WALL in Fairview including furnishing all labor, equipment and materials (except as otherwise specified), and performing all work necessary for the construction.

WHEREAS, it is provided in said Contract that said Contractor shall furnish a bond in the sum hereinabove stated condition for the faithful performance of said Contract as well as any supplement or supplements in writing thereto covering additional or other work to be performed by the contractor pursuant to the terms and conditions of said Contract.

NOW, THEREFORE, if said Contractor shall in all respect faithfully and fully perform each and all of the terms, provisions, conditions, and undertakings of said Contract in writing to be by it performed, together with like performance of any an all supplements in writing thereto covering additional or other work to be performed by the Contractor, notice of any such supplement or supplements being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force, virtue and effect.

PROVIDED FURTHER, that it is expressly understood and agreed that notice of any default in or non-performance of any duty of obligation on the part of the Contractor under the terms of said Contract in writing, or any supplement in writing thereto covering additional or other work to be performed by the Contractor, is hereby expressly waived by the Surety, and that any such default or non-performance of any duty or obligation shall not absolve or release the Surety from its joint and several absolute and unconditional undertaking or indemnity, irrespective of whether Owner shall or shall not call upon the Contractor for compliance therewith or performance thereof, and that these present shall remain in full force, virtue and effect during the existence of said Contractor of any supplement in writing thereto covering additional or other work to be performed by the Contractor,

and thereafter for the purpose of adjusting rights and obligations which shall have accrued during the life of said written Contract, or any supplement in writing thereto covering additional or other work to be performed by the Contractor.

IN TESTIMONY WHEREOF, the Contractor has hereunto set his hand, and said Surety has caused these present to be executed in its name, and its corporate seal to be hereunto affixed, by its attorney-in-fact duly authorized to do so at_____, on this _____ day, of _____, 20_____.

SURETY COMPANY	CONTRACTOR
_____	_____
Name of Company	Name of Company
By:_____	By:_____
Attorney-in-Fact	
By:_____	_____
Title of Person Signing	Title of Person Signing
(Seal)	(Seal)

(Accompany this bond with attorney-in-fact's authority from the Surety company certified to include the date of the bond.)

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT, that _____ as "Contractor", and _____ a corporation organized under the laws of the State of _____, with general offices in _____, and authorized to transact business in the State of TEXAS as "Surety", are held and firmly bound unto the Town of Fairview, in the penal sum of _____ for the payment of which sum will and truly to be made, we bind ourselves, and our heirs, executors, administrators, successors, and assigns, jointly and severally, be these presents:

THE CONDITIONS OF THE FOREGOING OBLIGATIONS IS SUCH THAT:

WHEREAS, the Contractor has on the _____ day of _____, 2024, entered into a written contract with the Town for the FIRE STATION NO 1 MONUMENT WALL in Fairview including furnishing all labor, equipment and materials (except as otherwise specified), and performing all work necessary for the construction.

NOW, THEREFORE, if the Contractor and his subcontractors shall pay all indebtedness incurred for supplies, materials, or labor furnished, used or consumed in connection with the prosecution of the work provided for in said contract, this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed there under, or the specifications accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the specifications.

PROVIDED FURTHER, that the surety agrees that any person to whom there is due any sum for supplies, materials, or labor, hereinbefore stated, or his assigns, may bring an action on his bond for the recovery of the indebtedness; **PROVIDED,** that no action shall be brought on the bond after six months from the completion of the public improvements.

SURETY COMPANY:	CONTRACTOR:
_____	_____
Name of Company	Name of Company
By:_____	_____
By:_____	_____
Title of Person Signing	Title of Person Signing
(Seal)	(Seal)

(Accompany this bond with attorney-in-fact's authority from the Surety Company certified to include the date of the bond.)

GENERAL CONDITIONS

1. DEFINITIONS: Wherever used in the Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.1 Acceptance, Final Acceptance: The formal action by the Town in accepting the Work as being complete.

1.2 Addenda: Written or graphic supplemental documents issued prior to the opening of bids which modify or interpret the Contract Documents, by additions, deletions, clarifications, or corrections.

1.3 Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the work to be performed.

1.4 Bidder: Any individual, partnership, corporation, or combination thereof submitting a proposal for the Work contemplated, acting directly or through and authorized representative.

1.5 Bonds: Bid, performance, and payment bonds and other instruments or security, furnished by the Contractor and his surety in accordance with the Contract Documents.

1.6 Change Order: A document recommended by the Engineer which is signed by the Contractor and Town and authorizes an addition, deletion, or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Contract.

1.7 Contract: The written agreement between the Town and Contractor covering the work to be performed; other Contract Documents are attached to the Contract and made a part thereof as provided therein.

1.8 Contractor: The individual, partnership, corporation, or combination thereof who has entered into the Contract (or agreement) with the Town for the performance of the Work called for in the Contract Documents.

1.9 Contract Documents: The Notice to Contractors, Instructions to Bidders, Proposal, Contract Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary Conditions, Technical Specifications, Plans, Addenda, Notice of Award, and Notice to Proceed are each and all included in this Contract and the Work shall be done in accordance therewith.

1.10 Contract Price: The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

1.11 Contract Time: The number of calendar days stated in the Proposal for the completion of the Work. The term day as used in the Contract Documents shall mean calendar day unless specifically designated otherwise.

1.12 Effective Date of the Contract: The date indicated in the Notice to Proceed as the date of commencement of the Work, the date from which Contract Time is measured.

1.13 Engineer: The individual or firm designated, appointed, or otherwise employed or delegated by the Town for this Work, or their duly authorized agents, such agents acting within the scope of the particular duties entrusted to them in each case. The Engineer on this Project is the Town Engineer.

1.14 Field Order: A written order issued by the Engineer which orders minor changes in the Work but which do not involve a change in the Contract Price or the Contract Time.

1.15 Notice of Award: The written notice of the acceptance of the bid from the Town to the successful Bidder.

1.16 Notice to Proceed: Written communication issued by the Town to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work, also referred to as the Effective Date of the Contract.

1.17 Town: The Town of Fairview, Texas with whom the Contractor has entered into the Contract and for whom the Work is to be provided.

1.18 Plans: The part of the Contract Documents which shows the locations, characteristics, dimensions, and details of the Work to be performed and which have been prepared or approved by the Engineer.

1.19 Project: The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.20 Proposal: The offer or proposal of the Bidder submitted on the prescribed form bound herein, setting forth the prices for the Work to be performed.

1.21 Resident Project Representative or Inspector: The authorized representative of the Engineer who is assigned to the site or any part thereof.

1.22 Samples: Physical examples which illustrate materials, equipment or workmanship, and establish standards by which the Work will be judged.

1.23 Shop Drawings: All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

1.24 Specifications: Those portions of the Contract Documents consisting of written technical descriptions of material, equipment, construction systems, standards and workmanship

as applied to the Work and certain administrative details applicable thereto, including these General Conditions and the Supplementary Conditions.

1.25 Subcontractor: An individual, firm or corporation having direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

1.26 Substantial Completion: The Work (or a specified part thereof has progressed to the point where, in the opinion of Engineer as evidenced by Engineer's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended.

1.27 Superintendent: The employee of the Contractor at the project site who shall have sole responsibility and authority for supervision of the Contractor's forces and construction operations.

1.28 Supplementary Conditions: The part of the Contract Documents which amends or supplements these General Conditions.

1.29 Supplier: A manufacturer, fabricator, supplier, distributor, materialman or vendor.

1.30 Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasement containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

1.31 Work: The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

2. TERMS:

2.1 Whenever in these Contract Documents the works "as ordered", "as directed", "as required", "as permitted", "as allowed", or words or phrases of like import are used, it shall be understood that the order, directions, requirement, permission or allowance of the Town and Engineer is intended.

2.2 Similarly the works "approved", "reasonable", "suitable" acceptable", "properly", "satisfactory", or words of like effect an import, unless otherwise particularly specified herein, shall mean approved, reasonable, suitable, acceptable, proper or satisfactory in the judgement of the Town and Engineer.

2.3 Whenever any statement is made in the Contract Documents containing the expression "it is understood and agreed", or an expression of like import, such expression means the mutual

understanding and agreement of the parties executing the Contract of which these General Conditions are a part.

3. ABBREVIATIONS:

When references are made to the following abbreviations, they refer to the specifications, standards, or methods of the respective national association. All references to the above specifications, standards, or methods shall, in each instance, be understood to refer to the latest issue in effect (including all amendments).

ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AI	The Asphalt Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute (Succeeding ASA)
APWA	American Public Works Association, Inc.
AREA	American Railway Engineering Association
ASSHTO	American Association of the State Highway and Transportation Officials
ASTM	American Society for Testing Materials
AWS	American Welding Society
AWWA	American Water Works Association, Inc.
CRSI	Concrete Reinforcing Steel Institute
FED SPEC	Federal Specifications
IA	American Institute of Architects
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NTMWD	North Texas Municipal Water District
OSHA	Occupational Safety and Health Act of 1970
PCA	Portland Cement Association
ROW	Right of Way
SSPC	Steel Structures Painting Council
SWPPP	Sormwater Pollution Prevention Plan
TxDOT	Texas Department of Transportation
UBC	Uniform Building Code
U/L	Underwriter's Laboratories, Inc.

4. VERBAL STATEMENTS NOT BINDING: It is understood and agreed that the written items and provisions of this Contract shall supersede all prior verbal statements of any and every official and/or other representative of the Town, and such statements shall not be effective or be construed as entering into, or forming part of, or altering in any way whatsoever, the written Contract.

5. INTENT OF CONTRACT DOCUMENTS: The intent of the Contract Documents is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all.

6. INTENT OF PLANS AND SPECIFICATIONS: Certain Plans prepared by the Engineer on behalf of the Town and elsewhere described and named accompany and supplement these Specifications and constitute a part of the Contract Documents. Such Plans are agreed to be constructively attached to these Specifications although convenience may prevent physical attachment.

6.1 Modifications or Additions to Plans: The Town shall have the right to modify minor details of these Plans, to provide final or checked plans in lieu of any preliminary or unchecked plans, to supplement these Plans with additional plans or with additional information as the work proceeds, all of which shall be considered as Plans accompanying these Specifications.

6.2 Organization of Specifications: The organization of the Specifications into divisions, sections, and articles, and the arrangement of Plans shall not control the Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.

7. PRECEDENCE OF CONTRACT DOCUMENTS: In case of conflict between the Contract Documents, the following order of precedence shall govern:

First:	Supplemental Agreements (Change Orders and Field Orders), the last in time being first in precedence
Second:	Contract
Third:	Notice to Contractors, Instructions to Bidders
Fourth:	Plans and Specifications, the order to precedence in these documents shall be Supplementary Conditions, General Conditions, Technical Specifications and Plans
Fifth:	Contractor Proposal

Figure dimensions of Plans shall govern over scale dimensions, and detailed drawings shall govern over general drawings. In all cases, where a conflict is cited, the Engineer shall be duly informed. The Engineer will notify the Contractor in writing should the above procedure be deviated from in any particular instance.

8. DISCREPANCIES, ERRORS, AND OMISSIONS: Any discrepancies, errors, omissions, or ambiguities found in the contract Documents shall be promptly reported to the Engineer. The Engineer shall clarify such discrepancies or omissions, in writing, within a reasonable amount of time. Work done by the Contractor after his discovery of such discrepancies, inconsistencies, or ambiguities shall be at his own risk in that subsequent corrective measures will be required.

9. REUSE OF DOCUMENTS: Neither the Contractor nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect

contract with the Town shall have or acquire any title to or ownership rights in any of the Plans, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of the Engineer; and they shall not reuse any of them on extensions of the Project or any other project without written consent of the Town.

10. PRECONSTRUCTION CONFERENCE: Before the Contractor starts work at the site, a conference attended by the Contractor, Engineer and others as appropriate will be held to discuss the procedures for handling Shop Drawings and other submittal and for processing Payment Estimates, and to establish a working understanding among the parties as to the Work.

11. SHOP DRAWINGS: Where called for in the Contract Documents, the Contractor shall submit to the Engineer for review, six (6) prints of each Shop Drawing. Shop Drawings shall be understood to include detail calculations, reinforcement bar bending diagrams, fabrication, erection and installation drawings, parts lists, graphs, wiring diagrams, operating instructions, etc. Drawings shall be submitted in sufficient time to allow the Engineer not less than ten (10) working days for review of such drawings, and to accommodate the rate of construction progress required under the Contract.

The review of Shop Drawings by the Engineer will be limited to checking for general agreement with the Contract Documents, and shall in no way relieve the Contractor of responsibility for errors or omissions contained in the Contract Documents. Fabricating dimensions, quantities of material, applicable code requirements, and other Contract requirements shall be the Contractor's responsibility. When the Shop Drawings have been reviewed by the Engineer, four (4) sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the Shop Drawings may be rejected and one (1) set will be returned to the Contractor with the required changes or corrections indicated, and the Contractor shall promptly make the required changes or corrections. The Contractor shall make a complete and acceptable second submittal to the Engineer. Revisions to the Shop Drawings shall be limited to changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work. The Contractor shall have no claims for extra work. The Contractor shall have no claims for damages or extension of time due to any delay resulting from the
Contractor's having to make the required revisions.

Portions of the Work requiring a Shop Drawing or sample submission shall not begin until the Shop Drawing or sample has been reviewed.

13. WORK DONE WITHOUT LINES OR GRADES: Any work done without being properly located and work established by base lines, offset stakes, bench marks, or other basic reference points not located, established, or checked by the Engineer, may be ordered removed and replaced at the Contractor's cost and expense.

14. PRESERVATION OF MONUMENTS AND STAKES: The Contractor shall carefully preserve all monuments, bench marks, reference points and stakes, and in case of willful or careless destruction of the same will be charged with the resulting expense of replacement, and shall be responsible for any mistake or loss of time that may be caused by their unnecessary loss

or disturbance. In the event that the stakes and marks placed by the Engineer are destroyed through carelessness on the part of the Contractor, and that the destruction of those stakes and marks cause a delay in the Work, the Contractor shall have no claim for damages or extensions of time. In the case of any permanent monuments or bench marks which must of necessity be removed or disturbed in the construction of the Work, the Contractor shall carefully protect and preserve the same until they can be properly referenced for relocation. The Contractor shall furnish at his own expense such materials and assistance as are necessary for the proper replacement of monuments or bench marks that have been removed or destroyed.

15. UNDERGROUND FACILITIES:

15.1 Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on the information and data furnished to the Town by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

(a) The Town shall not be responsible for the accuracy or completeness of any such information or data; and,

(b) The Contractor shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price. This shall include any utilities owned by the Town.

15.2 Not Shown or Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which the Contractor could not reasonably have been expected to be aware of, the Contractor shall, promptly after becoming aware thereof and before performing any work affected thereby (except in an emergency) identify the owner of such Underground Facility and give written notice thereof to that owner and to the Engineer. The Engineer will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, the Contractor shall be responsible for the safety and protection of such Underground Facility. The Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and of which the Contractor could not reasonably have been expected to be aware. If the parties are unable to agree as to the amount of length thereof, the Contractor may make a claim therefor.

16. TOWN'S RESPONSIBILITIES:

16.1 Communications: The Town shall issue all communications to the Contractor through the Engineer.

16.2 Information and Payments: The Town shall promptly furnish the data required of the Town under the Contract Documents and shall make payments to the Contractor promptly after they are due.

16.3 Land and Rights-of-Way: Prior to issuance of Notice to Proceed, the Town will obtain all land and rights-of-way necessary for carrying out and for the completion of the work to be performed pursuant to the Contract Documents, unless otherwise mutually agreed. Nothing contained in the Plans or Specifications shall be interpreted as giving the Contractor exclusive occupancy of the land or rights-of-way provided. Land owned and rights-of-way acquired by the Town are as shown on the Plans.

16.4 Encroachments: The Town will secure, from the agencies having jurisdiction, the necessary permits to create obstructions, to make excavations if required under the Contract, and to otherwise encroach upon rights-of-way.

16.5 Town's Right to Retain Imperfect Work: If any part or portion of the Work done or material furnished under this contract shall prove defective and not in accordance with the Contract Documents, and if the imperfection in the same, in the opinion of the Engineer, shall not be of sufficient magnitude or importances to make the Work dangerous or undesirable, the Town shall have the right and authority to retain such Work but shall make such deductions in the final payment therefor as may be just and reasonable.

16.6 Temporary Suspension of Work: The Town may suspend the Work or any portion thereof by written notice to the Contractor for a period of not more than sixty (60) days or such further time as agreed upon by the Contractor due to financing delays, unsuitable weather and/or other unfavorable conditions for prosecution of the Work, delay in delivery of Town-furnished equipment or materials, or failure of the Contractor to carry out provisions of the Contract or to provide materials and workmanship meeting the requirements of the Specifications. Suspended work shall be resumed by the Contractor within ten (10) days of receipt of written notice from the Town to resume the Work.

16.6.1 The Contractor shall have no claim for damages alleged to have been suffered by reason of any suspension of the Work without termination of the Contract, and he shall receive no additional compensation because of any such suspension.

16.6.2 If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of a failure of the Town to act within the time specified above, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Town to notify the Contractor to resume Work.

16.7 Termination of Contract (Contractor Not at Fault) : The Town may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate

the Contract provided that such termination is in the best interest of the Town. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which termination becomes effective.

16.8 Termination of Contract (Contractor at Fault): The Town may, without prejudice to any other right or remedy, terminate the Contract after ten (10) days from delivery of a written notice to the Contractor and his surety in the event of breach of the Contract or of any default by the Contractor. It shall be considered a default by the Contractor whenever he shall:

(a) declare bankruptcy, become insolvent, or assign his assets for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws;

(b) repeatedly fail to provide a qualified superintendent, sufficient skilled workmen, suitable materials or equipment;

(c) repeatedly fail to make prompt payments to Subcontractors or for labor, materials, or equipment delivered;

(d) disregard laws, ordinances rules, regulations, or orders of any public body having jurisdiction over the Work or if he disregards the authority of the Engineer;

(e) violates any important provisions of the Contract Documents; or

(f) repeatedly fail to prosecute work according to the approved progress schedule.

16.8.1 In the event the Contract is terminated due to defaults described above, the Town may take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the Work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished.

16.8.2 If the unpaid balance of the Contract Price exceeds the direct and indirect cost of completing the Project, including compensation for additional professional services, such excess will be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Town. Such costs incurred by the Town will be determined by the Engineer and incorporated in a Change Order.

16.8.3 Where the Contractor's services have been so terminated by the Town, said termination shall not affect any right of the Town against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Town due to the Contractor will not release the Contractor from compliance with the Contract Documents.

17. ENGINEER'S AUTHORITY: The Engineer will be the Town's representative during the construction period. The duties and responsibilities and the limitations of authority of the Engineer as the Town's representative during construction are set forth herein and shall not be extended without written consent of the Town Council.

17.1 Project Representation: The Town, at its option, may furnish a Resident Project Representative and Inspector to assist the Engineer in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and Inspectors will be as provided in the Supplementary Conditions.

17.2 Clarifications and Interpretations: The Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) as the Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If the Contractor believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, the Contractor may make a claim therefor.

17.3 Authorized Variations in Work: The Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on the Town, and also on the Contractor who shall perform the Work involved promptly. If the Contractor believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, the Contractor may make a claim therefor.

17.4 Rejecting Defective Work: The Engineer will have authority to disapprove or reject Work which the Engineer believes to be defective, and will also have the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed or completed.

17.5 Determinations for Payment: The Engineer will determine the actual quantities and classifications of Work performed by the Contractor. The Engineer will review with the Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of a Payment Estimate or otherwise). The Engineer's written decisions thereon will be final and binding upon the Town and Contractor, unless, within ten (10) days after the date of any such decision, the Contractor delivers to the Town written notice of intention to appeal from such a decision. The Engineer will not be responsible for the Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and program incident hereto, and the Engineer will not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents. The Engineer will not be responsible for the acts or omissions of the Contractor, of any Subcontractor, of any Supplier, or of any other person or organization performing or furnishing any of the Work.

18. CONTRACTOR'S RESPONSIBILITY: By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

18.1 Insurance Requirements: Before any work at the site is started, the Contractor shall deliver to the Town certificates of insurance which the Contractor is required to purchase and maintain in accordance with the Contract Documents.

18.2 Supervision: The contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of Construction, but the Contractor shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. The Contractor shall be responsible to see that the finished Work complies accurately with the Contract Documents.

18.3 Superintendence of Work: The Contractor shall provide and maintain, continually on the site of the Work during its progress, adequate and competent superintendence of all operations for and in connection with the Work being performed under this Contract, either personal or by a duly authorized superintendent or representative.

18.3.1 The superintendent or other representative of the Contractor on the Work, and who has charge thereof, shall be fully authorized to act for the Contractor and to receive whatever orders as may be given by the Engineer for the proper prosecution of the Work, or notices in connection therewith.

18.3.2 The superintendent shall be a person having considerable experience on similar projects. The Contractor shall submit the name of the proposed superintendent to the Town together with a list of projects on which the proposed individual has served as superintendent. Such list shall detail the size and complexity of projects and shall include references for each engagement. The Engineer shall review the submitted qualifications. No person shall serve as superintendent without approval of the Town.

18.4 Labor, Materials and Equipment: The Contractor shall provide competent, suitably qualified personnel to lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site. 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 in the Contract Documents, all Work at the site shall be performed during regular working hours, and the Contractor will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without the Town's prior written consent.

18.4.1 The Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

18.4.2 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by the Engineer, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to the Engineer, or any of the Town's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work.

18.5 Sunday, Holiday and Night Work: Except in connection with the care, maintenance or protection of equipment, or of work already done, no work shall be done between the hours of 7 P.M. and 7 A.M., or on Sundays or legal holidays, without the written consent of the Town.

18.6 Prosecution and Progress: The Contractor shall, within ten (10) days after being instructed to do so in a written notice from the Town, commence the Work to be done under this Contract; and the rate of progress shall be such that the Work shall have been completed in accordance with the terms of the Contract on or before the termination of the Contract Time stated in the Proposal, subject to any extension or extensions of such time made as hereinafter provided.

18.6.1 Promptly after the award of the Contract, the Contractor shall submit to the Engineer for approval an estimated progress schedule and a written program of construction outlining the proposed operations and the order of completion of the various parts in sufficient detail to demonstrate to the Engineer the adequacy of the progress to complete the construction within the time provided. No payment shall be made to the Contractor on any Payment Estimate until such progress schedule and program have been submitted and approved.

18.6.2 Should it become evident at any time during construction that construction operations will or may fall behind the schedule of this first program of construction the Contractor shall, upon request, promptly submit revised written schedules setting out operations, methods and equipment, added amount labor, or of working shifts, night work, etc., by which lost time shall be made up and shall confer with the Engineer until an approved modification of the original program and schedule have been provided by the Contractor. Execution of the Work according to the accepted program of construction, or approved modifications thereof, shall be an obligation of the Contract.

18.6.3 Should the Contractor fail to complete the Work within the Contract Time as stipulated in the Proposal or within such extra time as may have been allowed by extension, the Town will deduct from any moneys due or coming due to the Contractor, the amount indicated in the Proposal for each calendar day the Work shall remain uncompleted. This sum shall be

considered and treated not as a penalty but as fixed, agreed and liquidated damages due the Town from the Contractor by reason of interference with business, inconvenience to the public, added cost of engineering, administration, inspection, maintenance of detours and temporary facilities, and other items which have caused an expenditure of funds resulting from his failure to complete the Work within the Contract Time.

18.6.4 Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Town of any of its rights under the Contract.

18.6.5 Neither by the act of taking over the Work nor by the annulment of the Contract nor by requiring the surety to complete the Contract shall the Town forfeit the right to recover liquidated damages from the Contractor or his surety for failure to complete the Contract within the specified Contract Time.

18.7 Extensions of Time: The Contractor shall place orders for all principal materials to be needed in the Work within ten (10) days after award of the Contract and delivery dates shall be obtained, in writing, from the suppliers of each of these materials. One copy of each order for the primary materials in the Contract together with one copy of the suppliers reply stating the date of delivery shall be furnished to the Engineer prior to the payment of the first partial monthly Payment Estimate. Payment of partial monthly Payment Estimates shall not be commenced until these provisions have been complied with to the full satisfaction of the Engineer.

18.7.1 Should special conditions arise from war, strikes or other national emergencies wherein restrictions may prevent or delay the acquirement, delivery or use of materials and be the direct cause of specific delays, extensions of time will be granted. In such event, the Contractor shall file with the Engineer, copies of documentary evidence to substantiate the causes and extent of resultant delays at the time they are in occurrence. This evidence together with the original orders and written delivery dates will be used by the Engineer to determine the amount of extension of time to be made on account of such delays. In determining extensions of time, revised delivery dates for primary materials will be computed by extending the original Contract Time by the actual number of days which elapses during any emergency.

18.7.2 The Contractor is requested to bring to the attention of the Engineer, by letter, during the progress of the Work, the occurrence of events which the Contractor considers may warrant extensions of time under the conditions of the Contract. If the Contract is not completed within the Contract Time, the Contractor shall, at the conclusion of the Work, present to the Engineer a written statement presenting his view upon all matters of time extensions.

18.7.3 The amount of all extensions of time, for whatever reason granted, shall be determined by the Engineer with due consideration given to working seasons and working conditions.

In general, only actual and not constructive or hypothetical days of delay will be considered. The Town shall have the authority to grant additional extensions of time as the Town may deem advisable and justifiable.

18.8 Substitutes or "Or-Equal" Items: Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by the Engineer to determine that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and equipment will not be accepted by the Contractor. If the Contractor wishes to furnish or use a substitute item of material or equipment, the Contractor shall make written application to the Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not be prejudice the Contractor's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the Town for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Engineer in evaluating the proposed substitute. The Engineer may require the Contractor to furnish, at the Contractor's expense, additional data about the proposed substitute.

18.8.1 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Engineer, if the Contractor submits sufficient information to allow the Engineer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents.

18.8.2 The Engineer will be allowed a reasonable time within which to evaluate each proposed substitute. The Engineer will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Engineer's prior written acceptance, which will be evidenced by a Change Order or an approved Shop Drawing. The Town may require the Contractor to furnish , at the Contractor's expense, a special performance guarantee or other surety with respect to any substitute.

18.9 Subcontractors and Suppliers: The Contractor shall not employ any Subcontractor, Supplier or other person or organization, whether initially or as a substitute, against whom the Town may have reasonable objection. The Contractor shall not be required to employ any

Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom the Contractor has reasonable objection.

18.9.1 If the Supplementary Conditions require and identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to the Town for acceptance by the Town and if the Contractor has submitted a list thereof in accordance with the Supplementary Conditions, the Town's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case the Contractor shall submit an acceptable substitute. The Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued. No acceptance by the Town of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of the Town to reject defective Work.

18.9.2 The Contractor shall be fully responsible to the Town for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with the Contractor just as the Contractor is responsible for the Contractor's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between the Town and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the Town to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

18.9.3 The division and sections of the Specifications and the identifications of any Plans shall not control the Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

18.9.4 All Work performed for the Contractor by a Subcontractor will be pursuant to an appropriate agreement between the Contractor and the Subcontractor, which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the Town. The Contractor shall pay each Subcontractor a just share of any insurance money received by the Contractor on account of losses under policies issued.

18.10 Patent Fees and Royalties: The Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and, if to the actual knowledge of the Town its use in subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the Town in the Contract Documents. The Contractor shall indemnify and hold harmless the Town and anyone directly or indirectly employed by the Town from and against all claims, damages, losses and expenses (including attorney's fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or

resulting from the incorporation in the Work of any invention, design, process, produce or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

18.11 Permits: Unless otherwise provided in the Supplementary Conditions, the Contractor shall obtain and pay for all construction permits and licenses. The Town shall assist the Contractor, when necessary, in obtaining such permits and licenses. The Contractor shall pay all charges of utility owners for connections to the Work, and the Town shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

18.12 Laws and Regulations: The Contractor shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, the Town shall not be responsible for monitoring the Contractor's compliance with any Laws or regulations. If the Contractor observes that the Plans and Specifications are at variance with any Laws or Regulations, the Contractor shall give the Engineer prompt written notice thereof, and any necessary changes will be authorized. If the Contractor performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to the Engineer, the Contractor shall bear all costs arising therefrom; however, it shall not be the Contractor's primary responsibility to make certain that the Plans and Specifications are in accordance with such Laws and Regulations.

18.13 Use of Premises: The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas Contiguous thereto, resulting from the performance of the Work. Should any claim be made against the Town by any such owner or occupant because of the performance of the Work, the Contractor shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or by law. The Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold the Town harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against the Town to the extent based on a claim arising out of the Contractor's performance of the Work.

18.13.1 Where the space within the project site, right-of-way or easements is not available for construction plant, the Contractor shall provide at his own expense any work area he requires, shall construct and maintain any roadway or other facilities required for this purpose and the cost thereof shall be included in the prices bid for the various items scheduled in the Proposal.

18.13.2 During the progress of the Work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. at the completion of the Work, the Contractor shall remove all waste materials, rubbish and debris from

and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by the Town. The Contractor shall restore to original condition all property not designated for alteration by the Contract Documents.

18.13.3 The Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

18.14 Record Documents: The Contractor shall maintain in a safe place at the site one record copy of all Plans, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications in good order annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to the Engineer for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to the Town.

18.15 Safety and Protection: The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

18.15.1 The Contractor shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in these paragraphs caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and the Engineer has issued a notice to the Contractor that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

18.15.2 The Contractor shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Town.

18.16 Emergencies: In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Engineer prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Engineer determines that a change in the Contract Documents is required because

of the action taken in response to an emergency, a Change Order will be issued to document the consequences of the changes or variations.

18.17 Loses From Natural Causes: All loss or damage arising out of the nature of the Work, to be done, or from the action of the elements, or from floods or overflows, or from groundwater, or from any unusual obstruction or difficulty, or any other natural or existing circumstances either known or unforeseen, which may be encountered in the prosecution of the Work shall be sustained and borne by the Contractor at his own cost and expense.

18.18 Continuing the Work: The Contractor shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the Town. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the Contractor and Town may otherwise agree in writing.

18.19 Indemnification: To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Town and its consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expenses:

(a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and

(b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

18.19.1 In any and all claims against the Town or any of its consultants, agents or employees by any employee of the Contractor, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or any such Subcontractor or other person or organization under workers or workmen's compensation or benefits payable by or for the contractor or any such Subcontractor or other person or organization under workers or workmen's compensation acts, disability benefit acts or other employee benefit acts.

18.20 Contractor's Responsibility in Case of Termination: After receipt of a Notice of Termination, and except as otherwise directed by the Town, the Contractor shall:

(a) stop work under the Contract on the date and to the extent specified in the Notice of Termination,

(b) place no further orders or subcontractors for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract that is not terminated;

(c) terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the Notice of Termination;

(d) assign to the Town, in the manner, at the times, and to the extent directed by the Town, all of the right, title, and interest of the Contractor under the orders and subcontracts;

(e) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Town, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

(f) transfer title and deliver to the Town, in the manner, at the times, and to the extent, if any, directed by the Town, the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a performance of, and the work terminated by the Notice of Termination; and the completed or partially completed plans, drawings information, and other property which, if the Contract had been completed, would have been required to be furnished to the Town.

(g) complete performance of such part of the Work as shall not have been terminated by the Notice of Termination; and

(h) take such actions as may be necessary, or as the Town may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Town has or may acquire an interest.

18.20.1 After receipt of a Notice of Termination, the Contractor shall submit to the Town his termination claim, in the form and with certification prescribed by the Town. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless extensions in writing are granted by the Town, upon request of the Contractor made in writing within such one year period or authorized extension thereof. However, if the Town determines that the facts justify such actions, he may receive and act upon any such termination claim at any time after such one year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed the Town may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

18.20.2 Upon termination of the Contract, the Contractor shall have no claims against the Town except for:

(a) the value of work performed plus profit up to the date the Contract is terminated; and

(b) the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Contract is terminated, which would be needed in the Work and which meets the requirements of the Contract Documents.

18.20.3 The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined in accordance with the procedure prescribed for the making of the final estimate and payment.

19. OTHER WORK: The Town may perform other work related to the Project at the site by the Town's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the Contractor prior to starting any such other work; and, if the Contractor believes that such performance will involve additional expense to the Contractor or requires additional time and the parties are unable to agree as to the extent thereof, the Contractor may make a claim therefor.

19.1 The Contractor shall afford each utility owner and other contractor who is a party to such a direct contract (or the Town, if the Town is performing the additional work with the Town's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. The Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. The Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Engineer and the others whose work will be affected. The duties and responsibilities of the Contractor under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of the Contractor in said direct contracts between the Town and such utility owners and other contractors.

19.2 If any part of the Contractor's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or the Town), the Contractor shall inspect and promptly report to the Engineer, in writing, any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. The Contractor's failure to report will constitute and acceptance of the other work as fit and proper for integration with the Contractor's Work except for latent or nonapparent defects or deficiencies in the other work.

19.3 Coordination: If the Town contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of he activities among the various prime contractors will be identified in the

Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions. unless otherwise provided in the Supplementary Conditions, the Town shall have no authority or responsibility in respect of such coordination.

20. MISCELLANEOUS PROVISIONS:

20.1 Legal Address: The business address of the Contractor given in the Proposal upon which this Contract is founded is hereby designated as the place to which all notices, letters and other communications to the Contractor may be mailed or delivered. The business address of the Town appearing in the Contract, is hereby designated as the place to which all notices, letters and other communications to the Town may be mailed or delivered. The delivery by one party to the other party at an address so designated, or the depositing in any mailbox regularly maintained by the post office, of any notice, letter or other communication addressed to such address, postage prepaid, registered or certified mail, with return receipt requested, shall be deemed sufficient service thereof, and the date of said service shall be the date of such delivery of mailing. Either party may change the said address or addresses at any time by an instrument in writing delivered to the other party. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter or communication upon either party personally.

20.2 Independent Contractor: The right of general supervision by the Town shall not make the Contractor an agent of the Town, and the liability of the Contractor for all damages to persons, firms and corporations, arising from the Contractor's execution of the work, shall not be lessened because of such general supervision; but as to all such persons, firms and corporations and the damages, if any, to them or their property, the contractor herein is an independent contractor in respect to the Work.

20.3 Suggestions to Contractor Adopted at his Own Risk: Any plan or method of work suggested by the Town, the Engineer, or their representatives, to the Contractor, but not specified, or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor, and the Town will assume no responsibility therefor.

20.4 Hindrances and Delays: In executing the Contract, the Contractor expressly covenants and agrees that, in undertaking to complete the Work within the time therein fixed, he has taken into consideration and made allowances for all hindrances and delays incident to such work, whether growing out of delays in securing materials or workmen or otherwise. No charge shall be made by the Contractor for hindrances or delays from any cause during the progress of the work, or any portion thereof, embraced in this Contract, except as provided by the Town's right to suspend the Work.

20.5 Provision for Emergencies: Whenever, in the opinion of the Engineer, the Contractor has not taken sufficient precaution for the safety of the public or the protection of the Work to be constructed under this Contract or of adjacent structures or property which may be injured by processes of construction on account of such neglect, and whenever, in the opinion of

the Engineer, an emergency shall arise and immediate action shall be considered necessary in order to protect public or private personal property interests, then the Engineer, with or without notice to the Contractor, may provide (but does not have the duty to do so) suitable protection to the said interests by causing such work to be done and material to be furnished and placed as the Engineer may consider necessary and adequate. The cost and expense of such work and material so furnished shall be borne by the Contractor, and , if the same shall not be paid on presentation of the bills therefor, such costs shall be deducted from any amounts due or to become due the Contractor. The performance of such emergency work under the direction of the Engineer shall in no way relieve the Contractor of responsibility for damages which may occur during or after such precaution has been duly taken by the Engineer.

20.6 Assignment of Contract: The Contractor shall not assign the work, or any part thereof, without the previous written consent of the Town, nor shall he assign, by power of attorney or otherwise, any of the money payable under this Contract unless by and with the like consent of the Town to be signified in like manner. No right under this Contract, nor to any money due or to become due hereunder, shall be asserted in any manner against said Town, or persons acting for the Town, by reason of any so-called assignment of this Contract or any part thereof, unless such assignment shall have been authorized by the written consent of the Town. In case the Contractor assigns all, or any part of, any moneys due or to become due under this Contract, the instrument of assignment shall contain a right of the assignee in and to any moneys due or to become due or to become due under this Contract, the instrument of assignment shall contain a right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all prior liens of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

20.7 Protests: If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or if he considers any order, instruction, or decision of the Engineer or of any Inspector to be unfair, he shall, immediately upon receipt of such order, instruction, or decision, ask for a written confirmation of the same, whereupon he shall proceed without delay to perform the Work or to conform to the order, instruction, or decision; but if the Contractor finds such written order, instruction, or decision unsatisfactory, he shall, within ten (10) calendar days after receipt of same, file a written protest with the Town, stating clearly and in detail his objections and the reasons therefor. Except for such protests or objections to the orders, instructions, or decisions of the Engineer and hereby agrees that as to all matters not included in such protest, the orders, instructions, and decisions of the Engineer shall be considered final and binding. All orders, instructions, and decisions of the Engineer will be limited to matters properly falling within the Engineer's authority.

20.8 Arbitration; All claims, disputes, or other questions that may arise between the Town and the Contractor concerning any provision or provisions of this Contract which cannot otherwise be settled and which have not been waived by the making and acceptance of final payment or any progress payment may be submitted to and be determined and settled by arbitration in the manner set forth in this paragraph if both parties agree to arbitration prior to entering into arbitration. Either party, by written notice to the other received before litigation is commenced, may demand arbitration and may appoint an arbitrator. If litigation has been commenced prior to receipt of a demand to arbitrate, arbitration shall not be held. Within five

(5) days after receipt of such notice, the other party shall, by written notice to the former, appoint another arbitrator, and in default of said second appointment, the arbitrator first appointed shall be sole arbitrator and shall proceed in the same manner as hereinafter provided for three (3) arbitrators. When two (2) arbitrators have been appointed as aforesaid, they shall, if possible, agree upon a third arbitrator and shall appoint him by notice in writing, signed by both of them given to the Town and the Contractor. If fifteen (15) days shall elapse after the appointment of the second arbitrator without notice of appointment of the third arbitrator being given as aforesaid, then either party may, in writing, request that the American Arbitration Association appoint the third arbitrator. Upon appointment of the third arbitrator, the three (3) arbitrators shall meet without delay and shall proceed with determination of the dispute in accordance with the Construction Industry Rules of the American Arbitration Association. If the award sustains the position of the contractor or if the award does not sustain the position of either party, the fees and expenses of the arbitration proceedings shall be assessed equally against both parties and shall be paid one-half by the Town and one-half by the Contractor. The decision of the arbitrators shall be final. The Contractor shall carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed upon in writing.

21. BONDS AND INSURANCE

21.1 Insurance: The Contractor shall secure, and maintain throughout the duration of this Contract, insurance of such types and in such amounts as may be necessary to protect himself against all hazards or risks of loss as hereinafter designated and specified. The form and limits of such insurance, together with the underwriter thereof in each case, shall be the responsibility of the Contractor to maintain such coverage shall not relieve him of any contractual responsibility or obligation. If a part of the Contract is to be sublet, the Contractor shall:

(a) Cover any and all Subcontractors in his insurance policies, or

(b) Require each Subcontractor not so covered to secure insurance which will protect said Subcontractor against all applicable hazards or risks or loss designated herein.

21.2.1 Workmen's Compensation and Employer's Liability Insurance: This insurance shall protect the Contractor against any and all claims brought under the Workmen's Compensation law for the State of Texas. It shall also protect the Contractor against claims for injury to, disease or death of workmen engaged in the Work under this Contract which, for any reason, may not fall within the provisions of the Workmen's Compensation Act. Liability limits for this insurance on this Project shall be as specified in the SECTION: SUPPLEMENTARY CONDITIONS.

21.2.3 Comprehensive General Liability Insurance: This insurance, to be on the comprehensive form, shall protect the Contractor against any and all claims arising from injuries to members of the public or damage to property or others arising out of any act or omission of the Contractor, his agents, employees, or subcontractors, in connection with the operation or performance of the Work for and in connections with this Contract.

In addition, this general liability insurance policy shall specifically insure the contractual liability of the Contractor assumed under the provisions for indemnifying the Town.

21.2.4 Bodily Injury and Property Damage Insurance: The property damage liability coverage under the comprehensive general liability policy shall contain no exclusion relative to blasting, explosion, collapse of buildings, or damage to underground property. Liability limits for general liability insurance coverage under this policy on this Project shall be as specified in SECTION: SUPPLEMENTARY CONDITIONS.

21.2.5 Comprehensive Automobile Liability Insurance: This insurance, to be on the comprehensive form, shall protect the Contractor against any and all claims or injuries to members of the public and damage to property of others arising from the use of automobiles and trucks in connection with the performance of the Work under this Contract, and shall cover operation on or off the site of the Work of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired by the Contractor. The policy shall include an "all states" endorsement. Liability limits for automobile liability insurance coverage on this Project shall be as specified in the SECTION: SUPPLEMENTARY CONDITIONS.

21.2.6 Property Insurance: The Contractor shall effect and maintain Builder's Risk Insurance to the full insurable value of the Work, with extended coverage for fire, vandalism, hail, wind, storm, etc., naming the Town as co-insured. The Contractor shall provide insurance certificates to the Town attesting to the coverage. insurance shall not be modified or cancelled without written notification to the Town of such change or cancellation at least fifteen (15) days in advance of such change or cancellation.

22. TESTS AND INSPECTIONS; DEFECTIVE WORK:

22.1 Warranty and Guarantee: The Contractor warrants and guarantees to the Town that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the Contractor. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.

22.2 Access to Work: The Engineer or other representatives of the Town, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. The Contractor shall provide proper and safe conditions for such access.

22.3 Tests and Inspections: The Contractor shall give the Engineer timely notice of readiness of the Work for all required inspections, tests or approvals. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, the Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish the Engineer the required certificates of inspection, testing or approval, the Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the Town's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for

approval prior to the Contractor's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by the Town (unless otherwise specified).

22.3.1 All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the Town.

22.3.2 If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of the Engineer, it must, if requested by the Engineer, be uncovered for observation. Such uncovering shall be at the Contractor's expense unless the Contractor has given the Engineer timely notice of the Contractor's intention to cover the same, and the Engineer has not acted with reasonable promptness in response to such notice.

22.3.3 Neither observations by the Engineer nor inspections, tests or approvals by others shall relieve the Contractor form the Contractor's obligations to perform the Work in accordance with the Contract Documents.

22.4 Uncovering Work: If any portion of the Work is covered contrary to the written request of the Engineer, it must, if requested by the Engineer, be covered for the Engineer's observation and replaced at the Contractor's expense. if the Engineer considers it necessary or advisable that covered Work not contrary to Engineer's request or previously approved must be observed by the Engineer or inspected or tested by others, the Contractor, at the Engineer's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, the Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals), and the Town shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, they may make a claim therefor. If, however, such Work is not found to be defective, the Contractor shall be allowed and increase in the Contract price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the Contractor may make a claim therefor.

22.5 Town May Stop the Work: If the Work is defective, or the Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Town to stop the Work shall not give rise to any duty on the part of the Town to exercise this right for the benefit of the Contractor or any other party.

22.6 Correction or Removal of Defective Work: If required by the Engineer, the Contractor shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by the Engineer, remove it from the site and replace it with nondefective Work. The Contractor shall bear all direct, indirect and

consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

22.7 One Year Correction Period: If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, the Contractor shall promptly, without cost to the Town and in accordance with the Town's written instructions, either correct such defective Work, or, if it has been rejected by the Town, remove it from the site and replace it with nondefective Work. If the Contractor does not promptly comply with the terms of such instructions, or in any emergency where delay could cause serious risk of loss or damage, the Town may have the defective Work (such costs to include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to the Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the Town shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the Town may make a claim therefor. If the acceptance occurs after such recommendation, an appropriate amount will be paid by the Contractor to the Town.

22.9 Town May Correct Defective Work: If the contractor fails within a reasonable time, after written notice of the Engineer, to correct defective Work or to remove and replace rejected Work as required by the Engineer, or if the Contractor fails to perform the Work in accordance with the Contract Documents, or if the Contractor fails to comply with any other provisions of the Contract Documents, the Town may, after seven (7) days written notice to the Contractor, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph, the Town shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the Town may exclude the Contractor from all or part of the site, take possession of all or part of the Work, and suspend the Contractor's services related thereto, take possession of the 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 the Town has paid the Contractor but which are stored elsewhere. The Contractor shall allow the Town, the Town's representatives, agents and employees such access to the site as may be necessary to enable the Town to exercise the rights and remedies under this paragraph. All direct, indirect and consequential cost to the Town in exercising such rights and remedies will be charged against the Contractor in an amount determined by the engineer, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the Town shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the Town may make a claim therefor. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the Town of the Town's rights and remedies hereunder.

23. CHANGES IN THE WORK:

23.1 Modifications and Alterations: The Contractor agrees that the Town shall have the right to make modifications, changes and alterations in the arrangement or extent of the work, without affecting the validity of the Contract and the Bonds thereunder.

23.1.1 If the modification or alteration increases the amount of work to be done, and the added work or any part thereof is of a type and character which can be properly and fairly classified under one or more unit price items of the Proposal, then such added work or part thereof shall be paid for according to the amount actually done and at the applicable unit price or prices therefor. Otherwise, such work shall be paid for as herein provided under "Extra Work".

23.1.2 If the modification or alteration decreases the amount of work to be done, such decrease shall not constitute the basis for a claim for damages or anticipated profits on work affected by such decrease. Where the value of omitted work is not covered by applicable unit prices, the Engineer shall determine, on an equitable basis, the amount of :

(a) credit due the Town for contract work not done as a result of an authorized change;

(b) allowance to the Contractor for any actual loss incurred in connection with the purchase, delivery and subsequent disposal of materials or equipment required for use on the Work as planned and which could not be used in any part of the work as actually built; and

(c) any other adjustment of the contract Price where the method to be used in making such adjustment is not clearly defined in the Contract Documents.

23.1.3 Except for minor changes or adjustments which involve no adjustment in the Contract Price or other monetary consideration, and with the exception of adjustments of estimated quantities for unit price work or materials to conform to actual pay quantities therefor as hereinafter provided under "Estimated Quantities", all changes and alterations in the terms or scope of the Contract shall be made under the authority of duly executed Change Orders issued and signed by the Town and accepted and signed by the contractor.

23.2 Extra Work: The term "Extra Work", as used in this Contract, shall be understood to mean and include all work that may be required by the Town to be done by the Contractor to accomplish any change or alteration in or addition to the Work shown by the Plans or reasonably implied by the Specifications and not covered by items, and which is not otherwise provided under "Modifications and Alterations".

23.2.1 It is agreed that the Contractor shall perform all extra work under the direction of the Engineer when and as so ordered in writing by the Town. It is further agreed that the compensation to be paid the Contractor for performing extra work shall be determined by one or more of the following methods:

Method A: By agreed unit prices; or

Method B: By agreed lump sum; or

Method C: If neither Method A nor Method B can be agreed upon before the extra work is started, the Contractor shall be paid his actual field cost of the work plus fifteen percent (15%) for the work which he performs with his own forces and/or the Contractor shall be paid the subcontractor's actual field cost of the work plus twenty percent (20%) for work which is performed by his subcontractor or subcontractors.

23.2.2 Where extra work is performed under Method C, the actual field cost of such extra work is hereby defined to be and shall include:

(a) the payroll cost for all workmen, such as foremen, mechanics, craftsmen, laborers;

(b) the cost of all materials and supplies not furnished by the Town;

(c) rental for all power-driven equipment at agreed-upon rates for the time actually employed or used in the performance of extra work;

(d) transportation charges necessarily incurred in connection with any equipment authorized by the Engineer for use on said extra work and which is not already on the job;

(e) all power, fuel, lubricants, water, and similar operating expenses;

(f) all incidental expenses incurred as a direct result of such extra work, including sales or use taxes on materials, payroll taxes, and the additional premiums for construction bonds, workmen's compensation, public liability and property damages, and other insurance required by the Contract where the premiums therefor are based on payroll and materials costs.

23.2.3 The Engineer may direct the form in which the actual field cost shall be kept, and may also specify in writing before the work commences, the method of doing the work and the type and kind of machinery and equipment, if required, which shall be used in the performance of extra work under Method C. If machinery or heavy construction equipment is required for extra work, the authorization and basis for the use thereof shall be stipulated in the written extra work order. The applicable "plus" percentage (15% or 20%) of the actual field cost to be allowed and paid to the Contractor shall constitute full compensation for profit, overhead, superintendence, field office expense, and all other elements of cost not embraced within the actual field cost as herein defined.

23.2.4 No claim for extra work of any kind will be allowed unless ordered in writing by the Town prior to commencement of said extra work. In case any orders or instructions, either oral

or written, appear to the Contractor to involve extra work for which he should receive compensation, he shall make a written request to the Town for a written order authorizing such extra work. Should a difference of opinion arise as to what does or does not constitute extra work, or concerning the payment thereof, and the Engineer insists on its performance, the Contractor shall proceed with the Work after making a written request for a written extra work order and shall keep an accurate account of the actual field cost thereof as provided for Method C in the foregoing paragraph.

23.3 Extra Work a Part of Contract: If extra work is performed in accordance with the provisions of this Contract, such extra work shall be considered a part hereof and subject to each and all terms and conditions of said Contract.

24. PAYMENTS TO CONTRACTOR AND COMPLETION:

24.1 Estimated Quantities: Any and all estimated quantities stipulated in the Proposal under unit price items are approximate and are to be used only:

(a) as a basis for estimating the probable cost of the Work, and

(b) for the purpose of comparing the proposals submitted for the Work.

It is understood and agreed that the actual amounts of work done and materials furnished under unit price items may differ from such estimated quantities and that the basis of payment for such work and materials shall be the actual amount of work done and materials furnished in each case. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the amounts estimated therefor in the Proposal or other Contract Documents.

24.2 Monthly Estimates and Payments: On or about the first day of each month, the Contractor will make an approximate estimate of the value of work done in conformity with the Plans and Specifications during the previous calendar month and of unused materials delivered for, and stored on the site of, the Work. The Contractor shall submit the estimate to the Engineer and furnish such detailed information as he may request to aid him in the review and recommendation for approval of monthly estimates. After each such estimate has been approved by the Town (and any Federal or State funding agency), the Town shall pay to the Contractor ninety percent (90%) of the amount of such estimated sum. For Contract amounts equal to or greater than $400,000, the Town will either place the entire retainage in an interest bearing account, or reduce the amount of retainage to five percent (5%).

24.2.1 It shall be understood that payments made by the Town for materials stored on the site shall be based only upon the actual cost of materials to the Contractor, and shall not include any overhead or profit to the Contractor.

24.2.2 Partial payment shall in general include only completed units or lump sum items. If the Contractor desires payment for partially completed lump sum items, he shall submit an

appropriate cost breakdown of such items prior to commencing Work on the Project. The Engineer will review the itemized breakdown and if he agrees with the breakdown, partial payments will be made accordingly. If the Engineer does not agree with the breakdown for any reason whatsoever, no partial payment will be made for such lump sum items.

24.3 Placing Work in Service: If desired by the Town, portions of the Work may be placed in service when completed and the Contractor shall give proper access to the Work for this purpose; but such use and operation shall not constitute an acceptance of the Work, and the Contractor shall be liable for defects due to faulty construction until the entire Work under this Contract is finally accepted and for one year thereafter as stipulated under the Paragraphs hereinbefore which address defective work.

24.4 Completion and Acceptance of Work: On completion of the Work, the Engineer shall:

(a) satisfy himself, by examination and tests, that the Work has been fully and finally completed in accordance with the Plans, Specifications and Contract, and

(b) report such completion to the Town Council.

24.4.1 Before final acceptance by the Town of the Work, the Contractor shall submit to the Town a notarized affidavit, in duplicate, stating under oath that all subcontractors, vendors and other persons or firms who have furnished or performed labor or furnished or performed labor or furnished materials for the Work have been fully paid or satisfactorily secured. Such affidavit shall bear or be accompanied by a statement, signed by the surety company who provided the Performance and Payment bonds for the Work, to the effect that said surety company consents to final payment to the Contractor being made by the Town.

24.5 No Waiver of Rights: Neither the inspection by any of the Town's officials, employees, or agents, nor any order by the Town for payment of money, or any payment for, or acceptance of, the whole or any part of the Work by the Town, nor any extension of time, nor any possession taken by the Town or its employees, shall operate as a waiver of any provisions of this Contract, or of any power herein reserved to the Town or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

24.6 Final Estimate and Payment: After official approval and acceptance of the Work by the Town the Contractor shall prepare a final estimate of the Work done under this Contract and the value thereof. Such final estimate shall be submitted to the Town after its preparation has been approved and authorized as aforesaid; and the Town shall, after said final estimate is made and certified, pay the entire sum so found to be due hereunder, after deducting all amounts to be kept and retained under any provision of this Contract. All prior estimates and payments shall be subject to correction in the final estimate and payment; but in the absence of error or manifest mistake, it is agreed that all estimates, when approved by the Town, shall be conclusive evidence of the work done and materials furnished.

24.7 Release of Liability: The acceptance by the Contractor of the last payment shall operate as, and shall be, a release to the Town and every officer and agent thereof, from all claims and liability hereunder for anything done or furnished for, or relating to the Work, or for any act or neglect of the Town or of any person relating to or affecting the Work.

SUPPLEMENTARY CONDITIONS OF AGREEMENT

1. GENERAL DESCRIPTION OF WORK: The work to be performed under this Contract includes the furnishing of all supplies and appurtenances; providing all construction plant, equipment and tools; performing all work necessary for construction of various drainage improvements in Fairview.

2. CONTRACT SPECIFICATIONS: The Specifications which are bound herewith and which shall govern the materials furnished and the work to be performed in the construction of the work under this Contract and based thereon, are identified and indexed in the Table of Contents at the beginning of this volume of the Contract Documents.

3. COPIES OF SPECIFICATIONS: The Contractor will be furnished, without cost to him, five (5) copies of all Specifications enumerated in the foregoing paragraphs 2 and 3, together with any and all addenda thereto. The Contractor shall keep one copy of all such Specifications constantly accessible on the work site.

4. LIQUIDATED DAMAGES: Should the Contractor fail to complete the work within the required annual contract time, or within such extra time as may have been allowed by extension, the Town will deduct from any moneys due or coming due the Contractor, the sum of One Hundred Dollars ($100.00) for each calendar day that the work shall remain uncompleted. This sum shall be considered and treated not as a penalty but as fixed, agreed and liquidated damages due the Town from the Contractor for reasons of inconvenience to the public, added cost of engineering, administration, supervision, inspection and other items which have caused an expenditure of public funds resulting from his failure to complete the work within the time specified in the Contract.

6. INSURANCE: The Contractor shall provide Certificates of Insurance in accordance with Paragraph 21.2 of the GENERAL CONDITIONS. Insurance coverage shall be in the amounts specified below:

6.1 Workmen's Compensation

A. Definitions:

Certificate of cover ("certificate"). A copy of a certificate of insurance, a certificate of authority to self insure issued by the commission, or a coverage agreement (TWCC - 81, TWCC - 82, TWCC -83, or TWCC - 84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the Town.

Persons providing services on the project ("subcontractor" in Texas Labor Code § 406.096) - includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the Town prior to being awarded the Contract.

D. If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Town showing that coverage has been extended.

E. The contractor shall obtain from each person providing a service on a project, and provide to the Town:

(1) a certificate of coverage, prior to that person beginning work on the project, so the Town will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) no later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The Contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The Contractor shall notify the Town in writing by certified mail or personal delivery, within ten days after the Contractor knew or should have known, of any changes that materially affects the provision of coverage of any person providing services on the project.

H. The Contractor shall post on each project site a notice, in the text form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered and stating how a person may verify coverage and report lack of coverage.

I. The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) provide coverage, based on proper reporting of classification codes, and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for all of its employees providing services on the project, for the duration of the project;

(2) provide to the Contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) obtain from each other person with whom it contracts, and provide to the Contractor:

(a.) a certificate of coverage, prior to the other person beginning work on the project; and

(b.) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) notify the Town entity in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificate of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Town that all employees of the Contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreement will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The Contractor's failure to comply with any of these provisions is a breach of Contract by the Contractor which entitles the Town to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Town.

L. A Contractor Shall:

(1) provide coverage for its employees providing services on a project, for the duration of the project based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements;

(2) provide a certificate of coverage showing workers' compensation coverage to the Town prior to beginning work on the project;

(3) provide the Town, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the project;

(4) obtain from each person providing services on a project, and provide to the Town:

(a) a certificate of coverage, prior to that person beginning work on the project, so the Town will have on file certificates of coverage showing coverage for all person providing services on the project; and

(b) no later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage ends during the duration of the project;

(5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) notify the Town in writing by certified mail or personal delivery, within ten (10) days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing serviced on the project;

(7) post a notice on each project site informing all persons providing services on the project that they are required to be covered, and stating how a person may verify current coverage and report failure to provide coverage. This notice does not satisfy other posting requirements imposed by the Act or other commission rules. This notice must be printed with a title in at least 30-point bold type and text in at least 19-point normal type, and shall be in both English and Spanish and any other language common to the worker population. The text for the notices shall be the following text provided by the commission on the sample notice, without any additional works or changes:

REQUIRED WORKERS' COMPENSATION COVERAGE

"The law requires that each person working on this site or providing services related to this construction project must be covered by workers' compensation insurance. This includes persons providing, hauling, or delivering equipment or materials, or providing labor or transportation or other service related to the project, regardless of the identity of their employer or status as an employee."

"Call the Texas Workers' Compensation Commission at 512-440-3789 to receive information on the legal requirement for coverage, to verify whether your employer has provided the required coverage, or to report an employer's failure to provide coverage."

(8) contractually require each person with whom it contracts to provide services on a project, to:

(a) provide coverage based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements for all of its employees providing services on the project, for the duration of the project.

(b) provide a certificate of coverage to the Contractor prior to that person beginning work on the project;

(c) include in all Contracts to provide services on the project the language in subsection (e) (3) of this rule;

(d) provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage

period shown on the current certificate of coverage ends during the duration of the project;

(e) obtain from each other person with whom it contracts, and provide to the contractor:

(i) a certificate of coverage, prior to the other person beginning work on the project; and

(ii) prior to the end of the coverage showing extension of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(f) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(g) notify the governmental entity in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

((h) contractually require each other person with whom it contracts, to perform as required by paragraphs (a) - (h), with the certificate of coverage to be provided to the person for whom they are providing services.

6.2 Employer's Liability Insurance: Liability limits for this insurance shall be not less than the following:

Employer's Liability	$1,000,000 each person

6.3 Bodily Injury and Property Damage Insurance: Liability limits for general liability insurance coverage under this policy shall be not less than the following:

Bodily	$1,000,000 each person $1,000,000 each accident
Property Damage	$1,000,000 each accident $1,000,000 aggregate

6.4 Comprehensive Automobile Liability Insurance: Liability limits for automobile liability insurance coverage under this policy shall be not less than the following:

Bodily	$1,000,000 each person $1,000,000 each person

Property Damage $1,000,000 each accident

7. LICENSES, PERMITS AND CERTIFICATES: All licenses, permits, certificates, etc., required for and in connection with the work to be performed under the provisions of these Contract Documents shall be secured by the Contractor entirely at his own expense except for any permits required for work to be performed within State Rights-of-Ways. These permits will be obtained by the Town from the Texas Department of Transportation.

8. WATER: All water required for and in connection with the work to be performed may be obtained from the Town at no expense. The Town will provide a meter for measuring any water obtained from the Town for execution of the work. Upon completion of the work, the Contractor shall remove all of his temporary service installations. The Contractor shall inform the Utility Superintendent prior to taking water.

9. POWER: All power for lighting, operation of Contractor's plant or equipment, or for any other use as may be required in the execution of the work to be performed under the provision of these Contract Documents shall be provided by the Contractor at his expense.

10. RIGHT-OF-WAY: The Contractor shall confine his construction operations to the street right-of-way as shown on the Plans, and shall use due care in placing construction tools, equipment, excavated materials, pipe materials and supplies, so as to cause the least possible damage to property and interference with traffic. The placing of such tools, equipment and materials shall be subject to the approval of the Engineer.

Where space within the right-of-way is not available for construction plant, the Contractor shall provide, at his own expense, any working area he requires, shall construct and maintain any roadway or other facilities required for this purpose and the cost thereof shall be included in the prices bid for the various items in the Proposal.

11. DAMAGE TO EXISTING STRUCTURES, MATERIALS OR EQUIPMENT: The Contractor will be held responsible for any damage to existing structures, work, materials or equipment because of his operations and shall repair or replace any such damaged structures, work, materials or equipment to the satisfaction of the Town Engineer at no additional cost to the Town.

12. PROTECTION AND MAINTENANCE OF PUBLIC AND PRIVATE PROPERTY: The Contractor shall protect, shore, brace, support and maintain all underground construction uncovered or otherwise affected by the construction work performed by him. All surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, and other surface structures affected by construction operations in connection with the performance of the Contract, together with all sod and shrubs in areas crossed by or adjacent to the right-of-way, shall be maintained and, if removed or otherwise damaged, shall be restored to the original condition thereof as determined and approved by the Town Engineer. All replacements of such underground construction and surface structures or parts thereof shall be made with new materials conforming to the requirements of these Specifications or, if not specified, as approved by the Engineer. The Contractor shall be responsible for all damage to roads, railroads, shoulders, ditches, embankments, culverts, bridges, or other public or private

property or facilities, regardless of location or character, which may be caused by moving, hauling, or otherwise transporting equipment, materials or men to or from the work or any part of site thereof, whether by him or his subcontractor or subcontractors. The Contractor shall make satisfactory and acceptable arrangements with the Town, or with the agency or authority having jurisdiction over, the damaged property or facility concerning its repair or replacement, or payment of costs incurred in connection with said damage.

13. RESPONSIBILITY OF CONTRACTOR FOR EMBANKMENT AND BACKFILL SETTLEMENT: The Contractor shall be responsible, financially and otherwise, for (a) any and all settlement of trench and other backfill and embankment which may occur from the time of original placement until the expiration of a period of one year from and after the date of final acceptance of the entire Contract under which the backfilling or embankment work was performed, (b) the refilling and repair of all backfill settlement and the repair or replacement to the original or a better condition of all tracks, pavement, top surfacings, driveways, walks, surface structures, utilities, drainage facilities, sod and shrubbery which have been damaged as a result of said settlement or which have been removed or destroyed in connection with replacement operations, and (c) any and all damage claims filed with or court actions brought against the Town for and on account of any damage or damages directly or indirectly caused by said settlement. The Contractor shall make or cause to be made, all necessary backfill or embankment replacements, and repairs or replacements appurtenant thereto, within thirty (30) days from and after due notification by the Town of settlement and resulting damage at any designated locations.

14. GUARANTY: The Contractor shall insure and guarantee the satisfactory operation of all the installation, the workmanship and restoration of the project area, including backfill settlement. The project shall be guaranteed to be complete and to function correctly for a period of one year from the date of its acceptance and the Contractor hereby agrees to repair or replace any defective items occurring within that year, free of expense to the Town.

15. BARRICADES AND LIGHTS: All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public against accident by reason of such open construction. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

16. DIVISION OF WORK: Items for this contract shall be bid as either lump sum or unit price as shown on the summary of quantities in the Proposal. Whenever two or more items abut each other, the division of work shall be as defined in the Specifications and as shown on the Plans. If the Specifications do not define the division of work, the Contractor shall make such divisions at his own discretion. It is the intent of these Specifications that the completion of all bid items shall result in the completion of all work shown on the Plans.

17. MANUFACTURER'S RECOMMENDATION: When an item of work is stated to be in accordance with or conform to manufacturer's recommendations, that item shall be submitted to the Engineer in writing for approval and shall be done in accordance with the approved method.

18. QUALITY ASSURANCE: When manufacturer's names are specified herein, they are used to establish a specific minimum requirement for materials used in construction, performance, and

dimensional compatibility. The naming of one manufacture is not intended to show preference, eliminate competition or prohibit other manufacturers from offering equipment conforming to the requirements of the Contract Documents. The use of "or equal" items shall be done in accordance with Paragraph 18.8 of the GENERAL CONDITIONS.

19. PRE-CONSTRUCTION CONFERENCE: As stated in Paragraph 10 of the GENERAL CONDITIONS, a pre-construction conference will be set to discuss scheduling and coordination of the work under this Contract.

20. EXISTING UTILITIES: Certain pipe lines, sewers, culverts, drains, cables, and other existing subsurface structures in the vicinity of the work to be done are indicated on the Plans according to the best information available to the Town. However, the town does not guarantee the accuracy of the information. Any delay to the Contractor due to encountering pipe lines or structures shall not constitute a claim for payment or an extension of time. The Contractor shall be responsible for contacting the utility companies and arranging for an on-site inspection so that the company representatives may locate all facilities endangered by construction:

The Contractor shall be responsible for protecting such existing utilities and for repairs to such facilities in case of damage to same. Should there be relocations or adjustments of utilities necessary to accommodate construction activities, the Contractor shall cooperate with the Company(s) involved and will coordinate such relocations with the schedule of work herein.

21. PARTIAL USE OF IMPROVEMENTS: The Town, at its election, may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the Technical Specifications, and if in its opinion, each such section is reasonably safe, fit and convenient, for the use and accommodation for which it was intended, provided:

a. The use of such sections of the Improvements shall in no way impede the completion of the remainder of the work by the Contractor.

b. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

c. The use of such sections shall in no way relieve the Contractor of his liability due to having used defective materials or poor workmanship.

d. The period of guarantee stipulated in the Paragraph "Guaranty" of this Section, shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

22. PROTECTION OF TREES AND SHRUBBERY: No trees shall be removed on the right-of-way except where their removal is authorized in writing by the Engineer.

Main tree roots shall not be cut except where they fall within the area to be occupied by the improvements. Excavation shall be done by and where necessary to prevent injury to roots or

protected from permanent damage by reason of construction operations. Trimming of standing trees where required shall be as directed by the Engineer. All shrubbery outside of the right-of-way which is damaged or removed by the Contractor shall be replaced under the directions of and to the satisfaction of the Town Engineer and property owner, by and at the expense of the Contractor.

23. REMOVAL AND REINSTALLATION OF ITEMS: Street signs, street stop signs, mailboxes and other existing items found within construction limits shall without damage be removed, stored and reinstalled in a condition comparable to pre-existing condition. Unless approved by the town, no extra pay shall be given if existing items are damaged by the Contractor and have to be replaced.

24. MAINTENANCE OF LOCAL TRAFFIC: The Contractor shall notify the Town Engineer at least 72 hours in advance of closure to provide ample time for notifying the public and providing detours. When notice of intended closure is given, the Contractor shall give the Town Engineer an estimate of the period of time that closure of the street will be necessary. Detour signs shall be installed at the locations shown on the Plans.

25. DUST CONTROL: Adequate precaution should be taken to insure excessive dust does not become airborne during construction. No separate payment will be made for performing dust control or for the water used for this purpose. The cost of these items shall be subsidiary to other items.

26. JOB SITE CONDITION: During the construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove same from any portion of the site, if in the opinion of the Town Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need thereof develops.

27. DISPOSAL OF WASTE: All trees, stumps, existing surface, waste concrete and reinforcing and other debris, which result from the Contractor's excavation and operations, shall be removed from the property. All waste or excess earth shall be either removed from the site or neatly spread on the job site in a manner satisfactory to the Town Engineer. The disposal site for all such waste shall be the responsibility of the Contractor unless otherwise instructed by the Town Engineer.

28. FAILURE OF MATERIALS TO MEET TESTING REQUIREMENTS: Should any materials test specified herein fail to meet the minimum requirements specified, the Contractor shall furnish additional testing, by an independent laboratory approved by the Town Engineer, as necessary to satisfy the Town Engineer that the failed condition or material has been corrected.

29. CONSTRUCTION SEQUENCE: The Contractor shall submit to the Engineer for approval his proposed sequence of construction. The Construction Sequence shall be approved by the Engineer prior to starting the work, and shall be in accordance with the above sequence for placement of new facilities into service.

30. RESIDENT PROJECT REPRESENTATIVE: The Town intends to have a Project Inspector to inspect the Work. All pipe bedding will be inspected prior to backfilling, and any backfill over pipe not inspected shall be removed for inspection. The Project Inspector will observe the construction activities and note its conformance with the Plans and Specifications as well as the progress of the Work. The Inspector will notify the Contractor and Engineer of any discrepancies. He shall not authorize any deviations from the Contract Documents or interrupt the Contractor's progression of the Work without specific instructions from the Engineer.

31. STATE AND TOWN SALES TAX: The CONTRACTOR'S attention is directed to Texas House Bill 11 (72nd Legislature, 1st C.S.) which amended the Texas Tax Code Section 151.311 This amendment provides that by the CONTRACTOR entering into a separated contract, the CONTRACTOR will become a seller of materials purchased for the project, which will obviate paying taxes on materials incorporated into the project. As a seller, the CONTRACTOR purchases materials and issues a resale certificate in lieu of paying the sales tax at the time of purchase. The Town, as an exempt entity, will at the time of the "sale" of the materials to the Town, thereby preclude the Town, and CONTRACTOR, from paying the sales tax on the materials. Execution of the Contract Agreement by the Town shall serve as the CONTRACTOR'S authorization to issue a resale certificate. Services are not tax exempt. The CONTRACTOR will be required to pay all appropriate taxes for all services as set forth herein.

For purposes of these Contract Documents, the following definitions are provided for Materials and Services:

> Materials: Materials are those items which are tax exempt and are items physically incorporated into the facility constructed for the Town. Materials include, but are not limited to, purchased items such as pipe, embedment, the storage tank, concrete, manhole rings and covers and barrel sections, riprap, asphalt, road base and subbase, etc.
>
> Services: Services are those items that are not tax exempt and are items used by the CONTRACTOR but which are not physically incorporated into the Town's facility and/or are items which are consumed by construction. Services include, but are not limited to, items such as supplies, tools, concrete forms, scaffolding, temporary storage buildings, the purchase or rental or lease of equipment, skill and labor, etc.

For further information concerning taxes as they relate to materials and services, the CONTRACTOR shall refer to House Bill 11 and/or contact the Texas Comptroller of Public Accounts, Austin, Texas at (800) 252-5555.

32. WAGE RATES: The Contractor and any subcontractors shall pay not less than the current prevailing wage rates for the Fairview area to all laborers, workmen and mechanics employed by them in the execution of this Contract. The Town will not provide wage rates for this project and will not require submission of documentation of wages.

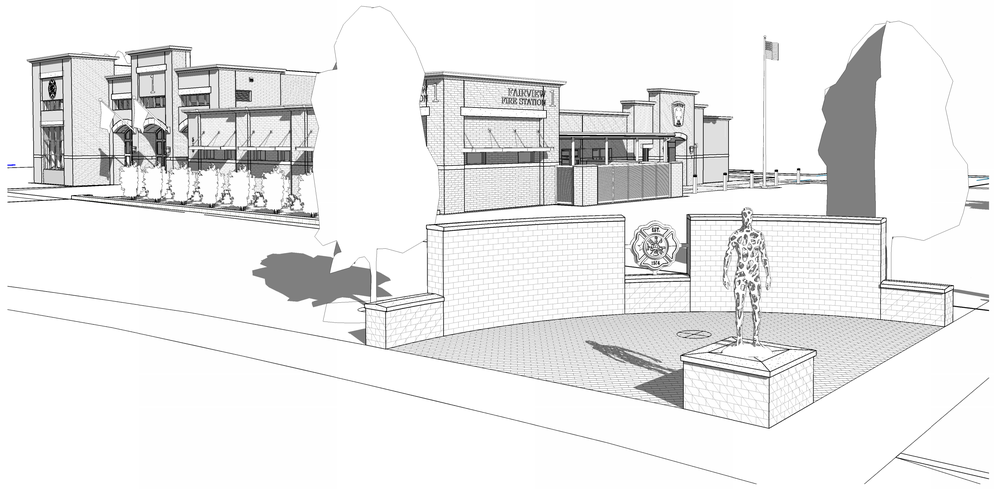
33. CONSTRUCTION STAKING: The Engineer has established a base line on the project, which is shown on the plans. Immediately prior to beginning of construction, the Town's Surveyor

shall traverse the project with the Contractor to determine location of control points and bench marks. The Surveyor shall replace any of these controls and bench marks which may have been disturbed. By using these control points and bench marks the Contractor shall provide all additional construction staking to establish proper line and grade for this project. It shall be the Contractor's responsibility to set any offset control points and bench marks deemed desirable such that, when construction activities disturb the base line, there will remain adequate horizontal and vertical control.

During this offset control staking procedure, the Contractor shall keep the Engineer informed regarding the controls being set. The Engineer may require additional control points if, in his opinion, those being set by the Contractor are not adequate to properly establish line and grade.

FAIRVIEW FIRE STATION № 1
HONOR PLAZA

BID SET



PROJECT INFORMATION

FAIRVIEW FIRE STATION NO. 1
510 STATE HIGHWAY 5
FAIRVIEW, TX 75069

ADDITION OF A MONUMENT PLAZA IN THE INTEREST OF PUBLIC ART ON THE SITE OF THE EXISTING CENTRAL FIRE STATION.

ADOPTED BUILDING CODES*
- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL MECHANICAL CODE
- 2017 NATIONAL ELECTRICAL CODE
- 2018 INTERNATIONAL PLUMBING CODE
- 2018 INTERNATIONAL FIRE CODE
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE
- 2018 INTERNATIONAL FUEL & GAS CODE
- 2012 TEXAS ACCESSIBILITY STANDARDS
- 2018 TEXAS HEALTH CODE

*ALL CODE REQUIREMENTS TO INCLUDE THE RECOMMENDED AMENDMENTS OF THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (2018 IBC VERSION) AS WELL AS ANY OTHER LOCAL AMENDMENTS.

OCCUPANCY AND CONSTRUCTION TYPE

OCCUPANCY TYPE	B
CONSTRUCTION TYPE	V-B

GROSS BUILDING AREA

LEVEL	AREA
LEVEL 1	12,639 SF
MEZZANINE	1,903 SF
	14,542 SF

PROJECT CONTACTS

OWNER
TOWN OF FAIRVIEW
FIRE CHIEF JEFF BELL
372 TOWN PLACE
FAIRVIEW, TX
972-562-0522

ARCHITECT
BRINKLEY SARGENT WIGINTON ARCHITECTS
5000 QUORUM DRIVE, SUITE 600
DALLAS, TX 75254
972-960-9970 (T)
972-960-9751 (F)

SITE DESIGN
KENDALL LANDSCAPE ARCHITECTURE
8150 NORTH CENTRAL EXPRESSWAY
DALLAS, TX 75206
214-739-3226 (T)

LIST OF DRAWINGS - HONOR PLAZA

SHEET NO.	DRAWING TITLE	02/07/2024 ISSUE
G-CVR	HONOR PLAZA COVER SHEET	●
SP1.1	SITE PLANS AND DETALS	●
A-01	SITE PLAN, ELEVATIONS, SECTIONS, DETAILS, 3D AXONS	●

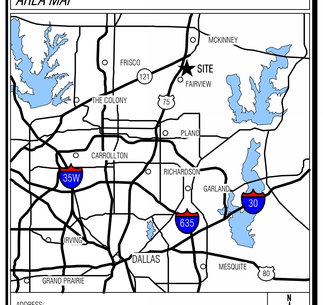
GENERAL NOTES

1. FIRST LEVEL FINISH FLOOR ELEVATION OF THE BUILDING. 100'-0" = 654.75
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR & OBTAIN ALL PERMITS & LICENSES, & PAY ANY REQUIRED FEES.
3. IN GENERAL, WORK UNDER THIS CONTRACT INCLUDES SITE WORK, GRADING, DEMOLITION, FOUNDATIONS, STRUCTURAL MASONRY AND OTHER WORK AS SPECIFIED & INDICATED ON THESE DOCUMENTS.
4. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES HAVING JURISDICTION TO VERIFY LOCATION OF ALL EXISTING UTILITY LINES & ANY OTHER FEATURES UNIQUE TO THIS PROJECT.
5. DIMENSIONS: ALL PLAN DIMENSIONS ARE FROM FACE OF MASONRY OR FACE OF STUD, UNLESS NOTED OR SHOWN OTHERWISE.
6. MATERIAL OR FINISHES NOTED ON DRAWINGS ARE FOR GENERAL INFORMATION & TO FACILITATE INTERPRETATION OF THE DRAWINGS. THE CONTRACTOR SHALL FURNISH OTHER MATERIALS, ACCESSORIES & OR FINISHES AS REQUIRED TO COMPLETE WORK.
7. CONTRACTOR SHALL, IN THE WORK OF ALL TRADES, PERFORM ANY & ALL CUTTING, PATCHING, REPAIRING, RESTORING & THE LIKE NECESSARY TO COMPLETE THE WORK & TO RESTORE ANY DAMAGED OR AFFECTED SURFACES RESULTING FROM THE WORK OF THESE CONTRACTS TO A FINISHED CONDITION TO THE SATISFACTION OF THE ARCHITECT & OWNER.
8. ALL MATERIALS & FINISHES USED ON THIS PROJECT SHALL BE NEW & UNUSED, UNLESS NOTED OTHERWISE.
9. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS & DIMENSIONS AT THE JOB SITE WHICH MAY AFFECT THIS WORK PRIOR TO STARTING THE WORK, & SHALL NOTIFY THE OWNER & ARCHITECT OF ANY DISCREPANCIES IMMEDIATELY UPON DISCOVERY.
10. PROVIDE GROUTED CMU CELLS BEHIND ALL SIGNS & WHERE INDICATED OR REQUIRED TO INSURE PROPER & SECURE INSTALLATION OF SUCH ITEMS.
11. THESE DRAWINGS ARE THE SOLE PROPERTY OF BRINKLEY SARGENT WIGINTON ARCHITECTS, INC. THE USE OR RE-USE OF THESE DRAWINGS IS HEREBY RESTRICTED TO THE ORIGINAL SITE FOR WHICH THEY WERE PREPARED. REPRODUCTION OF THESE DRAWINGS, IN WHOLE OR IN PART, WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECT IS HEREBY PROHIBITED. COPYRIGHT BRINKLEY SARGENT WIGINTON ARCHITECTS 2024.
12. THESE DRAWINGS CONTAIN PROPRETARY INFORMATION AND INTELLECTUAL AND INDUSTRIAL COPYRIGHTS THAT ARE THE PROPERTY OF BRINKLEY SARGENT WIGINTON ARCHITECTS (BSW). NO COPIES SHALL BE MADE WITHOUT APPROVAL. THESE DRAWINGS SHALL NOT BE USED BY ANY OTHER PARTY FOR ANY OTHER PURPOSE OTHER THAN THE PURPOSE INTENDED WITHOUT THE EXPRESS WRITTEN CONSENT OF BRINKLEY SARGENT WIGINTON ARCHITECTS (BSW).

ABBREVIATIONS

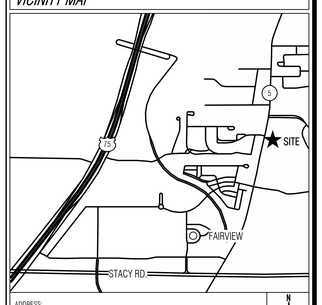
&	AND
@	AT
ACT	ACOUSTIC CEILING TILE
ADA	AMERICANS WITH DISABILITIES ACT
ADD	ADDENDUM
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
ARCH	ARCHITECTURAL
BD	BOARD
BLDG	BUILDING
BO	BOTTOM OF
BOD	BOTTOM OF DECK
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTL'D
CG	CORNER GUARD
CJ	CONTROL JOINT
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONF	CONFERENCE
CONT	CONTINUOUS
CPT	CARPET
CT	CERAMIC TILE
DBL	DOUBLE
DEFS	DIRECT-APPLIED EXTERIOR FINISH SYSTEM
DEMO	DEMOLISH/DEMOLITION
DEPT	DEPARTMENT
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DR	DOOR
DWR	DRAWER
DWG	DRAWING
EA	EACH
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATION / ELEVATOR
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
EXT	EXTERIOR
FAR	FLOOR AREA RATIO
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONTROL
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FFE	FINISH FLOOR ELEVATION
FF&E	FIXTURE, FURNISHINGS & EQUIPMENT
FLOUR	FLUORESCENT
FLR	FLOOR
FO	FACE OF
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOS	FACE OF STUD
GA	GAUGE
GALV	GALVANIZED
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
HB	HOSE BIB
HGT	HEIGHT
HMTL	HOLLOW METAL
HORIZ	HORIZONTAL
HR	HOUR
HT	HEIGHT
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HW	HARDWARE
HWD	HARDWOOD
ILO	IN LIEU OF
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
J-BOX	JUNCTION BOX
JAN	JANITOR
JCT	JUNCTION
JT	JOINT
LAV	LAVATORY
LCD	LIQUID CRYSTAL DIODE
LED	LIGHT EMITTING DIODE
LT	LIGHT
LTG	LIGHTING
MAINT	MAINTENANCE
MAT	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MIC	MICROPHONE
MISC	MISCELLANEOUS
MIN	MINIMUM
MTD	MOUNTED
MTL	METAL
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NRC	NOISE REDUCTION COEFFICIENT
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED
OH	OPPOSITE HAND
OHD	OVERHEAD DOOR
OZ	OUNCE
PERF	PERFORATED
PERIM	PERIMETER
PERP	PERPENDICULAR
PNL	PANEL
PLAM	PLASTIC LAMINATE
PLUMB	PLUMBING
PLWD	PLYWOOD
PR	PROPOSAL REQUEST
PREFAB	PREFABRICATED
PT	PRESSURE TREATED
PNT	PAINT
PVC	POLYVINYL CHLORIDE
PVT	PRIVATE
PWR	POWER
RAD	RADIUS
REBAR	REINFORCING BAR
RECOM	RECOMMENDED
REF	REFERENCE
REFR	REFRIGERATOR
REG	REGULAR
REINF	REINFORCING
REM	REMOVE
REQ	REQUIRED
RFI	REQUEST FOR INFORMATION
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RPM	REVOLUTIONS PER MINUTE
RWC	RAIN WATER CONDUCTOR
RWL	RAIN WATER LEADER
SAN	SANITARY
SCHED	SCHEDULE
SHR	SHOWER
SF	SQUARE FEET
SI	SUPPLEMENTAL INSTRUCTION
SIM	SIMILAR
SPEC	SPECIFICATION
SPK	SPEAKER
SS	STAINLESS STEEL
STL	STEEL
STRUC	STRUCTURAL
SYS	SYSTEM
T&G	TONGUE AND GROOVE
TAN	TANGENT
TAS	TEXAS ACCESSIBILITY STANDARDS
TC	TOP OF CURB
TD	TRENCH DRAIN
TELE	TELEPHONE
TEMP	TEMPERATURE
TLT	TOILET
TO	TOP OF
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TPO	THERMOPLASTIC POLYOLEFIN
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VAC	VACUUM
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
VWC	VINYL WALL COVERING
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WF	WIDE FLANGE
WH	WATER HEATER

AREA MAP



ADDRESS:
510 TX-5
FAIRVIEW, TX 75069

VICINITY MAP



ADDRESS:
510 TX-5
FAIRVIEW, TX 75069

SYMBOL LEGEND

1 / A101 — SECTION REFERENCE	101 / ROOM NAME — ROOM TAG NAME & NUMBER	01/ A101 — INTERIOR ELEVATION	A1 — GLAZING TAG
1 / A101 — SECTION DETAIL REFERENCE	101 — ROOM TAG NUMBER ONLY	A — WALL TAG	1! — WINDOW TAG
1 / A101 — DETAIL REFERENCE	1408A — DOOR TAG	TITLE / ELEVATION — ELEVATION DATUM	0'-0" — SPOT ELEVATION
A101 / 1 — EXTERIOR ELEVATION	EQNUM — EQUIPMENT TAG	NORTH — TRUE NORTH ARROW	PLAN — PLAN NORTH ARROW

BRINKLEY SARGENT WIGINTON ARCHITECTS
Architect: Brinkley Sargent Wiginton Architects (972) 960-9970
Landscape: Kendall Landscape Architecture (214) 739-3226

FAIRVIEW FIRE STATION NO. 1
HONOR PLAZA
510 STATE HIGHWAY 5 FAIRVIEW, TX 75069

HISTORY

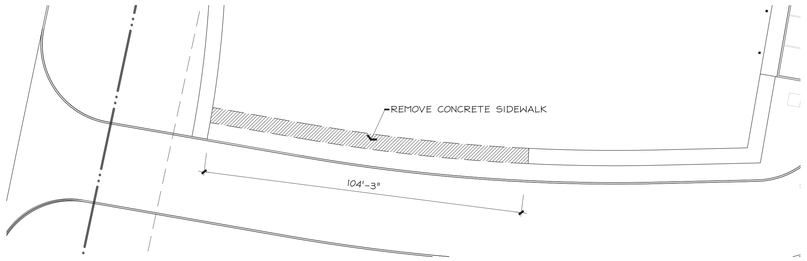
#	DATE	DESCRIPTION

02/07/2024

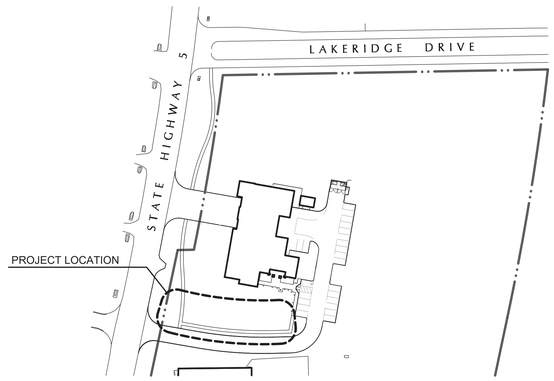
HONOR PLAZA
COVER SHEET

22315
02/07/2024
G-CVR

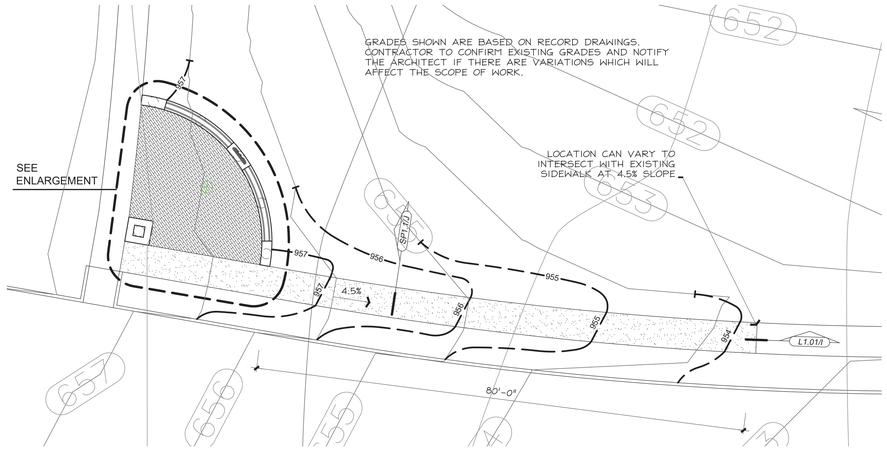
BID SET



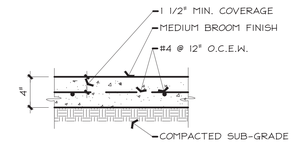
B PAVING DEMOLITION PLAN
1" = 20'-0" 0 10' 20' 40'



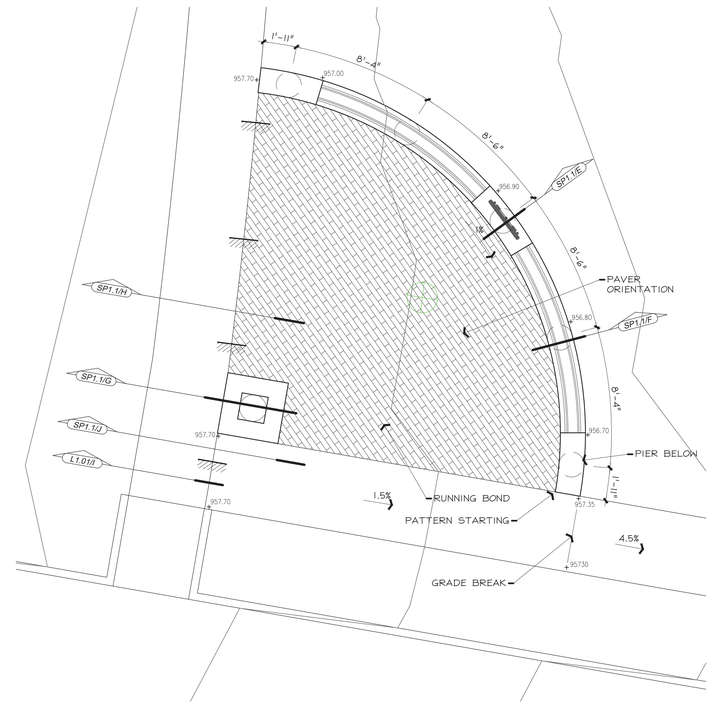
A LOCATION PLAN
1" = 1200' 0 50' 100' 200'



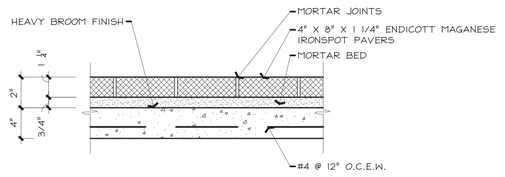
C OVERALL SITE LAYOUT AND GRADING PLAN
1" = 10'-0" 0 5' 10' 20'



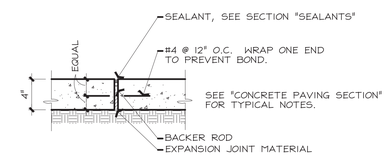
J CONCRETE PAVING - SECTION
1 1/2" = 1'-0" 0 1'



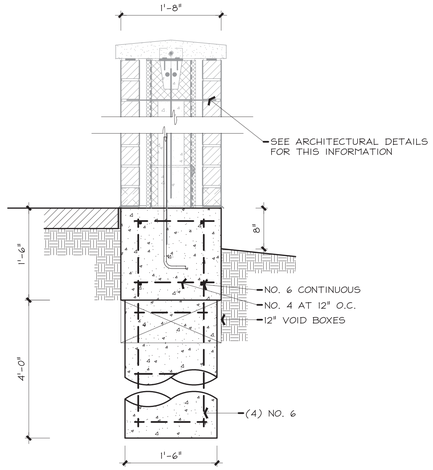
D ENLARGED SITE PLAN
1/4" = 1'-0" 0 2' 4' 8'



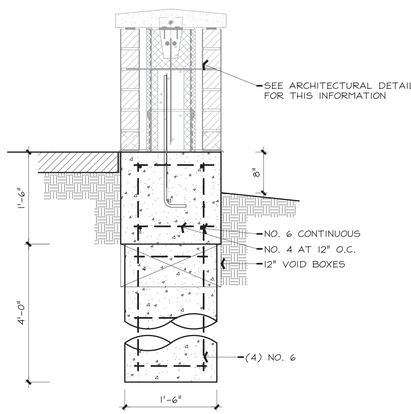
H CONCRETE PAVER ON CONCRETE SUBBASE
1 1/2" = 1'-0" 0 1'



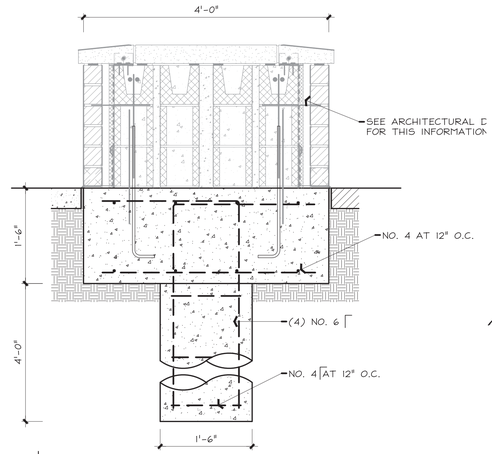
I EXPANSION JOINT - SECTION
1 1/2" = 1'-0" 0 1'



E TALL WALL FOUNDATION SECTION
1" = 1'-0" 0 1'



F SHORT WALL FOUNDATION SECTION
1" = 1'-0" 0 1'



G PEDESTAL FOUNDATION SECTION
1" = 1'-0" 0 1'

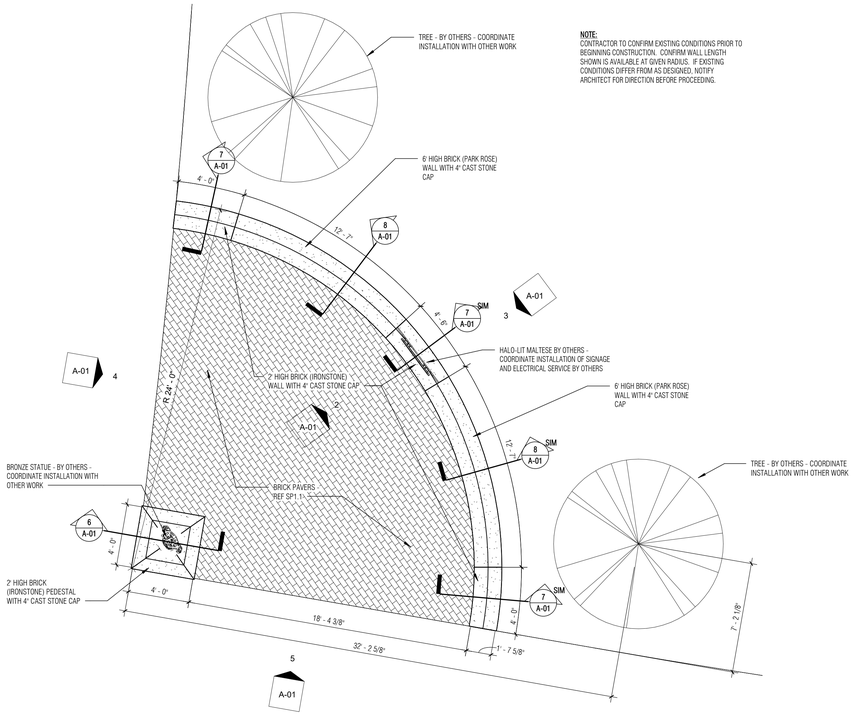
BRINKLEY SARGENT WIGINTONARCHITECTS
Architect: Brinkley Sargent Wiginton Architects (972) 960-9970
Landscape: Kendall Landscape Architecture (214) 739-3226

FAIRVIEW FIRE STATION NO. 1
HONOR PLAZA
510 STATE HIGHWAY 5 FAIRVIEW, TX 75069

REGISTERED LANDSCAPE ARCHITECT STEPHEN [illegible] 1121 STATE OF TEXAS
02.07.2024

SITE PLANS AND DETAILS

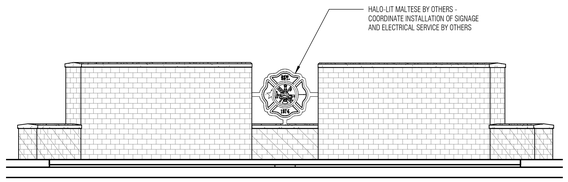
BID SET
02.07.2024 SP1.1



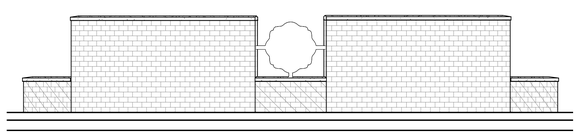
NOTE:
CONTRACTOR TO CONFIRM EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION. CONFIRM WALL LENGTH SHOWN IS AVAILABLE AT GIVEN RADIUS. IF EXISTING CONDITIONS DIFFER FROM AS DESIGNED, NOTIFY ARCHITECT FOR DIRECTION BEFORE PROCEEDING.

NORTH

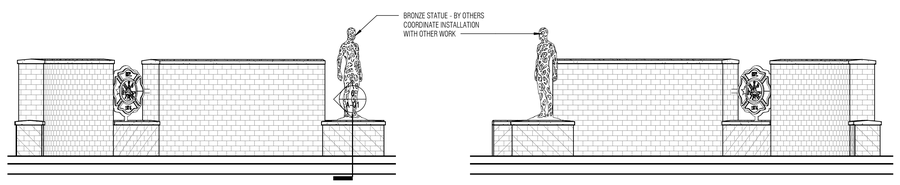
1 SITE PLAN
SCALE: 1/4" = 1'-0"



2 NORTHEAST ELEVATION
SCALE: 1/4" = 1'-0"

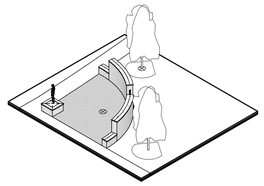


3 SOUTHWEST ELEVATION
SCALE: 1/4" = 1'-0"

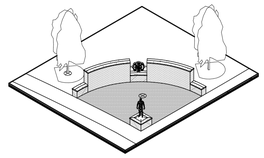


4 EAST ELEVATION
SCALE: 1/4" = 1'-0"

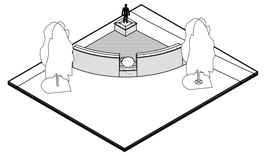
5 NORTH ELEVATION
SCALE: 1/4" = 1'-0"



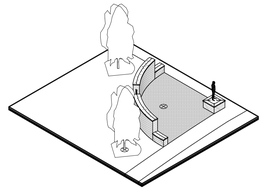
HONOR PLAZA - AXON 1



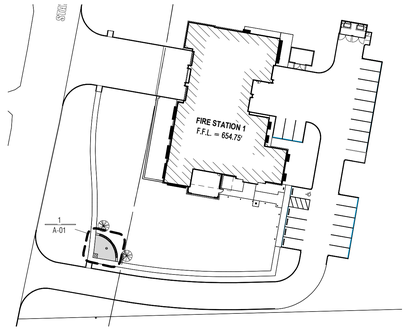
HONOR PLAZA - AXON 2



HONOR PLAZA - AXON 3



HONOR PLAZA - AXON 4



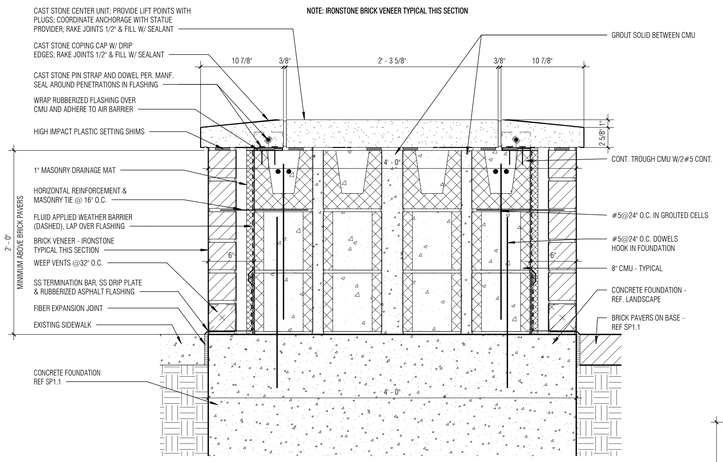
KEY PLAN

SITE GENERAL NOTES

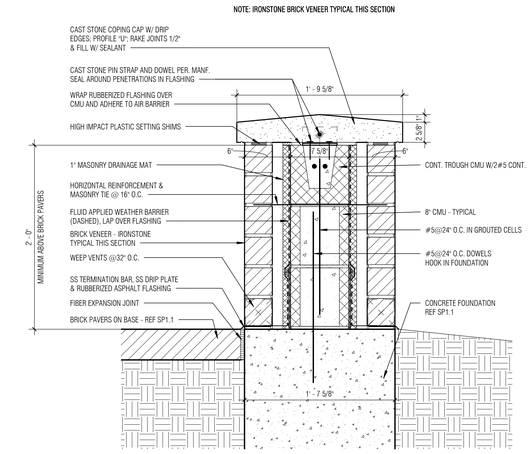
STRUCTURAL MASONRY:
GENERAL
1. REFER TO ARCHITECTURAL LAYOUT AND DRAWINGS AND SPECIFICATIONS FOR DETAILS AND EXACT DIMENSIONS OF BRICK MASONRY WORK INCLUDING RUSTICATIONS, CORBELS, COURSING, REGLETS, WEEP HOLES, WATERPROOFING AND FLASHING.
2. GROUT LIFTS AT REINFORCED MASONRY WALLS SHALL NOT EXCEED FIVE FEET.
3. REQUIRED PRISM STRENGTH OF STRUCTURAL ASSEMBLY = 1500 PSI
4. REQUIRED 28-DAY COMPRESSIVE STRENGTH OF MORTAR = 1900 PSI
5. REQUIRED 28-DAY COMPRESSIVE STRENGTH OF GROUT = 2000 PSI

REINFORCING
1. HORIZONTAL JOINT REINFORCING SHALL BE "LADDER TYPE" 9 GA. WELDED WIRE SPACED 16 INCHES ON CENTER VERTICALLY.
2. PROVIDE SPECIAL "L" AND "T" SHAPED SECTIONS AT WALL INTERSECTIONS. LAP HORIZONTAL WIRES AT LEAST 12" AT SPLICES.
3. HORIZONTAL REINFORCING IN TROUGH TILES SHALL BE LAPPED 30 BAR DIAMETERS AT SPLICES. STAGGER SPLICES IN ADJACENT BARS AT LEAST 4'-0". SEE DETAILS FOR REINFORCING.
4. PROVIDE CORNER BARS AT INTERSECTIONS OF REINFORCED TROUGH TILES EQUAL IN SIZE AND NUMBER TO HORIZONTAL REINFORCING LAPPED 30 BAR DIAMETERS EACH WAY.
5. THE FIRST CELL AT CORNERS, ENDS OF WALLS, AND EACH SIDE OF OPENINGS SHALL BE GROUTED AND REINFORCED WITH 1 #5 VERTICAL.
6. VERTICAL REINFORCING IN GROUTED CELLS AND PILASTERS SHALL BE LAPPED 48 BAR DIAMETERS AND WIRE TIED AT SPLICES, UNLESS OTHERWISE NOTED.
7. DO NOT SPLICE VERTICAL REINFORCING WITHIN 1/4TH OF WALL HEIGHT ABOVE OR BELOW MID-HEIGHT.

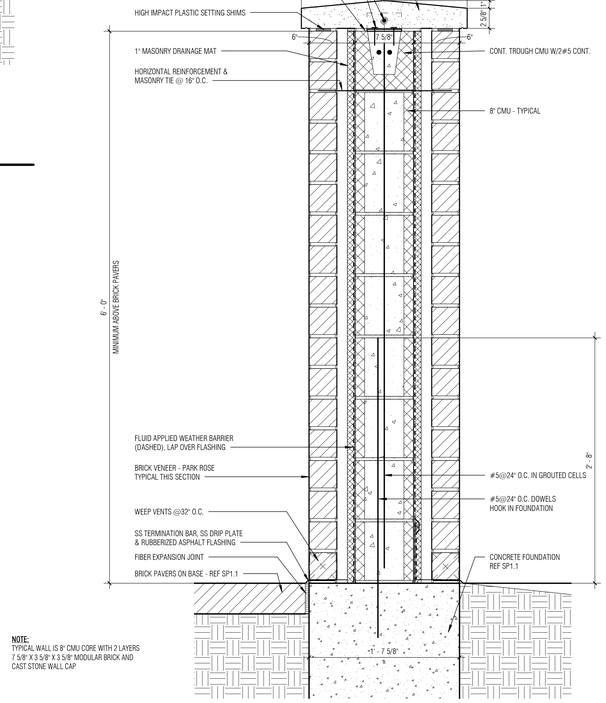
REF. SHEET SP1.1 FOR:
- FLATWORK FINISHES
- PAVEMENT SLEEVES
- EROSION CONTROL
- HORIZONTAL CONTROL
- SUBGRADE PREPARATION
- GRADING & DRAINAGE



6 SECTION - STATUE PEDESTAL
SCALE: 1 1/2" = 1'-0"



7 SECTION - LOW WALL
SCALE: 1 1/2" = 1'-0"



NOTE:
TYPICAL WALL IS 8" CMU CORE WITH 2 LAYERS 7 5/8" X 3 5/8" X 3 5/8" MODULAR BRICK AND CAST STONE WALL CAP

8 SECTION - HIGH WALL
SCALE: 1 1/2" = 1'-0"

BRINKLEY SARGENT WIGINTON ARCHITECTS
Architect: Brinkley Sargent Wiginton Architects (972) 960-9970
Landscape: Kendall Landscape Architecture (214) 739-3226

FAIRVIEW FIRE STATION NO. 1
HONOR PLAZA
510 STATE HIGHWAY 5 FAIRVIEW, TX 75069

HISTORY

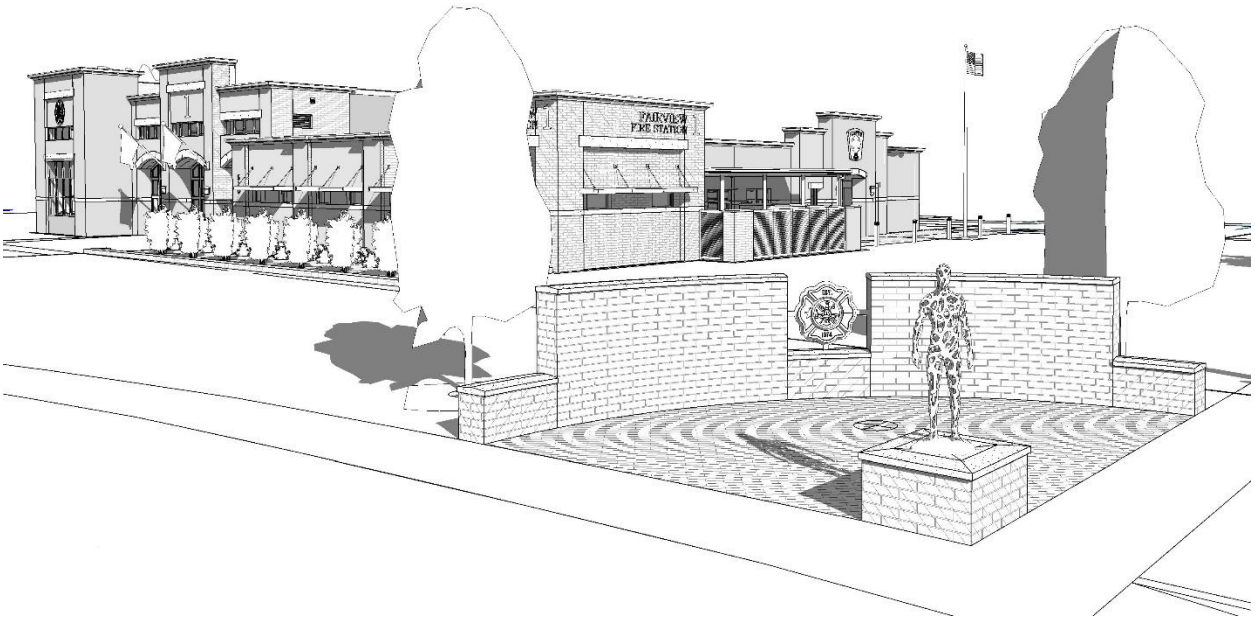
#	DATE	DESCRIPTION

SITE PLAN, ELEVATIONS, SECTIONS, DETAILS, 3D AXONS

22315
02/07/2024
A-01

BID SET

TOWN OF FAIRVIEW



FIRE STATION NO. 1
HONOR PLAZA

PROJECT MANUAL

BID ISSUE SET

FEBRUARY 7, 2024

BRINKLEY SARGENT WIGINTON ARCHITECTS

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PROFESSIONAL SEALS PAGE

The specifications sections listed below were prepared by or under the direct supervision of the Landscape Architect.

Kendall + Landscape Architecture
6976 Santa Barbara
Dallas, Texas 75214

DIVISION 32 – SITEWORK

03 1100	Concrete Formwork
03 2100	Concrete Reinforcing
03 3100	Concrete Cast in Place
32 1413	Pavers

SECTION 00 0010
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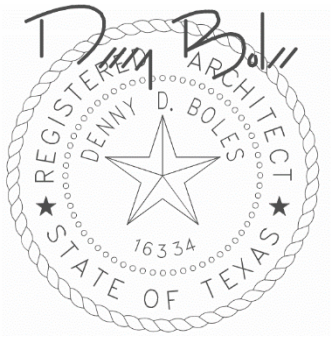

END OF SECTION

SECTION 00 3132
GEOTECHNICAL DATA

1.1 INVESTIGATION

A. Investigation: An investigation of subsurface soil conditions at the building sites was authorized by the Owner, and investigations were made.

1.2 REPORT

A. The complete report of the subsurface investigation is bound herein for information only and follows this page.

B. Report and log of borings are bound herein for Contractor's information but is not a warranty of subsurface conditions, nor is it a part of the Contract Documents.

1.3 RESPONSIBILITY

A. Bidders are expected to examine the site and subsurface investigation reports and then decide for themselves the character of the materials to be encountered.

B. The Architect and Owner assume no responsibility for variations of subsoil quality of conditions.

END OF SECTION

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GEOTECHNICAL EXPLORATION

on

FAIRVIEW FIRE STATION NO. 1, FIRE ADMINISTRATION, EOC/TRAINING AND PUBLIC WORKS

SEC of Greenville Drive and Lakeridge Drive
Fairview, Texas
ALPHA Report No. G170915-Revised

Prepared for:

TOWN OF FAIRVIEW
372 Town Place
Fairview, Texas 75069
Attention: Mr. James Chancellor, P.E.
November 21, 2019

Prepared By:

ALPHA TESTING, INC.
2209 Wisconsin Street, Suite 100
Dallas, Texas 75229

ALPHA TESTING
WHERE IT ALL BEGINS

Geotechnical
Construction Materials
Environmental
TBPE Firm No. 813

2209 Wisconsin Street,
Suite 100
Dallas, Texas 75229

Tel: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

November 21, 2019

Town of Fairview
372 Town Place
Fairview, Texas 75069
Attention: Mr. James Chancellor, P.E.

Re: Geotechnical Exploration
Fairview Fire Station No. 1, Fire Administration, EOC/Training and Public Works
SEC of Greenville Dr. and Lakeridge Dr.
Fairview, Texas
ALPHA Report No. G170915-Revised

Attached is the report of the geotechnical exploration performed for the project referenced above. This study was authorized by Ms. Julie Couch on April 10, 2017 and performed in accordance with ALPHA Proposal No. 58263 dated April 7, 2017.

This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses were used to develop recommendations to aid design and construction of foundations and pavement.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing materials testing services during construction, please contact our office.

Sincerely,

ALPHA TESTING, INC.

11/21/19
STATE OF TEXAS
CHRISTOPHER W. EDDY
86610
LICENSED
PROFESSIONAL ENGINEER

Christopher W. Eddy, P.E.
Senior Project Engineer

Mark L. McKay, P.E.
Geotechnical Department Manager

CWE/MLM
Copies: (1) Client

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On

ALPHA REPORT NO. G170915-Revised

1.0 PURPOSE AND SCOPE

The purpose of this geotechnical exploration is for ALPHA TESTING, INC. (ALPHA) to evaluate for the "Client" some of the physical and engineering properties of subsurface materials at selected locations on the subject site with respect to formulation of appropriate geotechnical design parameters for the proposed new construction. The field exploration was accomplished by securing subsurface samples from widely spaced test borings performed across the expanse of the proposed new construction. Engineering analyses were performed from results of the field exploration and results of laboratory tests performed on representative samples.

Also included are general comments pertaining to reasonably anticipated construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to evaluate subsurface conditions and to aid in ascertaining construction meets project specifications.

Recommendations provided in this report were developed from information obtained in test borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those observed at the boring locations, and subsurface conditions at boring locations may vary at different times of the year. The scope of work may not fully define the variability of subsurface materials and conditions that are present on the site.

The nature and extent of variations between borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and possibly other tests.

2.0 PROJECT CHARACTERISTICS

The project site is located at the southeast corner of Greenville Drive and Lakeridge Drive in Fairview, Texas. A site plan provided by the Client illustrating the general outline of the property is provided as Figure 1, the "Boring Location Plan", in the Appendix of this report. At the time of the field exploration, the southern portion of site was developed with several single-story buildings with associated pavements, three ground supported storage tanks, and an elevated storage tank. The north portion of the site is vacant land with trees along the west property boundary and extending east-west across the site. A stockpile of debris (limestone boulders, concrete pipe, concrete slabs, lumber, etc.) is located on the southeast corner of the site. Grades tend to slope downward to the east with as much as 20 feet of elevation change across the site.

Present plans are to construct a fire station with an attached fire administration building and a future police building on the north portion of the site. A public works administration building, storage/workshop/garage, truck wash, covered parking and covered storage bins are planned on the south portion of the site. The fire station, fire administration building and future police building will be two-stories while the remaining buildings will be single-story. Paved parking areas and drive lanes are planned across the site and a detention pond is planned on the southeast corner of the site.

Table A below shows the planned finish floor elevations for the proposed buildings. We understand the bottom level of the future police building will be situated below exterior grades.

TABLE A
PLANNED FINISH FLOOR ELEVATIONS

Building	Finish Floor Elevation, ft.
Fire Station and Fire Administration Building	660.0
Future Police Building	645.0
Public Works Administration	653.0
Storage/Workshop/Garage	652.0
Truck Wash	653.5

We anticipate area pavement for parking and drive lanes will consist of portland-cement concrete (PCC).

3.0 FIELD EXPLORATION

Subsurface conditions on the site were explored by drilling a total of sixteen test borings in general accordance with ASTM D 420 using standard rotary drilling equipment. Borings 1 through 10, associated with the buildings/structures, were drilled to depths of about 30 to 35 feet; Borings 11 through 15, associated with drives and parking areas, were drilled to a depth of about 10 feet each, and Boring 16, associated with the detention pond, was drilled to a depth of about 15 feet. The approximate location of each test boring is shown on the Boring Location Plan, Figure 1, enclosed in the Appendix of this report. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Section A-1 of the Appendix.

Subsurface types encountered during the field exploration are presented on the Log of Boring sheets included in the Appendix of this report. The boring logs contain our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are approximate and the actual transition between strata may be gradual.

4.0 LABORATORY TESTS

Selected samples of the subsurface materials were tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for foundation design and earthwork construction. A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented on the Log of Boring sheet enclosed in the Appendix.

5.0 GENERAL SUBSURFACE CONDITIONS

Based on the Geological Atlas of Texas (Dallas Sheet) from the Texas Bureau of Economic Geology, published by the University of Texas at Austin, and our experience, the project site is

located on the Austin Chalk (limestone) formation. The Austin Chalk generally consists of massive gray unweathered shaly limestone, overlain by tan weathered shaly limestone. Near-surface residual soils associated with the Austin Chalk generally consist of high plasticity clays and/or moderate plasticity calcareous clays.

Approximately 3 to 4 inches of asphaltic concrete with 3 to 8 inches of gravel base was present at the surface at Borings 9, 10 and 15. At Boring 7, approximately 4 inches of portland-cement concrete with 8 inches of base was present at the surface. The subsurface materials generally consist of clay (CH & CL) to depths of about 1 to 8 feet in the borings. Tan shaly limestone was present beneath the clays and extended to depths of about 10 to 24 feet below existing grade in Borings 1 through 10 and to the termination of Borings 11 through 16 at depths of about 10 to 15 feet. Gray shaly limestone was encountered beneath the tan shaly limestone in Borings 1 through 10 and extended to the termination of these borings at depths of about 30 to 35 feet. The upper 1 to 3 feet of clay at Borings 14 and 16 was visually classified as fill. The letters in parenthesis represent the soils' classification according to the Unified Soil Classification System (ASTM D 2487). More detailed stratigraphic information is presented on the Log of Boring sheet attached to this report.

Most of the subsurface materials are relatively impermeable and are anticipated to have a relatively slow response to water movement. Therefore, several days of observation will be required to evaluate actual groundwater levels within the depths explored. Also, the groundwater level at the site is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions and subsurface drainage characteristics.

Groundwater seepage was not encountered while advancing the borings and the boreholes appeared dry upon completion of drilling. However, it is common to detect seasonal groundwater from within fill materials, from natural fractures within the clayey matrix, at the soil/rock (shaly limestone) interface, or within fractures in the rock, particularly during or after periods of precipitation. If more detailed groundwater information is required, monitoring wells or piezometers can be installed.

Further details concerning subsurface materials and conditions encountered can be obtained from the Log of Boring sheets provided in the Appendix of this report.

6.0 DESIGN RECOMMENDATIONS

The following design recommendations were developed on the basis of the previously described Project Characteristics (Section 2.0) and General Subsurface Conditions (Section 5.0). If project criteria should change, including the location of the structures, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

The following design criteria given in this report were developed assuming the new structures are constructed with finish floor elevations as noted previously in Table A. Further cutting or filling on the site beyond that assumed above can alter the recommended foundation design parameters. Therefore, it is recommended our office be contacted before performing other cutting and filling on site to verify the appropriate design parameters are utilized for final foundation design.

6.1 Existing Fill

Based on visual observations of the samples collected, 1 to 3 feet of material encountered in some of the borings was visually classified as fill. If records of density testing are unavailable, the existing fill should be considered uncontrolled fill. Uncontrolled fill is generally not suitable for direct support of foundations and floor slabs. Considering the depth of subgrade improvement required for reducing floor slab movements (see Section 6.3 below), it is anticipated the fill will be removed from the building areas and replaced with controlled, engineered fill. Pavement areas should be properly prepared and tested as discussed in Section 7.1 of this report.

Although not encountered at the borings, fill materials can contain organics, boulders, rubble, and other debris which could be encountered during site grading and general excavation. A stockpile of debris (limestone boulders, concrete pipe, concrete slabs, lumber, etc.) is located on the southeast portion of the site in the vicinity of the proposed detention pond. Visual observations of the surface materials present in the stockpile indicate the stockpile material is not suitable for use as fill. The earthwork and excavation contracts should contain provision for removal of unsuitable materials in the existing fill. Test pits could be performed prior to construction to assess the depth, extent, and nature of the existing fill. ALPHA would be pleased to assist with a test pit program if desired

6.2 Drilled, Straight-Shaft Piers

The structural framing and walls for the proposed buildings should be supported using a system of drilled, straight-shaft piers bearing in the gray shaly limestone. These piers should bear at least 2 feet into the underlying gray shaly limestone. Deeper penetrations will be required to develop skin friction and/or uplift resistance. The gray shaly limestone was encountered at depths of about 10 to 24 feet below existing grade in Borings 1 through 10. In addition to any penetration in the gray shaly limestone required by the structural design of the piers, piers should have a minimum overall length of 8 feet.

Drilled piers bearing in gray shaly limestone can be dimensioned using a net allowable end-bearing pressure of 50 ksf and skin friction (in compression) of 7.5 ksf. The skin friction component should be applied only to the portion of the shaft located in the gray shaly limestone and below any temporary casing. Further, the minimum clear spacing between piers should be at least two pier shaft diameters to develop the full load carrying capacity from skin friction. The above bearing capacity contains a factor of safety of at least 3 considering a general bearing capacity failure and the skin friction value has a factor of safety of at least 2. Normal elastic settlement of piers under loading is estimated at less than about ½ inch.

Each pier should be designed with sufficient full-length reinforcing steel and a sufficient embedment into the gray shaly limestone to resist the uplift pressure (soil-to-pier adhesion) due to potential soil swell along the shaft from post construction heave and other uplift forces applied by structural loadings. The magnitude of uplift adhesion due to soil swell along the pier shaft cannot be defined accurately and can vary according to the actual in-place moisture content of the soils during construction. It is estimated this uplift adhesion

will not exceed about 2.0 ksf. This soil adhesion is approximated to act uniformly over the upper 12 feet of the pier shaft in contact with clayey soils. Tan shaly limestone was encountered within 1 to 8 feet of the existing ground surface in the borings. The uplift adhesion due to soil swell can be neglected over the portion of the shaft in contact with shaly limestone and non-expansive material used to grade the building pads.

The uplift resistance of each pier can be computed using an allowable skin friction value of 6 ksf acting uniformly over the portion of the shaft bearing in the gray shaly limestone. The uplift resistance should only be considered for the portion of the shaft in gray shaly limestone below the bottom of temporary casing. This uplift resistance value has a factor of safety of at least 2.

All grade beams connecting piers should be formed and not cast in earthen trenches. Grade beams should be formed with a nominal 6-inch void at the bottom. Commercially available cardboard box forms (cartons) are made for this purpose. The cardboard cartons should extend the full length and width of the grade beams. Prior to concrete placement, cartons should be inspected to verify they are firm, properly placed, and capable of supporting wet concrete. Some type of permanent soil retainer, such as pre-cast concrete panels, must be provided to prevent soils adjacent to grade beams from sloughing into the void space at the bottom of the grade beams. Additionally, backfill soils placed adjacent to grade beams must be compacted as outlined in Section 7.3 of this report. It is not necessary to construct voids under grade beams where competent shaly limestone is encountered.

Lateral analysis for drilled piers constructed at the site can be performed using the following design parameters (L-Pile) provided for the site soils in Table B. The lateral resistance of the top portion of the pier shafts (the portion in contact with clays soils within 8 feet of finished floor grade) should be neglected due to disturbance and potential soil shrinkage.

TABLE B
L-PILE DESIGN PARAMETERS FOR TAN AND GRAY SHALY LIMESTONE

Material	Unit Weight, pci	Young's Modulus (Rock Condition), psi	Uniaxial Compressive Strength, psi	K_{rm}
Tan Shaly Limestone	0.078	40,000	200	0.0005
Gray Shaly Limestone	0.081	80,000	400	0.0001

***Note:** Rock Quality Designation (RQD) for tan shaly limestone is generally in the range of 10 to 60 percent, and RQD for gray shaly limestone is generally in the range of 60 to 80 percent. Rock coring was not performed for this project. RQD values provided above are typical for the material recovered during coring, based on our area experience, and from information provided from field Texas Cone Penetration tests.

6.3 Floor Slabs

Grade supported floor slabs could experience soil-related movements due to soil moisture changes that can occur following construction. The movement potential is dependent on the thickness of active clay soils above the bedrock. We estimate the movement potential

to be less than ½ inch in areas where limestone is exposed at finish pad elevation (future police building) to as much as 6 to 7 inches in area areas where grades will be raised (fire station and fire administration building). The estimated potential movement for each building is provided in Tables C and D. The potential movements were estimated in general accordance with methods outlined by Texas Department of Transportation (TxDOT) Test Method Tex-124-E and engineering judgment and experience. Estimated movements were calculated assuming the moisture content of the in-situ soil within the normal zone of seasonal moisture content change varies between a "dry" condition and a "wet" condition as defined by Tex-124-E. Also, it was assumed a 1 psi surcharge load from the floor slab acts on the subgrade soils. Movements exceeding those predicted above could occur if positive drainage of surface water is not maintained or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from off-site locations.

In view of these potential movements, the most positive floor system for the buildings is a slab suspended completely above the existing expansive soils. A 12-inch void space should be provided between the bottom of the slab (and lowest suspended fixture/utility) and top surface of the underlying expansive clays. Cardboard carton forms or a deeper crawl space can be used to create the minimum void space. A ventilated crawl space is preferred. Provisions should be made for (a) adequate drainage of the under-floor space and (b) differential movement of utility lines, including areas where the utility penetrates through the grade beam and/or where the utility penetrates below grade areas.

If some floor slab movement is tolerable, an alternative method is for the floor system of the buildings to bear on improved soils. The recommended methods of building pad preparation to reduce potential floor slab movements to about ½ inch or ¾ inch are provided in Tables C and D below. ALPHA should be contacted for additional recommendations if finish floor elevations vary from those shown in the table. The soil improvement should extend beyond the building area to include entrances and flatwork areas sensitive to movement.

To reduce potential floor slab movements to about ½ inch, the subsurface improvement should consist of excavating the existing clay soils to the top of tan shaly limestone and replacing them with non-expansive fill (select fill or flexible base) to establish finish building pad elevation. It is recommended that flexible base be used in the fire station and fire administration building, while select fill or flexible base can be considered in the remaining building areas. Non-expansive fill (select fill or flexible base material) should meet the requirements as described in Section 7.3 of this report.

To reduce potential floor slab movements to about ¾ inch, the subsurface improvement should consist of moisture-conditioning the existing clay soils to the top of tan shaly limestone and capping them with 3 feet of non-expansive fill (select fill or flexible base) to establish finish building pad elevation. This method of building pad preparation is not recommended for the fire station and fire administration building due to the anticipated fill depths required for these buildings. Non-expansive fill (select fill or flexible base material) should meet the requirements as described in Section 7.3 of this report. Moisture conditioning is discussed in more detail in Section 6.3.1 below.

Based on the soil borings, the tan shaly limestone is anticipated to be as much as 12 to 14 feet below finish pad elevation in the fire station and fire administration building. Tan limestone is anticipated at shallower depths in the remaining building pad areas.

TABLE C
BUILDING PAD PREPARATION FOR ½ INCH MOVEMENT POTENTIAL OF GRADE SUPPORTED FLOOR SLABS

Building	Finish Floor Elevation, feet	Estimated Potential Vertical Movement, inch	Building Pad Preparation for Movement Potential of ½ inch or Less
Fire Station and Fire Administration Building	660.0	6 to 7	Remove existing clay soil to top of limestone and place **flexible base** to achieve finish pad elevation
Future Police Building	645.0	< ½	Remove existing clay soil to top of limestone and place **select fill or flexible base** to achieve finish pad elevation
Public Works Administration	653.0	3 to 4	
Storage/Workshop/ Garage	652.0	3 to 4	
Truck Wash	653.5	2 to 3	

TABLE D
BUILDING PAD PREPARATION FOR ¾ INCH MOVEMENT POTENTIAL OF GRADE SUPPORTED FLOOR SLABS

Building	Finish Floor Elevation, feet	Estimated Potential Vertical Movement, inch	Building Pad Preparation for Movement Potential of ¾ inch or Less
Fire Station and Fire Administration Building	660.0	6 to 7	Remove existing clay soil to top of limestone and place **flexible base** to achieve finish pad elevation
Future Police Building	645.0	< ½	Remove existing clay soil to top of limestone, moisture condition the clays to within 3 ft of pad elevation, and place 3 ft of **select fill or flexible base** to achieve finish pad elevation
Public Works Administration	653.0	3 to 4	
Storage/Workshop/ Garage	652.0	3 to 4	
Truck Wash	653.5	2 to 3	

If soil-supported floor slabs are utilized for the planned buildings, consideration should be given to a "floating" (fully ground supported, and not structurally connected to walls or foundations) floor slab. This can reduce the risk of cracking and displacement of the floor slab due to differential movements between the slab and foundations. A floor slab doweled into perimeter grade beams can develop a plastic hinge (crack) parallel to and approximately 5 to 10 feet inside the building perimeter. Differential movements can still occur between the grade beam and a “floating” floor slab. The structural engineer should determine the need for connections between the slab and structural elements and determine if control joints to limit cracking are needed. A properly designed and constructed moisture barrier should be placed between the slab and subgrade soils to retard moisture migration through the slab.

6.3.1 Subgrade Improvement Utilizing Moisture-Conditioned Soil

Movement of the floor slabs for the future police building, public works administration building, storage/workshop/garage and truck wash could be reduced to about ¾ inch by placing a minimum 3-foot cap of non-expansive material between the bottom of the floor slab and the surface of moisture-conditioned soil that extends to the top of competent tan shaly limestone. The depth of the shaly limestone is variable across the site and could be deeper than encountered at the boring locations. We should be contacted for further evaluation and recommendations if the shaly limestone is deeper than 6 feet below final building pad grade. If tan limestone is present at the building pad elevation, a minimum 6 inches of non-expansive material is recommended between the limestone subgrade and floor slab. Non-expansive fill could consist of select fill or flexible base material as described in Section 7.3 below.

Moisture-conditioning consists of processing and compacting the specified minimum thickness of on-site soil at a “target” moisture content approximated to be at least 5 percentage points above the material’s optimum moisture content as determined by the standard Proctor method (ASTM D 698). Calcareous clay soils and other clays with lower plasticity index (PI) values may need to be placed at moisture contents closer to optimum to allow compaction. The moisture-conditioned soil should be compacted to a dry density of 93 to 97 percent of standard Proctor maximum dry density. Moisture conditioning of the on-site soil should extend throughout the entire building pad area and adjoining flatwork, and at least 5 feet beyond the perimeter of the building. At building entrances and outward swinging doors, moisture conditioning should extend at least 10 feet beyond the building perimeter. However, non-expansive material should not extend beyond the building limits. If flatwork or paving is not planned adjacent to the structure (i.e. above the moisture-conditioned soils), a moisture barrier consisting of a minimum of 10 mil plastic sheeting with 8 to 12 inches of soil cover should be provided above the moisture conditioned soils. Moisture-conditioned soils should be maintained in a moist condition prior to placement of the required thickness of non-expansive material or flatwork.

The resulting estimated potential seasonal movement (about 1 inch) was calculated assuming the moisture content of the moisture-conditioned soil varies between the "target" moisture content and the "wet" condition while the deeper undisturbed in-situ soil within the normal zone of seasonal moisture content change varies between the "dry" condition and the "wet" condition as defined by methods outlined in TxDOT Test Method Tex-124-E.

It is the intent of the moisture-conditioning process described above to reduce the free swell potential of the moisture-conditioned soil to 1 percent or less. Additional laboratory tests (i.e., standard Proctors, absorption swell tests, etc.) should be conducted during construction to verify the "target" moisture content for moisture-conditioning (estimated at 5 percentage points above the material's optimum moisture content as defined by ASTM D 698) is sufficient to reduce the free swell potential of the processed soil to 1 percent or less. In addition, it is recommended samples of the moisture-conditioned material be routinely obtained during construction to verify the free swell of the improved material is 1 percent or less.

Moisture conditioning should be monitored and tested on a full-time basis by ALPHA to verify materials tested are placed with the proper degree of moisture and compaction as presented in this report. Field density tests should be performed for each lift of fill placed in each building pad area.

6.4 Below Grade Area for Future Police Building

A sub-floor drainage system is recommended for the below grade area of the future police building. The sub-floor drain system should be situated a minimum of 12 inches below the bottom of the floor slab. The drain system could consist of perforated collector pipes (minimum 6 inches in diameter) wrapped with a filter fabric (Mirafi 140N or equivalent) and placed in shallow trenches connected to a uniform drainage layer at least 8 inches thick. Spacing of the drain pipes should not exceed 30 ft. The sub-floor drainage system should be sloped to drain to suitable sump pits. Consideration should also be given to providing multiple sump pits with an emergency power source.

The drainage layer should consist of free-draining gravel material with a maximum nominal particle size of 2 inches and not more than 5 percent passing the No. 200 sieve. Gravel meeting the gradation requirements of ASTM C33 Size No. 57 is an example of a commercially available material suitable for this purpose. The gravel drainage layer can be used as a substitute for non-expansive material (select fill or flexible) used to improve the subgrade.

All below grade walls and floor slabs in occupied space must be waterproofed.

6.5 Flatwork

Flatwork, pavement and any other soil-supported structural elements will be subjected to the same level of movement as discussed in Section 6.3. If this level of movement is not acceptable, flatwork could be structurally supported on drilled pier foundations as described in Section 6.2 above. As an alternative, subgrade improvements as discussed in

Section 6.3 could be considered for reduction in soil movements in any areas where post-construction movements would be critical.

6.6 Seismic Considerations

The Site Class for seismic design is based on several factors that include soil profile (soil or rock), shear wave velocity, and strength, averaged over a depth of 100 feet. Since our borings did not extend to 100-foot depths, we based our determinations on the assumption that the subsurface materials below the bottom of the borings were similar to those encountered at the termination depth. Based on Section 1613.3.2 of the 2012 International Building Code and Table 20.3-1 in the 2010 ASCE-7, we recommend using Site Class C (very dense soil and soft rock) for seismic design at this site.

6.7 Below Grade Walls and Retaining Walls

6.7.1 Wall Foundations

Below grade walls and retaining walls that are sensitive to movement should be supported on a drilled, straight-shaft pier foundation system as discussed in Section 6.2. Retaining walls that are independent and are not structurally connected to the buildings could be supported by footing foundations bearing in native clay soils, properly compacted fills or tan shaly limestone. Footing foundations bearing in clay soils are susceptible to potential soil related movements of up to about 4½ inches depending on the depth to limestone.

A net allowable bearing pressure of 2 ksf can be used for walls supported on shallow footings bearing in native clay soils, properly compacted fills or tan shaly limestone. Footings should not bear on uncontrolled fill.

The above bearing pressures are applicable for footings bearing at least 2 feet below the final ground surface as measured at the toe of the wall or structure. The recommended footing depths are for bearing purposes only, the structural engineer should review the recommended bearing depths to insure the retaining walls are sufficiently designed for global stability and to resist sliding, overturning, etc. Global stability analyses are beyond the scope of this study.

Wall footings should have a least dimension of 18 inches for bearing capacity considerations. Footing subject to lateral forces or overturning should be proportioned such that the soil reaction force on the base of the footing lies within the middle one-third of the footing width.

All foundation excavations should be monitored during construction to locate any pockets or seams of unsatisfactory materials (organic material, wet, soft, or loose soil), which might be encountered in excavations for footings. Unsatisfactory materials encountered at the foundation bearing level should be removed and replaced with either lean concrete (about 2,000 psi strength at 28 days) or flexible base (see Section 7.3 of this report).

Resistance to sliding will be developed by friction along the base of the footings and passive earth pressure acting on the vertical face of the footing and/or a key installed in the base of the footings, if required. We recommend a coefficient of base friction of 0.3 along the bottom of the footing in clay materials and 0.35 for footings bearing on limestone. The available passive earth resistance on the vertical face of the toe of the footing and a possible key installed in the base of the footing may be calculated using an allowable uniform passive earth pressure of 500 psf for footings or keys bearing laterally against undisturbed vertical cuts in native clayey soils and 2,000 psf for footings or keys bearing laterally against vertical cuts in limestone. Passive resistance on the vertical face of the footing within 2 feet of the final site grade should be neglected.

6.7.2 Lateral Earth Pressures

Below grade walls for the future police building and low-level site retaining walls should be designed to resist the expected lateral earth pressures. The magnitude of lateral earth pressure against retaining walls is dependent on the method of backfill placement, type of backfill soil, drainage provisions, and type of wall (rigid or yielding) after placement of the backfill. Experience demonstrates when a wall is held rigidly against horizontal movement (restrained at the top), the lateral pressure (at-rest lateral earth pressure) against the wall is greater than the normally assumed active pressure. Yielding walls (rotation at the top of the wall on the order of 0.1 to 0.4 percent of the wall height) can be designed for active earth pressures (k_a) but rigid walls should be designed for higher at-rest lateral earth pressures (k_o). Walls should be designed using the equivalent fluid pressures provided in Table E, considering a triangular stress distribution and assuming a horizontal ground surface extending backward from the top of the wall. The equivalent fluid pressures provided do not include a factor of safety.

TABLE E
LATERAL EARTH PRESSURES FOR RETAINING WALL DESIGN

Material	Condition	Equivalent Fluid Pressure, pcf	
		Drained	Undrained
Free Draining Granular Soil Φ=35˚, γ_T =125 pcf	At-Rest, k_o=0.42	53	89
	Active, k_a=0.27	34	79
On-Site Clayey Soil Φ=15˚, γ_T =120 pcf	At-Rest, k_o=0.74	--	105
	Active, k_a=0.59	--	96

Φ – Internal friction and γ_T – Effective Total Unit Weight

Free draining granular backfill material should be a clean, non-plastic, relatively well-graded granular backfill consisting of either sand, gravel, or a sand and gravel mixture (less than 10 percent finer than the No. 200 sieve size). A material meeting

the gradation requirements of ASTM C33 No. 57 or 67 type material could be used for this purpose. To reduce surface water seepage into the free draining granular backfill, the top 1 foot of the backfill should consist of on-site clay soil with a plasticity index of at least 25. The free draining granular backfill should extend outward at least 2 feet from the base of the wall and then extend upward on a 1 (horizontal) to 2 (vertical) slope. The free draining granular backfill should be separated from the adjacent native soils using a non-woven filter fabric (Mirafi 140N, or equivalent) to prevent intrusion of native soils into the free draining granular backfill.

Complete drainage of the free draining granular material should be provided to prevent the development of hydrostatic pressures behind the wall. A typical drainage system should consist of perforated plastic drain pipes placed in filter trenches excavated parallel to the base of the walls for their entire length. The drain pipes should be positioned at a depth lower than the bottom elevation of the wall and should also be wrapped with filter fabric (Mirafi 140N, or equivalent). A perimeter drain system is beneficial regardless of the type of backfill used behind the wall. As a minimum, a system of weep-holes should be provided for free standing exterior walls. Subsurface drains are recommended behind retaining walls or below grade areas.

The effects of surcharge loading must also be considered. The surcharge load should be multiplied by the applicable coefficient of earth pressure from the table above, and the result applied as a uniform lateral pressure over the full height of the wall.

Lightweight, hand-controlled vibrating plate compactors are recommended for compaction of backfill adjacent to walls to reduce the possibility of increases in lateral pressures due to over-compaction. Heavy compaction equipment should not be operated within a distance equal to the height of the wall or at least 10 feet from the wall or whichever is greater. Also, compaction of backfill soils behind walls should not exceed 100 percent standard Proctor maximum dry density (ASTM D 698) to further limit lateral earth pressures against walls.

6.8 Area Pavement

Clayey soils and shaly limestone encountered near the existing ground surface at the borings or similar material placed as engineered fill will probably constitute the subgrade for most parking and drive areas. Therefore, it is recommended these materials be improved prior to construction of portland-cement concrete (PCC) pavement. To permit correlation between information from test borings and actual subgrade conditions exposed during construction, a qualified Geotechnical Engineer should be retained to provide subgrade monitoring and testing during construction. If there is any change in project criteria, the recommendations contained in this report should be reviewed by our office.

Calculations used to determine the required pavement thickness are based only on the physical and engineering properties of the materials used and conventional thickness

determination procedures. Pavement joining buildings should be constructed with a curb and the joint between the building and curb should be sealed. Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations, reinforcing steel, joint design and environmental factors will significantly affect the service life and must be included in preparation of the construction drawings and specifications, but all were not included in the scope of this study. Normal periodic maintenance will be required for all pavement to achieve the design life of the pavement system.

Please note, the recommended pavement sections provided below are considered the minimum necessary to provide satisfactory performance based on the expected traffic loading. In some cases, City minimum standards for pavement section construction may exceed those provided below.

6.8.1 Pavement Subgrade Preparation

In areas where clayey soils are exposed after final subgrade elevation is achieved, the exposed surface of the pavement subgrade soil should be scarified to a depth of 6 inches and mixed with a minimum of 8 percent hydrated lime (by dry soil weight) in conformance with TxDOT Standard Specifications Item 260. Assuming an in-place unit weight of 100 pcf for the pavement subgrade soils, this percentage of lime equates to about 36 lbs of lime per square yard of treated subgrade. The actual amount of lime required should be confirmed by additional laboratory tests (ASTM C 977 Appendix XI) prior to construction. It is not necessary to lime treat subgrade consisting of competent shaly limestone.

It is recommended lime modification procedures extend at least 1 foot beyond the edge of the pavement to reduce effects of seasonal shrinking and swelling upon the extreme edges of pavement. The soil-lime mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to +4 percentage points of the mixture's optimum moisture content. In all areas where hydrated lime is used to treat subgrade soil, routine Atterberg-limit tests should be performed to verify the resulting plasticity index of the soil-lime mixture is at or below 15.

In pavement areas where shaly limestone is exposed after final subgrade elevation is achieved, shaly limestone cuttings, flexible base, or lime trimmings from other areas of the site could be used as a leveling course (as needed) to provide a smooth surface for placement of the pavement. Material used as a leveling course should have a plasticity index of at least 4 and no greater than 15 and should be compacted to at least 95 percent of standard Proctor maximum dry density and within -2 to +2 percentage points of the material's optimum moisture content. It is not necessary to lime modify pavement subgrade that consists of shaly limestone.

Mechanical lime stabilization of the pavement subgrade soil will not prevent normal seasonal movement of the underlying untreated materials. Pavement and other flatwork will have the same potential for movement as slabs constructed

directly on the existing undisturbed soils. Therefore, good perimeter surface drainage with a minimum slope of 2 percent away from the pavement is recommended. The use of sand as a leveling course below pavement supported on expansive clays should be avoided. Normal maintenance of pavement should be expected over the life of the structure.

6.8.2 Portland-Cement Concrete (PCC) Pavement

Following subgrade improvement as recommended in Section 6.8.1 above, the following PCC (reinforced) pavement sections are recommended in Table F.

TABLE F
RECOMMENDED PCC PAVEMENT SECTIONS

Paving Areas and/or Type	PCC Thickness, Inches
**Light Duty Pavement (Parking Areas Subjected Exclusively to Passenger Vehicle Traffic – 90,000 ESALs)	5
Medium Duty Pavement (Drive Lanes and Areas Subject to Light Volume Truck Traffic – 500,000 ESALs)	6
Heavy Duty Pavement (Dumpster, Fire Truck and Medium Volume Truck Traffic – 1,000,000 ESALs)	7

****Note:** Lime treatment of the pavement subgrade is not necessary for pavements subjected *exclusively* to passenger vehicle traffic, although lime treatment in these areas would be generally beneficial to the long-term performance of the pavement and improve constructability. Prior to construction of pavement on untreated clay subgrade soil, the exposed subgrade should be scarified to a depth of at least 6 inches and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the material's optimum moisture content.

The PCC pavement sections given above are based on assumed traffic loadings as given in the table above. If higher ESAL counts are expected, we should be contacted for further recommendations.

Portland-cement concrete should have a minimum compressive strength of 3,000 psi at 28 days in Light Duty pavement areas subjected exclusively to passenger vehicle traffic. We recommend a minimum compressive strength of 3,500 psi at 28 days for Medium Duty and Heavy Duty pavement areas. Concrete should be designed with 5 $\pm$ 1 percent entrained air. Joints in concrete paving should not exceed 15 feet. Reinforcing steel should consist of No. 3 bars placed at 18 inches on-center in two directions.

Alternatively, mechanical lime stabilization of the pavement subgrade could be eliminated by increasing the PCC thickness in the pavement sections presented above by 1 inch. Prior to construction of pavement on untreated clay subgrade soil,

the exposed subgrade should be scarified to a depth of at least 6 inches and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the material's optimum moisture content.

6.9 Drainage and Other Considerations

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. All pavement and sidewalks within 5 feet of the structures should be sloped away from the buildings to prevent ponding of water around the buildings. Final grades within 5 feet of the structures should be adjusted to slope away from the structures at a minimum slope of 2 percent. **Maintaining positive surface drainage throughout the life of the structure is essential.**

In areas with pavement or sidewalks adjacent to the new structures, a positive seal must be maintained between the structures and the pavement or sidewalk to minimize seepage of water into the underlying supporting soils. Post-construction movement of pavement and flatwork is common. Normal maintenance should include examination of all joints in paving and sidewalks, etc. as well as resealing where necessary.

Several factors relate to civil and architectural design and/or maintenance, which can significantly affect future movements of the foundation and floor slab system:

1. Preferably, a complete system of gutters and downspouts should carry runoff water a minimum of 5 feet from the completed structure.

2. Large trees and shrubs should not be allowed closer to the foundations than a horizontal distance equal to roughly one-half of their mature height due to their significant moisture demand upon maturing.

3. Moisture conditions should be maintained "constant" around the edge of the slab. Ponding of water in planters, in unpaved areas, and around joints in paving and sidewalks can cause slab movements beyond those predicted in this report.

4. Planter box structures placed adjacent to the building should be provided with a means to assure concentrations of water are not available to the subsoil stratigraphy.

Trench backfill for utilities should be properly placed and compacted as outlined in Section 7.3 of this report and in accordance with requirements of local City standards. Since granular bedding backfill is used for most utility lines, the backfilled trench should not become a conduit and allow access for surface or subsurface water to travel toward the new structures. Concrete cut-off collars or clay plugs should be provided where utility lines cross building lines to prevent water from traveling in the trench backfill and entering beneath the structures.

7.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Professional Engineering firm be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be anticipated until the course of construction. The recommendations offered in the following paragraphs are intended not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the boring.

7.1 Site Preparation and Grading

Shaly limestone was encountered in the borings at depths of about 1 to 8 feet below the existing ground surface and we would expect shaly limestone to be encountered during general excavation and grading at this site. From our experience, this shaly limestone can be hard and difficult to excavate and grade, and difficulty excavating this material can increase with depth. Rock excavation methods (including, but not limited to rock teeth, rippers, jack hammers, or sawcutting) may be required to remove shaly limestone. Crushing equipment may be required to process the shaly limestone for use as controlled fill. The contractor selected should have experience with excavation in this shaly limestone.

About 1 to 3 feet of fill materials were encountered in some of the borings. Although not encountered at the borings, fill materials can contain organics, boulders, rubble, and other debris which could be encountered during site grading and general excavation. A stockpile of debris (limestone boulders, concrete pipe, concrete slabs, lumber, etc.) is located on the southeast portion of the site in the vicinity of the proposed detention pond. The stockpile material is not considered suitable for use as fill. The earthwork and excavation contracts should contain provision for removal of unsuitable materials in the existing fill and stockpile of debris. Test pits could be performed prior to construction to assess the depth, extent, and nature of the existing fill. ALPHA would be pleased to assist with a test pit program if desired

All areas supporting the foundations, flatwork, or areas to receive new fill should be properly prepared. Site preparation for the proposed project should include removing the existing site improvements (i.e. pavements, flatwork, gravel surfacing, foundation walls, utilities), vegetation, topsoil, and any other unsuitable surface materials from the areas of new construction. Existing foundation elements should be removed or cut off at least 1 foot below finished grade or 1 foot below the new structural elements, whichever is deeper. Abandoned utility lines should be either removed or positively sealed to prevent possible water seepage into subgrade soils. Any soil disturbed due to removal of the existing site improvements should be re-compacted in accordance with recommendations provided in Section 7.3 of this report.

After completion of the necessary stripping, clearing, and excavating, and prior to placing any required fill, the exposed soil subgrade should be evaluated by proof-rolling with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 20 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil. Proof-rolling procedures should be observed routinely by a Professional Engineer or his designated representative. Any undesirable material (organic material, wet, soft, or loose soil) exposed during the proofroll should be removed and replaced with well-compacted material as outlined in Section 7.3.

Prior to placement of any fill, the exposed soil subgrade should be scarified to a minimum depth of 6 inches and recompacted as outlined in Section 7.3.

If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench width of five (5) feet. This should provide a good contact between the existing soils and new fill materials, reduce potential sliding planes and allow relatively horizontal lift placements.

Even if fill is properly compacted, fills in excess of about 10 feet are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing utility lines under pavements and/or wall backfill.

Slope stability analysis of embankments (natural or constructed) and global stability analysis for retaining walls was not within the scope of this study.

The contractor is responsible for designing any excavation slopes, temporary sheeting or shoring. Design of these structures should include any imposed surface surcharges. Construction site safety is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods and sequencing of construction operations. The contractor should also be aware that slope height, slope inclination or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state and/or federal safety regulations, such as OSHA Health and Safety Standard for Excavations, 29 CFR Part 1926, or successor regulations. Stockpiles should be placed well away from the edge of the excavation and their heights should be controlled so they do not surcharge the sides of the excavation. Surface drainage should be carefully controlled to prevent flow of water over the slopes and/or into the excavations. Construction slopes should be closely observed for signs of mass movement, including tension cracks near the crest or bulging at the toe. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. Shoring, bracing or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Texas.

Due to the nature of the clayey soils found near the surface at the borings, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated during periods when these soils are saturated.

7.2 Foundation Excavations

All foundation excavations should be monitored to verify foundations bear on suitable material. The bearing stratum exposed in the base of all foundation excavations should be protected against any detrimental change in conditions. Surface runoff water should be drained away from excavations and not allowed to collect. All concrete for foundations should be placed as soon as practical after the excavation is made. Drilled piers should be excavated and concrete placed within the same day after the design penetration is begun.

Prolonged exposure of the bearing surface to air or water will result in changes in strength and compressibility of the bearing stratum. Therefore, if delays occur, drilled pier excavations should be slightly widened and deepened to provide a fresh penetration surface, or a new (deeper) full penetration should be provided for drilled piers.

All pier shafts should be at least 1.5 feet in diameter to facilitate clean-out of the base and proper monitoring. Concrete placed in pier holes should be directed through a tremie, hopper, or equivalent. Placement of concrete should be vertical through the center of the shaft without hitting the sides of the pier or reinforcement to reduce the possibility of segregation of aggregates. Concrete placed in piers should have a minimum slump of 5 inches (but not greater than 7 inches) to avoid potential honey-combing.

Observations during pier drilling should include, but not necessarily be limited to, the following items:

Verification of proper bearing strata and consistency of subsurface stratification with regard to boring logs,

Confirmation the minimum required penetration into the bearing strata is achieved,

Complete removal of cuttings from bottom of pier holes,

Proper handling of any observed water seepage and sloughing of subsurface materials,

No more than 2 inches of standing water should be permitted in the bottom of pier holes prior to placing concrete, and

Verification of pier diameter and steel reinforcement.

Groundwater was not encountered in the borings. From our experience, it is common to encounter seasonal groundwater seepage during pier installation, particularly during or after periods of precipitation. Submersible pumps, bailing tools, and/or immediate placement of concrete may be sufficient to control light seepage. Temporary casing may also be necessary to prevent sloughing of soils during pier drilling operations and to control water seepage as encountered. Casing should be seated in clay soils or shaly limestone below the depth of seepage, and all water and loosened material should be removed from the cased excavation before starting the design penetration. As casing is extracted, care

should be taken to maintain a positive head of plastic concrete and minimize the potential for intrusion of water seepage. It is recommended a separate bid item be provided for casing on the contractors' bid schedule.

Groundwater can also occur within fractures in the bearing stratum for drilled, straight-shaft piers and this may require extending the casing and deepening the piers. From our experience with similar soil and rock conditions, sometimes groundwater cannot be controlled by the use of casing, and underwater placement of pier concrete may be required. Special mix designs are usually required for tremied or pumped concrete. Proper concreting procedures should include placement of concrete from the bottom to the top of the pier using a sealed tremie or pumped concrete. The tremie should be maintained at least 5 feet into the wet concrete during placement. It is recommended a separate bid item be provided for casing and underwater concrete placement on the contractor's bid schedule. Pier drilling contractors experienced in similar soil and groundwater conditions should be utilized for this project.

ALPHA should be contacted for further evaluations and recommendations if caving soils and/or groundwater seepage is encountered during pier installation.

7.3 Fill Compaction

Select, Non-Expansive Fill: Materials used as select, non-expansive fill should have a liquid limit less than 35, a plasticity index (PI) not less than 4 nor greater than 15. Select, non-expansive fill should not contain deleterious material and debris. The select, non-expansive fill should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the material's optimum moisture content. The plasticity index and liquid limit of material used as select, non-expansive fill should be verified during fill placement using laboratory tests. Atterberg limits tests to verify the select, non-expansive fill shall be performed at a frequency of at least one test per 2 feet of thickness per 5,000 square feet. Atterberg limits shall be staggered between various lifts within each 5,000 square feet.

Flexible Base Material: Flexible base material used as non-expansive fill for the building pad area should meet the requirements of TxDOT Item 247, Type A or D, Grade 1 or 2. The material should be compacted to a minimum **98 percent** of standard Proctor maximum dry density (ASTM D 698) and within -2 to +3 percentage points of the material's optimum moisture content.

The following recommendations pertain to fill placement and compaction for general site grading **outside** the building pad areas. Fill placed within the building pad areas should conform to the requirements in Section 6.3 above.

Clay soils with a plasticity index equal to or greater than 25 should be compacted to a dry density between 93 and 98 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of +2 to +6 percentage points of the material's optimum moisture.

Sandy clay, calcareous clay, and clayey sand soils used for general fill with a plasticity index less than 25 should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of -1 to +3 percentage points of the material's optimum moisture.

Clayey soils used as fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Processed shaly limestone or other rock-like materials used as fill should be compacted to at least 95 percent of standard Proctor maximum dry density, at a moisture content of 0 to +4 percentage points of optimum moisture. Individual rock pieces larger than 6 inches in dimension should not be used as fill. However, if rock fill is utilized within 3 feet below the bottom of floor slabs, the maximum allowable size of individual rock pieces should be reduced to 3 inches. Processed limestone used as fill should incorporate sufficient fines to prevent the presence of voids around larger diameter rock pieces. A gradation of at least 70 percent passing a standard No. 4 sieve is recommended. Onsite processed rock used as non-expansive fill should have a plasticity index of 15 or less.

Compaction should be accomplished by placing fill in about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

In cases where either mass fills or utility lines are more than 10 feet deep, the fill/backfill below 10 feet should be compacted to at least 98 percent of standard Proctor maximum dry density (ASTM D 698) and within – 2 to +2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 feet should be compacted as outlined above.

Even if fill is properly compacted, fills in excess of about 10 feet are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing utility lines under pavements and/or wall backfill.

7.4 Groundwater

Groundwater was not encountered at the test borings. However, from our experience with similar soils, groundwater seepage could be encountered at shallower depths in excavations for foundations, utility conduits and other general excavations. The risk of encountering seepage increases with depth of excavation and during or after periods of precipitation. Standard sump pits and pumping may be adequate to control seepage on a local basis.

In any areas where cuts are made to establish final grades, attention should be given to possible seasonal water seepage that could occur through natural cracks and fissures in the newly exposed stratigraphy. Also, seasonal groundwater seepage could occur where shaly limestone is at or near the final site grade and where it is exposed in slopes and cuts. Subsurface drains may be required in these areas to intercept seasonal groundwater seepage. The need for these or other de-watering devices at the site should be carefully

addressed during construction. Our office could be contacted to visually observe the final grades to evaluate the need for such drains.

8.0 LIMITATIONS

Professional services provided in this geotechnical exploration were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water or groundwater. ALPHA, upon written request, can be retained to provide these services.

ALPHA is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for the exclusive use of the Client (and their designated design representatives), and is related solely to design of the specific structures outlined in Section 2.0. No party other than the Client (and their designated design representatives) shall use or rely upon this report in any manner whatsoever unless such party shall have obtained ALPHA's written acceptance of such intended use. Any such third party using this report after obtaining ALPHA's written acceptance shall be bound by the limitations and limitations of liability contained herein, including ALPHA's liability being limited to the fee paid to it for this report. Recommendations presented in this report should not be used for design of any other structures except those specifically described in this report. In all areas of this report in which ALPHA may provide additional services if requested to do so in writing, it is presumed that such requests have not been made if not evidenced by a written document accepted by ALPHA. Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than one (1) year after completion of this report. Non-compliance with any of these requirements by the Client or anyone else shall release ALPHA from any liability resulting from the use of, or reliance upon, this report.

Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may materially alter the recommendations. Further, ALPHA is not responsible for damages resulting from workmanship of designers or contractors. It is recommended the Owner retain qualified personnel, such as a Geotechnical Engineering firm, to verify construction is performed in accordance with plans and specifications.

APPENDIX

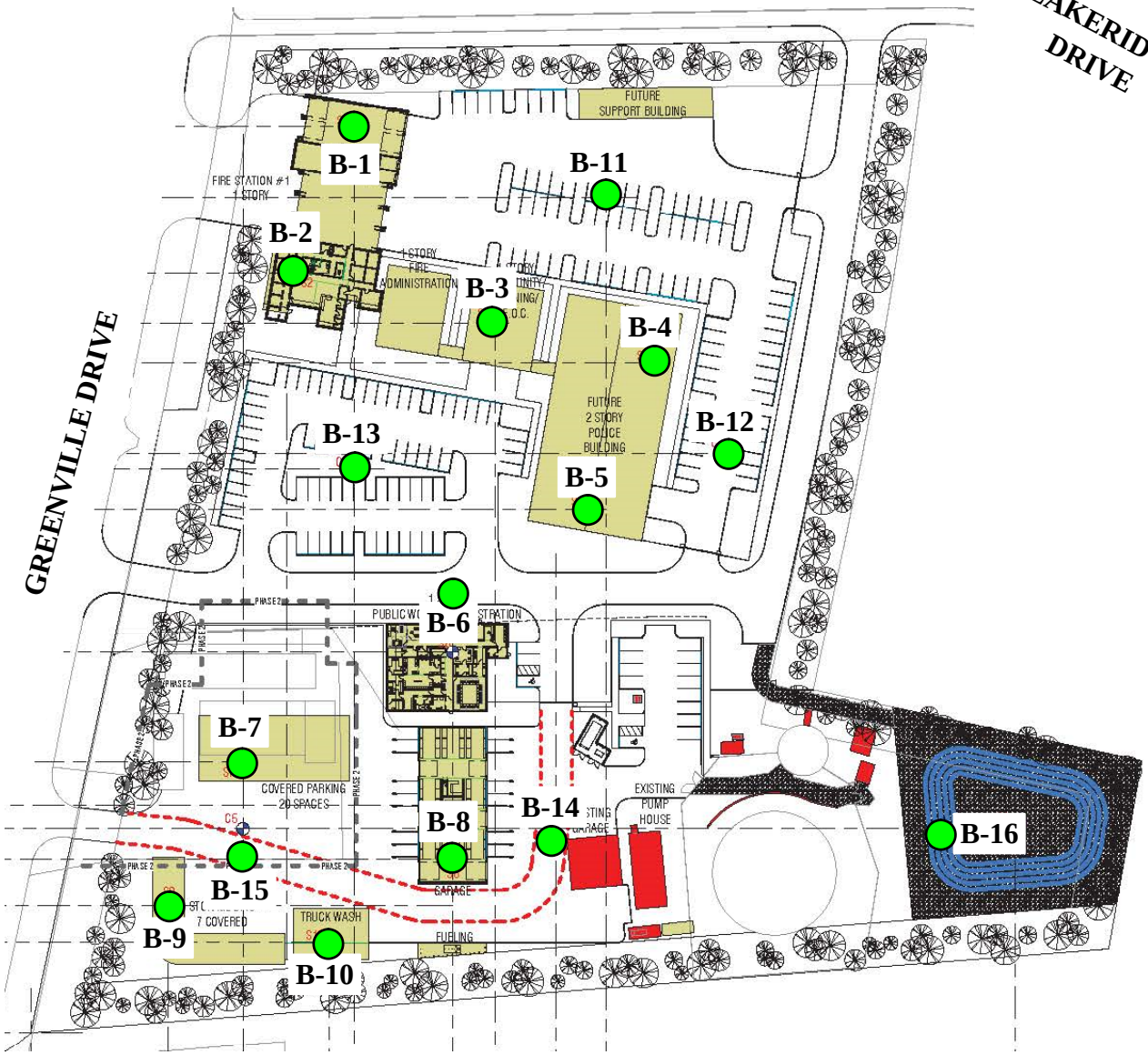
A-1 METHODS OF FIELD EXPLORATION

Sixteen test borings were performed for this geotechnical exploration at the approximate locations shown on the Boring Location Plan, Figure 1. The borings were advanced to depths of about 10 to 35 feet using standard rotary drilling equipment. The borings were located in the field using a handheld GPS device or by pacing or taping and estimating right angles from landmarks which could be identified in the field and as shown on the site plan provided during this study. The locations of the test borings shown on the Boring Location Plan are considered accurate only to the degree implied by the methods used to define them.

Relatively undisturbed samples of the cohesive subsurface materials were obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples were removed from the sampling tubes in the field and examined visually. One representative portion of each sample was sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

The Texas Cone Penetration (TCP) test was used to assess the apparent in-place strength characteristics of the rock type materials. The TCP test consists of a 3-inch diameter steel cone driven by a 170-pound hammer dropped 24 inches (340 ft-pounds of energy) and is the basis for TxDOT strength correlations. Depending on the resistance (strength) of the materials, either the number of blows of the hammer required to provide 12 inches of penetration, or the inches of penetration of the cone due to 100 blows of the hammer are recorded on the field logs and are shown on the Log of Boring sheets as “TX Cone” (reference: TxDOT Test Method TEX 132-E).

Logs of all borings are included in the Appendix of this report. The logs show visual descriptions of subsurface strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Samples not consumed by testing will be retained in our laboratory for at least 14 days and then discarded unless the Client requests otherwise.



N

Approximate Boring Locations

Geotechnical Exploration
Fairview Fire Station No. 1, Fire Administration, EOC/Training and Public Works Service Center
SEC of Greenville Drive and Lakeridge Drive
Fariview, Texas
ALPHA Report No. G170915

ALPHA TESTING
WHERE IT ALL BEGINS

Boring Location Plan
Figure 1

B-1 METHODS OF LABORATORY TESTING

Representative samples were evaluated and classified by a qualified member of the Geotechnical Division and the boring logs were edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318), pH (Tex-128-E) and resistivity (ASTM G 57) were performed on selected samples. In addition, pocket-penetrometer tests were conducted on selected soil samples to evaluate the soil shear strength. Results of all laboratory tests described above are provided on either the accompanying Log of Boring sheet.

In addition to the Atterberg-limit tests, the expansive properties of the clay soils encountered were further analyzed by absorption swell tests (ASTM D 4546). The swell test is performed by placing a selected sample in a consolidation machine and applying either the approximate current or expected overburden pressure and then allowing the sample to absorb water. When the sample exhibits very little tendency for further expansion, the height increase is recorded and the percent free swell and total moisture gain calculated. Results of the absorption swell test are provided on the Swell Test Data sheet, Figure 2 included in this appendix.

SWELL TEST DATA

Boring No.	2	5	7	8	9	14	15
Average Depth, ft	3	1	3	3	2.5	2	1
Dry Unit Weight, pcf	93	87	89	90	90	90	85
Liquid Limit	72	55	69	68	39	60	72
Plastic Limit	25	21	25	26	18	23	26
Plasticity Index	47	34	44	42	21	37	46
Initial Moisture Content	30%	25%	32%	28%	22%	16%	29%
Final Moisture Content	32%	30%	35%	31%	31%	28%	35%
Free Swell	0.3%	0.7%	0.1%	0.1%	0.3%	0.9%	1.7%

Geotechnical Exploration
Fairview Fire Station No. 1, Fire Administration, EOC/Training and Public Works Service Center
SEC of Greenville Drive and Lakeridge Drive
Fariview, Texas
ALPHA Report No. G170915

ALPHA TESTING
WHERE IT ALL BEGINS

Swell Test Data
Figure 2

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 653*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				2.75				28			
						4.5+				28	72	25	47
		4.0											
5		Tan CALCAREOUS CLAY				4.5+				16			
		5.0											
		Tan SHALY LIMESTONE with clay seams			100/ 9.5"								
					100/ 7"								
10					100/ 2"								
15					100/ 1.5"								
20					100/ 1"								
		24.0											
25		Gray SHALY LIMESTONE			100/ 1"								
30					100/ 0.75"								
35		35.0			100/ 0.5"								
		TEST BORING TERMINATED AT 35 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 2

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 654*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				2.25				25			
						4.5+				31	81	25	56
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 6.75"								
					100/ 6"								
10					100/ 2.5"								
15					100/ 1.5"								
20					100/ 1.75"								
		22.0											
		Gray SHALY LIMESTONE											
25					100/ 1.25"								
30					100/ 1"								
35		35.0			100/ 0.75"								
		TEST BORING TERMINATED AT 35 FT											
40		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											

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LOG OF BORING NO.: 3
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 651*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.2				31	71	26	45
						4.5+				30			
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 7.5"								
					100/ 4.5"								
10					100/ 3"								
15					100/ 1.75"								
		19.0											
20		Gray SHALY LIMESTONE			100/ 1.5"								
25					100/ 1"								
30		30.0			100/ 0.75"								
		TEST BORING TERMINATED AT 30 FT											
35		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 4

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 648*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				4.5+				26	63	23	40
		2.0											
		Tan SHALY LIMESTONE with clay seams			100/ 6.5"								
5					100/ 5.5"								
					100/ 5"								
10					100/ 3"								
15					100/ 1.5"								
20					100/ 1"								
		24.0											
25		Gray SHALY LIMESTONE			100/ 1"								
30					100/ 1"								
35		35.0			100/ 1"								
		TEST BORING TERMINATED AT 35 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 5
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/19/2017 **End Date:** 4/19/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 648*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY with calcareous nodules				2.75 3.75				29	55	21	34
		2.0 Tan CALCAREOUS CLAY				4.5				18			
		3.0 Tan SHALY LIMESTONE with clay seams			100/ 6"								
5					100/ 5.5"								
10		10.0 Gray SHALY LIMESTONE			100/ 3.5"								
15					100/ 1"								
20					100/ 1"								
25					100/ 0.75"								
30		30.0 TEST BORING TERMINATED AT 30 FT			100/ 0.75"								
35		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 6

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/19/2017 **End Date:** 4/19/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 650*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY with limestone fragments 1.0				2.75				30	61	22	39
		Tan SHALY LIMESTONE with clay seams			100/ 6.5"								
5					100/ 4.25"								
					100/ 3"								
10					100/ 1.5"								
		14.0											
15		Gray SHALY LIMESTONE			100/ 1.25"								
20					100/ 1"								
25					100/ 0.75"								
30					100/ 0.75"								
35		35.0			100/ 0.75"								
		TEST BORING TERMINATED AT 35 FT											
40		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											

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LOG OF BORING NO.: 7
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/19/2017 **End Date:** 4/19/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 656*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		4" CONCRETE OVER 8" GRAVEL BASE											
		1.0 Tan and Gray LIMESTONE - FILL				3.0				13			
		2.0 Dark Brown to Brown CLAY with calcareous nodules				4.5				33	69	25	44
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 7.5"								
					100/ 5"								
10					100/ 2.5"								
15					100/ 1.75"								
20					100/ 2"								
		21.0 Gray SHALY LIMESTONE											
25					100/ 1"								
30		30.0			100/ 1"								
		TEST BORING TERMINATED AT 30 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
35													
40													

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LOG OF BORING NO.: 8
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 652*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				2.25				30			
						4.5+				32	68	26	42
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 7.75"								
					100/ 5.5"								
10					100/ 3"								
		12.0											
		Gray SHALY LIMESTONE											
15					100/ 2"								
20					100/ 1"								
25					100/ 0.75"								
30		30.0			100/ 0.75"								
		TEST BORING TERMINATED AT 30 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
35													
40													

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LOG OF BORING NO.: 9
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 656*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		3" ASPHALT OVER 3" BASE 0.5											
		Dark Brown to Brown CLAY 2.0								28			
		Tan CALCAREOUS CLAY 3.0								22	39	18	21
		Tan SHALY LIMESTONE with clay seams			100/ 4.25"								
5					100/ 2.5"								
10					100/ 2.5"								
15													
20		20.0											
		Gray SHALY LIMESTONE											
25													
30		30.0											
		TEST BORING TERMINATED AT 30 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
35													
40													

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LOG OF BORING NO.: 10
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/20/2017 **End Date:** 4/20/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 654*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		4" ASPHALT OVER 8" BASE 1.0											
		Dark Brown to Brown CLAY				2.25				33			
		4.0				2.25				32	73	26	47
5		Tan SHALY LIMESTONE with clay layers			100/ 7"								
					100/ 4"								
10					100/ 3.25"								
15					100/ 1.25"								
		16.0											
		Gray SHALY LIMESTONE											
20					100/ 1"								
25					100/ 0.75"								
30		30.0			100/ 0.75"								
		TEST BORING TERMINATED AT 30 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
35													
40													

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LOG OF BORING NO.: 11

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 649*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY 1.0								33	62	24	38
		Tan SHALY LIMESTONE with clay seams			100/ 6"								
5					100/ 2.75"								
					100/ 3"								
10		10.0			100/ 4"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 12

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 647*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.5				32	61	22	39
		2.0											
		Tan CALCAREOUS CLAY				4.5+				20			
		4.0											
5		Tan LIMESTONE with clay seams			100/ 3.5"								
					100/ 2.25"								
10		10.0			100/ 1.75"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 13

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 653*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.5				25	64	25	39
		2.0											
		Tan LIMESTONE with clay seams			100/ 3"								
5					100/ 2.25"								
					100/ 2.5"								
10		10.0			100/ 1.5"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 14
Sheet 1 of 1
PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 650*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY with limestone fragments - FILL 1.0											
		Dark Brown to Brown CLAY				4.5+				18	60	23	37
						4.5+				21			
5		5.0											
		Tan SHALY LIMESTONE with clay seams			100/ 2.5"								
10		10.0			100/ 2.75"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 15

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/20/2017 **End Date:** 4/20/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 655*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		4" ASPHALT OVER 8" BASE 1.0											
		Dark Brown to Brown CLAY				4.5				31	72	26	46
		3.0											
		Tan CALCAREOUS CLAY 4.0				4.5+				23			
5		Tan Weathered SHALY LIMESTONE with clay seams			100/ 6"								
					100/ 5.5"								
10		10.0			100/ 2"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 16

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 645*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY - FILL				4.0				20			
		2.0				4.5+				15	57	22	35
		Tan and Gray LIMESTONE - FILL											
		3.0											
		Dark Brown to Brown CLAY				4.5+				25			
		4.0											
5		Tan CALCAREOUS CLAY				3.75				20			
						3.5				19	32	16	16
		8.0											
		Tan LIMESTONE with clay seams			100/ 1.75"								
10													
15		15.0			100/ 1.5"								
		TEST BORING TERMINATED AT 15 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
20													
25													
30													
35													
40													

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KEY TO SOIL SYMBOLS AND CLASSIFICATIONS

SOIL & ROCK SYMBOLS


(CH), High Plasticity CLAY


(CL), Low Plasticity CLAY


(SC), CLAYEY SAND


(SP), Poorly Graded SAND


(SW), Well Graded SAND


(SM), SILTY SAND


(ML), SILT


(MH), Elastic SILT


LIMESTONE


SHALE / MARL


SANDSTONE


(GP), Poorly Graded GRAVEL


(GW), Well Graded GRAVEL


(GC), CLAYEY GRAVEL


(GM), SILTY GRAVEL


(OL), ORGANIC SILT


(OH), ORGANIC CLAY


FILL

SAMPLING SYMBOLS


SHELBY TUBE (3" OD except where noted otherwise)


SPLIT SPOON (2" OD except where noted otherwise)


AUGER SAMPLE


TEXAS CONE PENETRATION


ROCK CORE (2" ID except where noted otherwise)

RELATIVE DENSITY OF COHESIONLESS SOILS (blows/ft)

VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

SHEAR STRENGTH OF COHESIVE SOILS (tsf)

VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.50
FIRM	0.50 TO 1.00
STIFF	1.00 TO 2.00
VERY STIFF	2.00 TO 4.00
HARD	OVER 4.00

RELATIVE DEGREE OF PLASTICITY (PI)

LOW	4 TO 15
MEDIUM	16 TO 25
HIGH	26 TO 35
VERY HIGH	OVER 35

RELATIVE PROPORTIONS (%)

TRACE	1 TO 10
LITTLE	11 TO 20
SOME	21 TO 35
AND	36 TO 50

PARTICLE SIZE IDENTIFICATION (DIAMETER)

BOULDERS	8.0" OR LARGER
COBBLES	3.0" TO 8.0"
COARSE GRAVEL	0.75" TO 3.0"
FINE GRAVEL	5.0 mm TO 3.0"
COURSE SAND	2.0 mm TO 5.0 mm
MEDIUM SAND	0.4 mm TO 5.0 mm
FINE SAND	0.07 mm TO 0.4 mm
SILT	0.002 mm TO 0.07 mm
CLAY	LESS THAN 0.002 mm

ALPHA TESTING
WHERE IT ALL BEGINS

Geotechnical
Construction Materials
Environmental
TBPE Firm No. 813

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Dallas, Texas 75229

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November 26, 2019

Town of Fairview
372 Town Place
Fairview, Texas 75069

Attention: Mr. James Chancellor, P.E.

Re: Addendum
Fairview Fire Station No. 1
SEC of Greenville Dr. and Lakeridge Dr.
Fairview, Texas
ALPHA Report No. G170915-A

ALPHA TESTING, INC. (hereinafter ALPHA) prepared a geotechnical exploration report for the referenced project as ALPHA Report No. G170915-Revised, dated November 21, 2019. The following recommendations are based on information developed during the referenced geotechnical exploration. This letter should be considered an addendum to the referenced geotechnical exploration report and should not be considered separately from said report.

Since submittal of the geotechnical exploration report, we understand the fire station location has been modified. The proposed location of the fire station is shown the attached Figure 1 – Boring Location Plan. Logs of the borings drilled in the vicinity of the proposed fire station are also attached to this addendum. Based on the Grading Plan prepared by Pacheco Koch (Sheet No. C3.1, dated October 2019), the fire station will have a finish floor elevation of 654.75 ft. We also understand ½ inch or less of floor slab movement is desired.

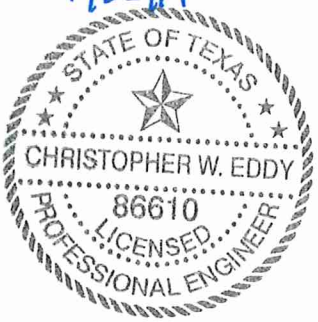
In order to reduce potential floor slab movements to ½ inch or less, the floor system of the structure should consist of a structured floor system supported by drilled, straight-shaft piers or a floor slab supported on grade following subgrade improvement. If a grade-supported floor system is utilized, the active clay soils present in the building area should be removed to the top of tan shaly limestone and replaced with a non-expansive fill material. Non-expansive fill can consist of flexible base material as described in Section 7.3 of the referenced geotechnical exploration report. All other comments and recommendations provided in the referenced geotechnical exploration report remain unchanged, unless specifically amended herein.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. Please contact our office if we can be of further assistance.

Sincerely,

ALPHA TESTING, INC.

11/26/19

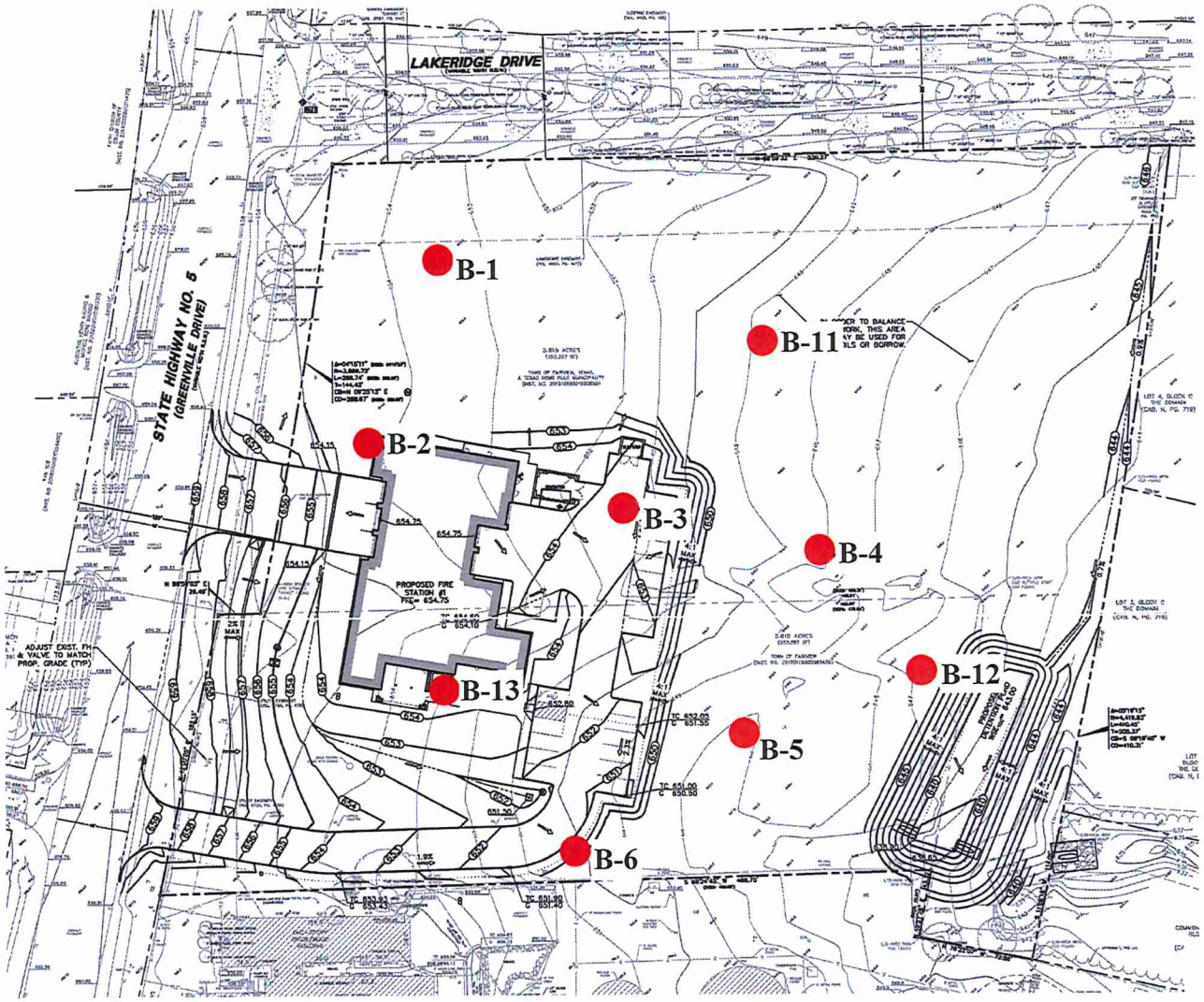


Christopher W. Eddy, P.E.
Senior Geotechnical Engineer

Harsha R. Addula, P.E.
Geotechnical Department Manager

Attachments: Figure 1- Boring Location Plan
Logs of Boring Nos. 1 through 6, 11, 12 and 13

Copy: Brinkley Sargent Wiginton Architects – Mr. Doug Edney, AIA (dedney@bsw-architects.com)



N

Approximate Boring Locations

Addendum
Fairview Fire Station No. 1
SEC of Greenville Drive and Lakeridge Drive
Fairview, Texas
Alpha Project No. G170915-A

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Boring Location Plan
Figure 1

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LOG OF BORING NO.: 1

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 653*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▽ After ___ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
0		Dark Brown to Brown CLAY				2.75				28			
						4.5+				28	72	25	47
		4.0											
5		Tan CALCAREOUS CLAY 5.0				4.5+				16			
		Tan SHALY LIMESTONE with clay seams			100/ 9.5"								
					100/ 7"								
10					100/ 2"								
15					100/ 1.5"								
20					100/ 1"								
		24.0											
25		Gray SHALY LIMESTONE			100/ 1"								
30					100/ 0.75"								
35		35.0			100/ 0.5"								
		TEST BORING TERMINATED AT 35 FT											
40		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											

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LOG OF BORING NO.: 2

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 654*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				2.25				25			
						4.5+				31	81	25	56
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 6.75"								
					100/ 6"								
10					100/ 2.5"								
15					100/ 1.5"								
20					100/ 1.75"								
		22.0											
		Gray SHALY LIMESTONE											
25					100/ 1.25"								
30					100/ 1"								
35					100/ 0.75"								
		35.0											
		TEST BORING TERMINATED AT 35 FT											
40		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											

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LOG OF BORING NO.: 3

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 651*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ___ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.2				31	71	26	45
						4.5+				30			
		4.0											
5		Tan SHALY LIMESTONE with clay seams			100/ 7.5"								
					100/ 4.5"								
10					100/ 3"								
15					100/ 1.75"								
		19.0											
20		Gray SHALY LIMESTONE			100/ 1.5"								
25					100/ 1"								
30		30.0			100/ 0.75"								
		TEST BORING TERMINATED AT 30 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
35													
40													

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LOG OF BORING NO.: 4

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/21/2017 **End Date:** 4/21/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 648*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▽ After ____ Hours (ft): ____

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				4.5+				26	63	23	40
		2.0											
		Tan SHALY LIMESTONE with clay seams			100/ 6.5"								
					100/ 5.5"								
5					100/ 5"								
					100/ 3"								
10													
15					100/ 1.5"								
20					100/ 1"								
		24.0											
		Gray SHALY LIMESTONE			100/ 1"								
25													
30					100/ 1"								
35		35.0			100/ 1"								
		TEST BORING TERMINATED AT 35 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 5

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/19/2017 **End Date:** 4/19/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 648*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft): ____

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft.in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY with calcareous nodules				2.75 3.75				29	55	21	34
		2.0 Tan CALCAREOUS CLAY				4.5				18			
		3.0 Tan SHALY LIMESTONE with clay seams											
5					100/ 6"								
					100/ 5.5"								
10		10.0			100/ 3.5"								
		Gray SHALY LIMESTONE											
15					100/ 1"								
20					100/ 1"								
25					100/ 0.75"								
30		30.0			100/ 0.75"								
		TEST BORING TERMINATED AT 30 FT											
35		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
40													

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LOG OF BORING NO.: 6

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/19/2017 **End Date:** 4/19/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 650*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY with limestone fragments 1.0				2.75				30	61	22	39
		Tan SHALY LIMESTONE with clay seams			100/ 6.5"								
5					100/ 4.25"								
					100/ 3"								
10					100/ 1.5"								
		14.0											
15		Gray SHALY LIMESTONE			100/ 1.25"								
20					100/ 1"								
25					100/ 0.75"								
30					100/ 0.75"								
35		35.0			100/ 0.75"								
		TEST BORING TERMINATED AT 35 FT											
40		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											

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LOG OF BORING NO.: 11

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 649*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY 1.0								33	62	24	38
		Tan SHALY LIMESTONE with clay seams			100/ 6"								
5					100/ 2.75"								
					100/ 3"								
10		10.0			100/ 4"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 12

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 647*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ____ Hours (ft): ____

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.5				32	61	22	39
		2.0											
		Tan CALCAREOUS CLAY				4.5+				20			
		4.0											
5		Tan LIMESTONE with clay seams			100/ 3.5"								
					100/ 2.25"								
10		10.0			100/ 1.75"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

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LOG OF BORING NO.: 13

Sheet 1 of 1

PROJECT NO.: G170915

Client: Town of Fairview
Project: Fairview Fire Station #1, Fire Administration, EOC/Training & Public Works
Start Date: 4/18/2017 **End Date:** 4/18/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Fairview, Texas
Surface Elevation: 653*
West:
North:
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): NONE
▼ After Drilling (ft): DRY
▼ After ___ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown to Brown CLAY				3.5				25	64	25	39
		2.0											
		Tan LIMESTONE with clay seams			100/ 3"								
5					100/ 2.25"								
					100/ 2.5"								
10		10.0			100/ 1.5"								
		TEST BORING TERMINATED AT 10 FT											
		*Surface elevations estimated from Boundary and Topographic Survey prepared by Pacheco Koch dated 2/16/17.											
15													
20													
25													
30													
35													
40													

SECTION 01 2500
SUBSTITUTION PROCEDURES DURING BIDDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for substitutions during bidding period only. Substitutions will not be considered after the bidding period unless the product specified is no longer available.

1.2 DEFINITIONS

A. Substitutions: Changes proposed by Bidder for products, fabrication, or installation that differs from those indicated or specified by Contract Documents.

1.3 SUBMITTALS

A. Requests for Substitution: Identify specified work (product, fabrication, or installation) to be replaced by requested substitution.
   1. Substitution Request Form: Use form provided by Architect, a copy of which is at end of this Section.
   2. Documentation: Show compliance with requirements for substitutions and following, as applicable:
      a. Statement indicating why specified work (product, fabrication, or installation) cannot be provided.
      b. List of modifications necessary to accommodate requested substitution.
      c. Detailed comparison of significant qualities of requested substitution with those of specified work. Include annotated copy of applicable Specification Section. Significant qualities include, but not limited to, attributes such as performance, weight, size, durability, visual effect, energy conservation, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from specified work.
      d. Cost information, including a proposal of change, if any, in contract sum.
      e. Product data, including drawings and descriptions of products, fabrication, or installation procedures for both specified work and requested substitution.
      f. Samples, where applicable or requested.
      g. Certificates and qualification data, where applicable or requested.
      h. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, where applicable or requested.
      i. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated, where applicable or requested.
      j. Research reports evidencing compliance with building code in effect for Project, where applicable or requested.
   3. Architect's Action:
      a. If necessary, with reasonable promptness Architect will request additional information or documentation for evaluation.
      b. Architect will notify Bidder of acceptance or rejection of requested substitution with reasonable promptness.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Bidder Representations: Bidder certifies following about proposed substitution product if accepted:
   1. It has been investigated and determined to be equivalent or superior to specified work in all respects.
   2. Warranty will be equivalent or superior to warranty for specified work.
   3. It will have no adverse effect on related, associated, and adjacent work.
   4. It will have no adverse effect on dimensions and will not delay construction progress.
   5. Maintenance service and replacement parts are reasonably available.
   6. Cost information included in request is complete and includes all related costs to integrate it into Work.

7. Claims for additional costs which may subsequently become apparent are waived.
8. Coordination, installation, and necessary changes in the Work will be complete in all respects.
9. It will function and perform same as specified work. Should requested substitution fail to function and perform as specified work, Bidder/Contractor shall remove requested substitution and install specified work at no additional cost to Owner.

PART 3 - EXECUTION (Not Used)

END OF SECTION

REQUEST FOR SUBSTITUTION

The undersigned Contractor requests consideration of the following request for substitution:

Date:

Project Name:

Specified Product:
Section Number:

Section Title:

Part, Article, Paragraph:

Description of specified work:

Requested Substitution: (Include product data and supplemental information as requested by the Architect)

Manufacturer's Certification:
The undersigned represents the manufacturer of the requested substitution and hereby certifies and warrants that the function and quality of the requested substitution is equivalent or superior to the specified work.

manufacturer's representative name and signature	date	company

Contractor's Acceptance:
The undersigned certifies the following is true and accurate, unless noted otherwise, about requested substitution if accepted:

1. It has been investigated and determined to be equivalent or superior to specified work in all respects.
2. Warranty will be equivalent or superior to warranty for specified work.
3. It will have no adverse effect on related, associated, and adjacent work.
4. It will have no adverse effect on dimensions and will not delay construction progress.
5. Maintenance service and replacement parts are reasonably available.
6. Cost information included in request is complete and includes all related costs to integrate it into Work. Also, if modifications are required in the Contract Documents, costs are included for services of Architect's, and Architect's Consultants.
7. Claims for additional costs which may subsequently become apparent are waived.
8. Coordination, installation, and necessary changes in the Work will be complete in all respects.
9. It will function and perform same as specified work. Should requested substitution fail to function and perform as specified work, Contractor shall remove requested substitution and install specified work at no additional cost to Owner.

Change to Contract Sum: $_____ [ ] Decrease [ ] Increase
Change to Contract Time: [ ] Adds _____ days [ ] Deletes _____ days [ ] Has no impact
Reason for Substitution: [ ] Substitution for Cause [ ] Substitution for Convenience

contractor's name and signature	date	company

Architect's Action:

[ ] Recommends acceptance [ ] Does not recommend acceptance
[ ] Returned - Request does not comply with specified requirements

Architect's name and signature	date	company

Owner's Action:

[ ] Accepts [ ] Does not accept

Owner's name and signature	date	company

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SECTION 01 2600
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request and after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect using Contractor’s Standard Form.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor.

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of change, submit an itemized account and supporting data necessary to

substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 2900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements necessary to prepare and process following on Project including, but not limited to, the following:
   1. Schedule of Values.
   2. Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule specified by Section 01 3200 - Construction Progress Documentation.
   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Submittals Schedule and Application for Payment forms with Continuation Sheets.
   2. Submit the Schedule of Values to Architect at earliest possible date but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
   3. Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of Owner.
      c. Owner’s project number and purchase order number.
      d. Name of Architect.
      e. Architect's project number.
      f. Contractor's name and address.
      g. Date of submittal.
   2. Format: Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value; percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
   4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed. Provide additional line items as requested by Architect to facilitate review.
   6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
   7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Payment Application Times: The date for each progress payment is the last day of each month. The time period covered by each Application for Payment is from the beginning to the end of each calendar month.

B. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

C. Requests for Additional Time: In addition to requirements of this Section, attach copies of requests for additional time due to weather delays to each Progress Payment. Requests for additional days will only be considered if submitted to Architect within 7 days after the beginning of the delay and copies of each request are attached to each Progress Payment. Approved additional days will be processed by change order.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. All copies shall include waivers of lien and an updated construction time schedule. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
   a. Materials previously stored and included in previous Applications for Payment.
   b. Work completed for this Application utilizing previously stored materials.
   c. Additional materials stored with this Application.
   d. Total materials remaining stored, including materials with this Application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors.
   2. Schedule of values.
   3. Contractor's construction schedule (preliminary if not final).
   4. Submittals schedule (preliminary if not final).
   5. List of contractor's staff assignments.
   6. Copies of building permits.
   7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
   8. Certificates of insurance and insurance policies.
   9. Performance and payment bonds.
   10. Data needed to acquire Owner's insurance.

I. In-Progress Applications for Payment: Administrative actions and submittals that must coincide with submittal of Application for Payment include the following:
   1. Changes to list of subcontractors.
   2. Updated construction schedule.
   3. Updated submittal schedule.
   4. Changes to contractor’s staff assignments.
   5. Progress of maintaining record documents.

J. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Application for Payment: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of closeout requirements according to Section 01 7700 - Closeout Procedures.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims.
   5. AIA Document G706A, Contractor's Affidavit of Release of Liens.
   6. AIA Document G707, Consent of Surety to Final Payment.
   7. Evidence that claims have been settled.
   8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

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SECTION 01 3100
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.
   2. Coordination drawings.
   3. Administrative and supervisory personnel.
   4. Requests for Information (RFIs).
   5. Project meetings.

1.2 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

1.3 GENERAL PROJECT COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Startup and adjustment of systems.
   8. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.4 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
      b. Indicate functional and spatial relationships of components of architectural,

structural, civil, mechanical, and electrical systems.

c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.

e. Indicate required installation sequences.

f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Key Personnel Names:

1. Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.
2. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses.
3. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
4. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments:

a. Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

b. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Contractor’s form with substantially the same content as indicated above, acceptable to Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 7 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for coordination information already indicated in the Contract Documents.
d. Requests for adjustments in the Contract Time or the Contract Sum.
e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 - Contract Modification Procedures.
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log with Contractor's Application for Payment. Include the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule.
   b. Phasing.
   c. Critical work sequencing and long-lead items.
   d. Designation of key personnel and their duties.
   e. Lines of communications.
   f. Procedures for processing field decisions and Change Orders.
   g. Procedures for RFIs.
   h. Procedures for testing and inspecting.

i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Sustainable design requirements.
m. Preparation of record documents.
n. Use of the premises.
o. Work restrictions.
p. Working hours.
q. Owner's occupancy requirements.
r. Responsibility for temporary facilities and controls.
s. Procedures for moisture and mold control.
t. Procedures for disruptions and shutdowns.
u. Construction waste management and recycling.
v. Parking availability.
w. Office, work, and storage areas.
x. Equipment deliveries and priorities.
y. First aid.
z. Security.
aa. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than 30 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
   a. Preparation of record documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Submittal of written warranties.
   d. Requirements for preparing sustainable design documentation.
   e. Requirements for preparing operations and maintenance data.
   f. Requirements for demonstration and training.
   g. Preparation of Contractor's punch list.
   h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
   i. Submittal procedures.
   j. Owner's partial occupancy requirements.
   k. Installation of Owner's furniture, fixtures, and equipment.
   l. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.
      2) Sequence of operations.
      3) Status of submittals.
      4) Deliveries.
      5) Off-site fabrication.

6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
5. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at appropriate intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS - Not Used
PART 3 - EXECUTION - Not Used

END OF SECTION

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SECTION 01 3200
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for documenting progress of construction during performance of the Work.

1.2 SUBMITTALS

A. Submittals Schedule: Submit following information in a tabular format:
   1. Scheduled date for first submittal.
   2. Specification Section number and title.
   3. Submittal category (action or informational).
   4. Name of subcontractor.
   5. Description of the Work covered.
   6. Scheduled date for Architect's final release or approval.

B. Contractor's Construction Schedule: Submit schedule for entire construction period.

1.3 COORDINATION

A. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 SUBMITTALS SCHEDULE

A. Preparation: Schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
   1. Coordinate Submittals Schedule with Schedule of Values and Contractor's Construction Schedule.
   2. Initial Submittal: Submit concurrently with preliminary construction schedule.
   3. Update Submittal: Submit concurrently with the update submittal of Contractor's Construction Schedule.

3.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

G. Schedule Preparation: Prepare a list of all activities required to complete the Work.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for activities.
   2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the schedule within the limitations of the Contract Time.

3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

H. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

I. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
b. Submit value summary printouts one week before each regularly scheduled progress meeting.

3.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial Completions and occupancies.
17. Substantial Completions authorized.

B. Material Location Reports:
1. At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site.
2. List shall be cumulative, showing materials previously reported plus items recently delivered.
3. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports:
1. Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report.
2. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Reporting Unusual Events:
   1. When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report.
   2. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information.
   3. Advise Owner in advance when these events are known or predictable.

3.4 CONSTRUCTION PHOTOGRAPHS

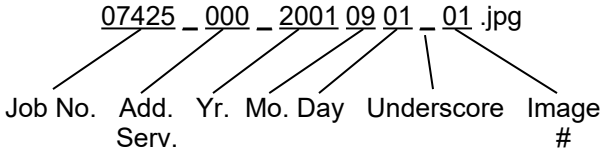
A. General: Document construction progress with digital images.

B. Minimum Digital Camera Resolution: 1800 x 1200 dpi (dots per inch) @ 72 dpi resolution.

C. Acceptable Electronic File Format: .jpg, .tif., .tiff., .tga., jpe., or .png.

D. Date Stamp: Date and time stamp each photograph as it is being taken so stamp is integral to photograph.

E. Image File Naming Convention:



F. Preconstruction Photographs:
   1. Before starting construction, take photographs of Project site, existing building, and surrounding properties from different vantage points.
   2. Show existing conditions adjacent to property.
   3. Submit digital files as required under “Submittals” Article.

G. Periodic Construction Photographs:
   1. Take photographs of Work monthly, coinciding with cutoff date associated with each Application for Payment.
   2. Select vantage points to best show status of construction and progress since last photographs were taken.
   3. Submit digital files as required under “Submittals” Article.

H. Final Completion Construction Photographs:
   1. Take photographs after date of Substantial Completion for submission as Project Record Documents.
   2. Submit digital files as required under “Submittals” Article.

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SECTION 01 3300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for submitting action, informational, close-out, and maintenance material submittals.

1.2 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related parts of Work so processing will not be delayed because of need to review submittals concurrently for coordination. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with requirements in Section 01 3200 - Construction Progress Documentation for list of submittals and time requirements for scheduled performance of related construction activities. No more than 6 submittals may be submitted in one week.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of Contract Time will be authorized because of failure to transmit submittals enough in advance of Work to permit processing, including resubmittals.
   1. Initial Review: Allow 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 21 days for review of each resubmittal.
   4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 28 days for initial review of each submittal.
   5. Concurrent Consultant Review: Where Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 21 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
   6. All submittals shall be delivered to Architect’s office before review time shall begin. Submittals received after 1:00pm shall be considered received the next day.
   7. All submittals that require color choices shall be submitted to Architect in two (2) groups. One for interior and one for exterior color/material selection so that coordinated color selections can be made for the building.

D. Identification: Place a permanent label or title block on each submittal for identification.
   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 6 by 8 in on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
   3. Include the following information on label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Submittal number or other unique identifier, including revision identifier.
      i. Number and title of appropriate Specification Section.
      j. Drawing number and detail references, as appropriate.

k. Location(s) where product is to be installed, as appropriate.
l. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

G. Transmittal:
1. Transmit all submittals electronically in Adobe Acrobat (.pdf) format unless otherwise specified or approved in advance by Architect. Submit paper copies only when requested or approved by Architect. Paper copy submittals received without request or approval by Architect shall be returned without review.
2. Submittals shall be transmitted via email. Should file size preclude use of email, an alternate method of electronic delivery shall be used as approved by the Architect. The Subject line of the email should read generally as follows: Project Name-Submittals-Section Number-Section Name. If the quantity of included submittals is too great to list in the subject, provide a list in the body of the email.
3. File naming conventions for .pdf files shall be as follows: “Project Name-Submittal-Section Number-Revision Number-Section name.pdf”.
4. Physical samples of products shall be transmitted under separate cover as indicated in item 2.2.D below.
5. Prepare each electronic submittal in the appropriate format individually by Specification Section. Email using the appropriate Subject and include properly formatted transmittal forms.
6. Package each sample submittal appropriately for handling and include a transmittal form.
7. Architect will return submittals, without review, received from sources other than Contractor.
8. Transmittal Form: Provide locations on form for following information:
a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number.
k. Submittal and transmittal distribution record.
l. Remarks.
m. Signature of transmitter.
9. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of

construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Architect.

PART 2 - PRODUCTS

2.1 GENERAL

A. Contractor's Responsibility: Prepare and submit Action, Informational, Close-Out, and Maintenance Material Submittals required by individual Specification Sections.

B. Quantity of Submittals: Number of copies of submittals as determined during Pre-Construction Conference.

C. Material Safety Data Sheets (MSDSs): Do not submit to Architect. Architect will not review if included in submittals.

2.2 ACTION SUBMITTALS

A. Product Data: Manufacturer's technical information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as shop drawings, not as product data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include following information, as applicable:
    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog information.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operation and maintenance manuals.
    k. Compliance with specified referenced standards.
    l. Testing by recognized testing agency.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.
4. Submit product data before or concurrent with samples.

B. Preliminary Shop Drawings: Prior to preparation of full shop drawings, prepare project-specific graphic information drawn accurately to scale illustrating brief overview of major elements, pertinent information, and major details of system that will be subsequently expanded in greater detail in full shop drawings.

C. Shop Drawings: Project-specific graphic information drawn accurately to scale. Do not base shop drawings on reproductions of Contract Documents.

1. Preparation: Fully illustrate requirements in Contract Documents. Include following information, as applicable:
    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Delegated engineering calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of delegated engineering professional if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets at least 8-1/2 by 11 in but no larger than 30 by 40 in.

D. Samples: Actual component to be delivered and installed for review of kind, color, pattern, and texture for checking characteristics with other elements and for a comparison of these characteristics between submittal and actual component.
   1. Identification: Attach label on unexposed side of sample that includes following, as applicable:
      a. Generic description of sample.
      b. Product name and name of manufacturer.
      c. Sample source.
      d. Number and title of appropriate Specification Section.
   2. Disposition: Maintain sets of approved samples at site, available for quality-control comparisons throughout course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      a. Samples that may be incorporated into Work must be in undamaged condition at time of installation.
      b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are property of Contractor.
   3. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing full range of colors, textures, and patterns available.
   4. Samples for Verification: Size indicated in individual Specification Sections, prepared from same material to be used for Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
      a. Samples include, but are not limited to, following:
         1) Partial sections of manufactured or fabricated components.
         2) Small cuts or containers of materials.
         3) Complete units of repetitively used materials.
         4) Swatches showing color, texture, and pattern.
         5) Color range sets.
         6) Components used for independent testing and inspection.
      b. Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      c. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit sets of paired units that show approximate limits of variations.

E. Product Schedule: Written summary indicating types of products required for Work and their intended location. Include the following information in tabular form, as applicable:
   1. Type of product. Include unique identifier for each product.
   2. Number and name of room or space.
   3. Location within room or space.

F. Warranty: Manufacturer’s standard warranty modified as specified. Include statements that supplement or extend warranties contained in Conditions of the Contract.

2.3 INFORMATIONAL SUBMITTALS

A. Installer Certifications: Written statements on manufacturer's letterhead certifying that Installer complies with requirements in Contract Documents and, where required, is authorized by manufacturer for this specific Project.

B. Welding Certifications: Written certification that welding procedures and personnel comply with requirements in the Contract Documents.

C. Manufacturers Project Acceptance Certifications: Written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in Contract Documents, notarized and signed by an individual authorized to sign documents. Include evidence of manufacturing experience where required.

D. Delegated Engineering Calculations: Written and graphic information, including, but not limited

to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations.

E. Fire Rated Assembly Design Classification: Written evidence from independent testing agency acceptable to authorities having jurisdiction that assembly complies with fire resistance ratings.

F. Building Code Evaluation Reports: Written evidence, from model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include following information, as applicable:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

G. Pre-Construction Test Reports: Written reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

H. Product Test Reports: Written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

I. Source Quality Control Test Reports: Written reports by qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed at manufacturing or fabrication source of product, for compliance with requirements in the Contract Documents.

J. Field Quality Control Test Reports: Written reports by qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

K. Delegated Engineering Field Inspection Reports: Written information documenting delegated engineering professional’s inspections.

L. Manufacturer's Field Inspection Reports: Written information documenting factory-authorized service representative's tests and inspections. Include following, as applicable:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

M. Installer Qualifications: Written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

2.4 CLOSE-OUT SUBMITTALS

A. Maintenance Contracts: Executed service agreements for use in facility operation and maintenance.

B. Maintenance Instructions: Written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

C. Bonds: Written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

D. Software: Extra copies of operating system and other utility software necessary to operate and maintain installed software during expected life of operating systems.

2.5 MAINTENANCE MATERIAL SUBMITTALS

A. Useable Products Remaining After Construction: Products purchased but not included in Work.

B. Extra Stock Materials: Products for use in facility operation and maintenance to replace worn or deteriorated installed products.

C. Tools: Specialized and unique hand tools, or other similar devices, necessary for use in facility operation and maintenance not normally available commercially.

D. Equipment: Specialized and unique equipment necessary for use in facility operation and maintenance not normally available commercially.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General:

1. Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
3. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken. Description of each action provided at Pre-Construction Meeting.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Close-Out Submittals: Architect will review each submittal and will forward to Owner.

E. Maintenance Material Submittals: Deliver to Owner and forward inventory list to Architect.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. See Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED ENGINEERING

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1.4 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Delegated Engineering Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee

payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Owner will engage a qualified testing agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
   1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
   2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
   1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.

3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Testing agency will retest and reinspect corrected work.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
2. Comply with the Contract Document requirements for Section 01 7329 – Cutting and Patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

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SECTION 01 4200
REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Reference standards, definitions and specification format and content.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term “indicated” refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as “shown”, “noted”, “scheduled”, and “specified” are used to help the user locate the reference.

C. Directed: The term “directed” is a command or instruction by Architect. Other terms including “requested,” “authorized,” “selected,” “approved,” and “permitted” have the same meaning as “directed.”

D. Approved: The term “approved”, when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulations: The term “regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term “furnish” means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. Install: The term “install” describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Provide: The term “provide” means to furnish and install, complete and ready for the intended use.

I. Submitted: The terms “submitted”, “reported”, “satisfactory” and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.

J. Installer: An “Installer” is the Contractor or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

K. Experienced: The term “experienced”, when used with an entity, means having successfully completed a minimum of ten previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.

L. Trades: Using terms such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

M. Project Site: The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

N. Testing Agencies: A “testing agency” is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI/CSC’s “Master Format” numbering system.

B. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

C. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular

situations. These conventions are as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
3. The words “shall” "shall be" or “shall comply with”, depending on the context are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

D. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

E. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where other Sections of the Specifications require that a product, material, or installation complies with specified industry standard, the Contractor shall obtain copies directly from the publication source, and submit copies of standards at same time as submittal of other specified submittals.

F. Industry Organization Abbreviations and Acronyms: Where abbreviations and acronyms are used in Specifications and other Contract Documents they shall mean the name of a trade association, standards-developing organization or other entity in the context of referencing a standard or publication. The following abbreviations and acronyms, as referenced in the Contract Documents, mean the associated names.

1. Names and Web site addresses are subject to change and are believed, but not assured, to be accurate and up to date as of the date of Contract Documents.
2. Refer to Gale Research’s "Encyclopedia of Associations," or Columbia Book’s “National Trade and Professional Association of the U.S.”.

G. Code Agency Abbreviations and Acronyms: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the following entities. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

H. Federal Government Agency Abbreviations and Acronyms: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the following entities. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

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SECTION 01 6100
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for following:
   1. Product delivery, storage, and handling.
   2. Product warranties.
   3. Product selection procedures.
   4. General installation provisions.
   5. Restriction of hazardous substances.

1.2 DEFINITIONS

A. Products: Term “product” includes terms “material,” “equipment,” “system,” “component,” and terms of similar intent.

B. Hazardous Substances Prohibited by Law: Including, but not limited to, any product, material, element, constituent, chemical, substance, compound, or mixture, which is defined in, included under, or regulated by any environmental laws.

C. Environmental Laws: Applicable local, state, and federal laws, rules, ordinances, codes, regulations, and requirements in effect at time Contractor’s services are rendered, any amendments for Contractor’s services rendered after effective date of any such amendments, including, without limitation, following:
   1. The Comprehensive Environmental Response, Compensation and Liability Act of 1980.
   2. The Resource Conservation and Recovery Act.
   3. The Toxic Substances Control Act.
   4. The Clean Water Act.
   5. The Clean Air Act.
   6. The Marine Protection Research and Sanctuaries Act.
   7. The Occupational Safety and Health Act.
   8. The Superfund Amendments and Reauthorization Act of 1986.
   9. The Environmental Protection Agency.
   10. Other state superlien or environmental clean-up or disclosure statutes including all state and local counterparts of such.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between 2 or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

B. Restriction of Hazardous Substances Compliance: Contractor shall take whatever measures deemed necessary to insure that employees, suppliers, vendors, fabricators, subcontractors, or their assigns, comply with restriction requirements for hazardous substance.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. General: Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions

B. Delivery and Handling:
   1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products on delivery to determine compliance with Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.5 PRODUCT WARRANTIES

A. General: Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of Contract Documents.
   1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by Contract Documents to provide specific rights for Owner.

B. Special Warranties: Written document that contains appropriate terms and identification, ready for execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Specified Form: When specified forms are included with Specifications, prepare a written document using indicated form properly executed.
   3. Refer to individual Specification Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. If standard products are available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves right to limit selection to products with warranties not in conflict with requirements of Contract Documents.
   4. Where products are accompanied by term "as selected," Architect will make selection.
   5. Descriptive, performance, and reference standard requirements in Specifications establish salient characteristics of products.
   6. Use of phrase “or equal” shall be defined as “or equivalent as judged by Architect.”

B. “Acceptable Manufacturers” or “Acceptable Manufacturers and Products”:
   1. Where Specifications include a list of named manufacturers and products that are acceptable, provide any product from that list that complies with requirements of Contract Documents.
   2. Manufacturers and products that can be used are restricted to those on list.
   3. Manufacturers and products not included on list are considered substitutions.

C. “Available Manufacturers” or “Available Manufacturers and Products”:
   1. Where Specifications include a list of named manufacturers and products that are known to be available, provide any product from that list, or a product from an unnamed manufacturer, that complies with requirements of Contract Documents.
   2. Manufacturers and products that can be used are not restricted to those on list.
   3. Manufacturers and products not included on list are not considered substitutions.

D. “Basis of Design”:
   1. Use of phrase “Product Standard” or similar phrase shall be defined as “Basis of Design.”

2. When Specifications name a single manufacturer and product, it is to establish significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics, for purposes of evaluating other named manufacturers and products. Drawings and Specifications indicate and specify characteristics that are based on “Basis of Design” manufacturer and product. Other acceptable or available manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and does not change intent of Contract Documents as judged by Architect.
3. If Specification includes a list of “Acceptable Manufacturers” or “Acceptable Manufacturers and Products,” provide named “Basis of Design” product or any product from that list that complies with requirements of Contract Documents.
4. If Specification includes a list of “Available Manufacturers” or “Available Manufacturers and Products,” provide named “Basis of Design” product or any product from that list, or a product from an unnamed manufacturer, that complies with requirements of Contract Documents.
5. If Specification does not include a list of either “Acceptable Manufacturers and Products” or “Available Manufacturers and Products,” any product that complies with requirements of Contract Documents may be used.

E. “Required Manufacturer” or “Required Manufacturer and Product”:
1. Where Specifications name a single, required manufacturer and product, only that manufacturer and product may be used.
2. Any other manufacturer and product is considered a substitution.

F. Visual Matching Specification: Where Specifications include phrase “match Architect's sample” or similar phrase, provide a product that complies with requirements of Contract Documents and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

G. Visual Selection Specification: Where Specifications include phrase “as selected by Architect from manufacturer's full range” or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Manufacturer’s Instructions:
1. Comply with manufacturer's installation instructions and recommendations, to extent that instructions and recommendations are more explicit or stringent than requirements in Contract Documents.
2. Handle, install, connect, clean, condition and adjust products according to manufacturer's instructions and in conformity with specified requirements.
a. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with manufacturer for further instructions.
b. Do not proceed with Work without clear instructions.
3. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by manufacturer.

B. Product Inspection: Inspect products immediately upon delivery and again prior to installation. Reject damaged and defective items.

C. Weather Conditions: Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible product or material as necessary to prevent deterioration.

3.2 RESTRICTION OF HAZARDOUS SUBSTANCES

A. Contractor agrees that it shall not knowingly, after reasonable diligence and effort, incorporate into Work any hazardous substance other than as may be lawfully contained within products, except in accordance with applicable environmental laws. Further, in performing any of its obligations hereunder, Contractor shall not cause any release of hazardous substances into, or contamination of environment, including soil, atmosphere, any watercourse or ground water, except in accordance with applicable environmental laws. In the event that Contractor engages

in any of activities prohibited in this paragraph, to fullest extent permitted by law, Contractor hereby indemnifies and holds harmless Owner and its partners, members, officers, directors, agents, employees and consultants from and against any and all claims, damages, losses, causes of action, suits and liabilities of every kind, including, but not limited to, expenses of litigation, court costs, punitive damages and attorney's fees, arising out of, incidental to or resulting from the activities prohibited.

B. In the event Contractor observes on site any substance which Contractor reasonably believes to be a hazardous substance, and which is being introduced into the Work, or exists on site, in a manner that violates applicable environmental laws, Contractor shall immediately notify Owner and report condition to Owner in writing. Work in affected area shall not thereafter be resumed except by written authorization of Owner if in fact a hazardous substance has been encountered and has not been rendered harmless. In the event that Contractor fails to give Owner proper notification hereunder, upon knowingly observing a hazardous substance at site, to fullest extent permitted by law, Contractor hereby indemnifies and holds harmless Owner, and all of its partners, members, officers, directors, agents, employees and consultants from and against all claims, damages, losses, causes of action, suits and liabilities of every kind, including, but not limited to, expenses of litigation, court costs, punitive damages and attorneys' fees, arising out of, incidental to, or resulting from Contractor's failure to stop the Work.

C. If Owner believes that hazardous substances may have been located, generated, manufactured, used or disposed of on or about site by Contractor or any of its employees, agents, subcontractors, suppliers, or invitees, Owner may have environmental studies of site conducted as it deems appropriate, and Contractor shall be responsible for cost of such studies to extent that Contractor or any of its employees, agents, subcontractors, suppliers or invitees are responsible for the presence of any hazardous substances.

END OF SECTION

SECTION 01 7300
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: General procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. General installation of products.
   4. Coordination of Owner-installed products.
   5. Progress cleaning.
   6. Starting and adjusting.
   7. Protection of installed construction.
   8. Correction of the Work.

1.2 SUBMITTALS

A. Qualification Data: For land surveyor or professional engineer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit signed and sealed by land surveyor or professional engineer.

E. Final Property Survey: Submit showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: Engage a professional land surveyor or engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions:
   1. The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed.
   2. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   3. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities:
   1. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.
   2. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
   3. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
   4. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions:
   1. Examine substrates, areas, and conditions, with Installer or Applicator present for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   3. Examine roughing-in for mechanical and electrical systems to verify actual locations of

connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information:
   1. Furnish information to local utility company that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction.
   2. Coordinate with authorities having jurisdiction.
B. Existing Utility Interruptions:
   1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   2. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
   3. Do not proceed with utility interruptions without Owner's written permission.
C. Field Measurements:
   1. Take field measurements as required to fit the Work properly.
   2. Recheck measurements before installing each product.
   3. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.
   4. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
E. Review of Contract Documents and Field Conditions:
   1. Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect.
   2. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
D. Building Lines and Levels:
   1. Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work.
   2. Transfer survey markings and elevations for use with control lines and levels.
   3. Level foundations and piers from two or more locations.
E. Record Log:
   1. Maintain a log of layout control work.

2. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used.
3. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points:
1. Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work.
2. Preserve and protect permanent benchmarks and control points during construction operations.
3. Do not change or relocate existing benchmarks or control points. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
4. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks:
1. Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points.
2. Comply with authorities having jurisdiction for type and size of benchmark.
3. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
4. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
5. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation, slab, bearing walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey:
1. Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
2. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
3. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General:
1. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
2. Make vertical work plumb and make horizontal work level.
3. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
4. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners:
1. Provide anchors and fasteners as required to anchor each component securely in place,

accurately located and aligned with other portions of the Work.
2. Where mounting heights are not indicated, mount components at heights recommended by industry standards.
3. Allow for building movement, including thermal expansion and contraction.

G. Joints:
1. Make joints of uniform width.
2. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect.
3. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General:
1. Clean Project site and work areas daily, including common areas.
2. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
3. Enforce requirements strictly.
4. Dispose of materials lawfully.
5. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
6. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
7. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas:
1. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
2. Remove liquid spills promptly.
3. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work:
1. Keep installed work clean.
2. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended.
3. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching:
1. Clean areas and spaces where cutting and patching are performed.
2. Completely remove paint, mortar, oils, putty, and similar materials.

3. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 4000 - Quality Requirements.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 7329 - Cutting and Patching. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

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SECTION 01 7700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial completion.
   2. Final completion.
   3. List of incomplete work (punch list).
   4. Warranties.
   5. Extra materials.
   6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   9. Submit test/adjust/balance records.
   10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   11. Advise Owner of changeover in heat and other utilities.
   12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   13. Complete final cleaning requirements, including touchup painting.
   14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection:
   1. Submit a written request for inspection for Substantial Completion.
   2. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.
   3. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

C. Reinspection:
   1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Section 01 2900 – PAYMENT PROCEDURES.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

C. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE WORK (PUNCH LIST)

A. Preparation: Submit list of work not complete. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding to interior spaces in order by room number.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 WARRANTIES

A. Product Warranties: Start on date of Substantial Completion. Owner may request a later start date on specific equipment that has been identified as incomplete on Substantial Completion date. Such extension shall be made in writing to Contractor from Architect.

B. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

B. Extra Materials: Refer to individual Sections for quantities of extra materials.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal & local environmental and antipollution regulations.

B. Cleaning:
1. Employ experienced workers or professional cleaners for final cleaning.

2. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program.
3. Comply with manufacturer's written instructions.
4. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    g. Sweep concrete floors broom-clean in unoccupied spaces.
    h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    j. Remove labels that are not permanent.
    k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    m. Replace parts subject to unusual operating conditions.
    n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    o. Clean exposed surfaces of diffusers, registers, and grills.
    p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
    q. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

END OF SECTION

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SECTION 01 7810
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for project record documents, including the following:
   1. Record Contract Drawings.
   2. Record Contract Specifications.
   3. Record submittals.

1.2 CLOSEOUT SUBMITTALS

A. Record Contract Drawings:
   1. Initial Submittal: Submit paper copy set of marked-up record contract drawings. Architect will indicate whether general scope information recorded is acceptable.
   2. Final Submittal: When initial submittal is designated acceptable by Architect, submit following:
      a. Paper copy set of marked-up record contract drawings.
      b. Electronic files of marked-up record contract drawings.
      c. Paper copy plot of each electronic drawing file, whether or not changes and additional information were recorded.

B. Record Contract Specifications:
   1. Initial Submittal: Submit paper copy set of marked-up record contract specifications. Architect will indicate whether general scope of information recorded is acceptable.
   2. Final Submittal: When initial submittal is designated acceptable by Architect, submit following:
      a. Paper copy set of marked-up record contract drawings.
      b. Electronic files of marked-up record contract drawings.

C. Record Submittals: Submit electronic files and directories of each submittal. Include images of approved samples and mock-ups with descriptive information for products and materials.

D. Other Specified Record Information: Submit electronic files and directories of other record information requirements, specified in individual Specification Sections.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS, GENERAL

A. Procedures: Maintain one copy of Contract Drawings, Contract Specifications, and each submittal during construction for project record document purposes.
   1. Post changes and modifications as they occur; do not wait until end of Project.
   2. Protect according to following:
      a. Store in field office apart from Contract Documents used for construction.
      b. Do not use for construction purposes.
      c. Maintain in good order and in a clean, dry, legible condition, protected from deterioration and loss.
   3. Require installers, subcontractors, suppliers, and similar entities, to provide record information.

B. Electronic Format: Scan in PDF, and organize information into separate electronic files that correspond to following:
   1. Contract Drawings: Each sheet; each file identified with sheet number and name.
   2. Contract Specifications: Each section; each file identified with section number and name.
   3. Submittals: Each individual submittal; each file identified with submittal number and name.

3.2 RECORD CONTRACT DRAWINGS

A. Preparation: Accurately mark to show conditions and information that varies from that indicated originally.
   1. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
   2. Accurately record information in an acceptable drawing technique.

3. Record data as soon as possible after obtaining it.
4. Record and check the markup before enclosing concealed installations.
5. Cross-reference to corresponding archive photographic documentation.
6. Use various colors to distinguish between changes for different categories of Work.

B. Content: Types of items requiring marking include, but are not limited to, following:
1. Dimensional changes to Contract Drawings.
2. Revisions to details shown on Contract Drawings.
3. Depths of foundations below first floor.
4. Locations and depths of underground utilities.
5. Revisions to routing of piping and conduits.
6. Revisions to electrical circuitry.
7. Actual equipment locations.
8. Duct size and routing.
9. Locations of concealed internal utilities.
10. Changes made by Change Order.
11. Changes made following Architect's written orders.
12. Details not on original Contract Drawings.
13. Field records for variable and concealed conditions.
14. Record information on the Work that is shown only schematically.

C. Other Specified Requirements: Assemble information specified by individual Specification Sections for record information in connection with actual performance of Work.

D. Identification: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

3.3 RECORD CONTRACT SPECIFICATIONS

A. Preparation: Accurately mark to show conditions and information that varies from that specified originally, and indicate actual materials, products, and equipment installed.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.

3.4 RECORD SUBMITTALS

A. Preparation: Accurately mark to show conditions and information that varies from that required by approved submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in materials, products, and equipment delivered to site and changes in manufacturer's written instructions for installation.

END OF SECTION

SECTION 03 1100
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 DESCRIPTION
A. Provide formwork and accessories for construction of cast-in-place concrete work.

1.2 RELATED SECTIONS
A. Section 03 21 00 - Concrete Reinforcement.
B. Section 03 31 00 - Concrete Cast-in-Place.

1.3 REFERENCE STANDARDS
A. ACI 347-68

1.4 COORDINATION
A. Notify responsible trades of schedules of concrete pours to allow time for installation and coordination.

1.5 SYSTEM DESCRIPTION
A. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements, so that resultant concrete conforms to required shapes, lines, and dimensions.

1.6 QUALITY ASSURANCE
A. Construct and erect concrete formwork in accordance with ACI 301 and 347.

PART 2- PRODUCTS

2.1 MATERIALS
A. Forms:
   1. Flatwork: Nominal 2" thick No. 2 Common Southern Yellow Pine or steel forms.
B. Form Oil: Non-staining, paraffin-base oil having a specific gravity of between 0.8 and 0.9; type which will not affect bond of subsequent concrete finish.
C. Form Ties: Bolts, rods, or patented devices having minimum tensile strength of 3000 pounds, adjustable in length, free of lugs which would leave a hole larger than 5/8" in diameter and having a full one-inch depth of break-back. Contractor to review positioning of form ties with Owner's Representative prior to construction of walls.
D. Fillets for Chamfered Corners: Wood strips, fabricated to profile shown.
E. Construction Joints: Galvanized steel, tongue and groove type, with knockout.
F. Void Boxes: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete until initial set.
G. Form Release Agent: Colorless materials, which will not stain, concrete or absorb moisture; manufactured by Nox-Crete, Symons or approved equal.

PART 3 - EXECUTION

3.1 STORAGE OF MATERIALS
A. Store materials on palettes under protective sheeting.

3.2 CONSTRUCTION AND ERECTION
A. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

B. Arrange and assemble formwork to permit stripping, so that concrete is not damaged during its removal.
C. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be over stressed by construction loads.
D. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.
E. Provide chamfer strips on external corners of all elements where they will be exposed to view after completion of construction.
F. Install void forms. Protect from moisture before concrete placement joists in accordance with manufacturers' requirements. Protect from crushing during concrete placement. Cap ends of void boxes as required. Replace damaged boxes before concrete placement.
G. Construct formwork to maintain tolerances in accordance with ACI 301.
H. Construct forms in accordance with ACI 347-68.
I. Build forms to shapes, lines and dimensions of detailed members of concrete construction. Set to line and grade, brace and secure so as to withstand placing of concrete and maintain their shape and position.
J. Construct forms with care to produce concrete surfaces without unsightly or objectionable form marks in exposed concrete surfaces.
K. Thoroughly clean surfaces of form material and remove nails before reuse. Do not reuse damaged or worn forms. Coat contact surfaces of forms with non-staining form oil prior to placing metal reinforcement.
L. Immediately before placing concrete, clean forms of chips, sawdust, and other debris. Immediately after removal of forms, remove form ties, wires and other defects and patch.

3.3 INSERTS AND ACCESSORIES

A. Make provisions for required installation of accessories, bolts, hangers, sleeves, anchor slots and inserts cast in concrete, as required by Drawings and other trades. Obtain suitable templates or instructions for installation of items. Place expansion joints where detailed and required.

3.4 REMOVAL OF FORMS AND SHORING

A. Remove forms and shores in accordance with ACI 347-68.

3.5 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
B. Do not reuse wood formwork more than two times for concrete surfaces to be exposed to view. Do not patch formwork.

END OF SECTION

SECTION 03 2100
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 DESCRIPTION
A. Provide steel reinforcement for cast-in-place concrete.

1.2 RELATED SECTIONS
A. Section 03 11 00 - Concrete Formwork.
B. Section 03 31 00 - Concrete Cast-in-Place.

1.3 REFERENCE STANDARDS
A. ACI 318-71
B. ACI 315-65

PART 2 - PRODUCTS

2.1 MATERIALS
A. Steel Reinforcements: Deformed billet steel, ASTM A615, Grade 40 for stairs and flatwork and Grade 60 for freestanding walls.
B. Dowels and Sleeves: 5/8" plain round bars, 36" long, with 18" long sleeve cap at one end, allowing one inch of movement. Dowels shall be placed 36" on center unless otherwise noted on drawings.
C. Miscellaneous Accessories: Provide spacers, chairs, ties, and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place. Detail reinforcing bars and provide bar supports and spacers in accordance with the A.C.I. detailing manual.

2.2 FABRICATION
A. Fabricate reinforcing steel to sizes, shapes and lengths detailed in accordance with requirements of ACI 318-71 and 315-65.

PART 3 - EXECUTION

3.1 DELIVERY AND STORAGE
A. Stack reinforcing steel in tiers and mark so that each length, size, shape and location can be readily determined. Exercise care to maintain reinforcement free of dirt, mud, paint, or rust.

3.2 INSTALLATION
A. Accurately place reinforcing steel of sizes, shapes, lengths, spacing and other dimensions in accordance with Drawings. Before placing, thoroughly clean reinforcement of any coating, which would reduce bonding. Do not head, cut, or bend bars without Owner's Representative approval. Do not splice reinforcement at points of maximum stress. Stagger splices in adjacent bars and provide minimum overlap of 30 bar diameters at splices unless specifically noted otherwise on Drawings.
B. Provide corner bars for each bar at the inside and outside faces of intersecting walls. Corner bars shall be the same size as the smaller bar at the intersection and shall extend 30 bar diameter each side of the corner.
C. Detail reinforcing bars and provide bar supports and spacers in accordance with the A.C.I. detailing manual.
    1. Run top and bottom bars continuous between ends of members.
    2. Splice top bars at the centerline between member supports. (U.N.O.)
    3. Splice bottom bars directly over member supports (U.N.O.)
    4. All bar splices in beams, slabs and walls shall be 30 bar diameter, minimum.

5. Provide corner bars for each bar at the inside and outside faces of intersection beams or walls. Corner bars shall be the same size as the smaller bar at the intersection and shall extend 30 bar diameter, each side of the corner.
6. Secure saddle tie at intersections with number 18 gauge black annealed wire. Rigidly secure reinforcement in place during concrete placing. Provide concrete coverage for reinforcing steel as shown on Drawings.

END OF SECTION

SECTION 03 3100
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION
A. Provide cast-in-place concrete including concrete retaining walls with footings, flatwork and concrete drainage structures, and specified testing.

1.2 RELATED SECTIONS
A. Section 03 11 00 - Concrete Formwork.
B. Section 03 21 00 - Concrete Reinforcement.

1.3 SAMPLES
A. Use specified concrete.

1.4 APPLICABLE STANDARDS
A. ACI 304 - Practice for Measuring, Mixing, Transporting, and Placing Concrete.
B. ACI 305 - Recommended Practice for Hot Weather Concreting.
C. ACI 306 - Recommended Practice for Cold Weather Concreting.
D. ACI 309 - Standard Practice for Consolidation of Concrete.
E. ACI 318-83 - Standard Building Code Requirements for Reinforced Concrete.
F. ASTM C33 - Concrete Aggregates.
G. ASTM C94 - Ready-Mixed Concrete.
H. ASTM C150 - Portland Cement.
I. ASTM C260 - Air-Entraining Admixtures for Concrete.
J. ASTM C494 - Chemical Admixtures for Concrete.
K. Texas Highway Department Standard Specs for Construction of Highways, streets and bridges.
L. Southwestern Laboratories Reports (for shaft construction and fill specs).

1.5 QUALITY ASSURANCE
A. Perform work in accordance with ACI 301, 304, 305, 306, and 309.
B. Obtain materials from same source throughout the Work.
C. Batch plant shall be able to show a minimum of 5 years experience in batching concrete. If required they shall furnish a list of similar sized jobs or special condition jobs performed during the last two years.

1.6 COORDINATION
A. Notify responsible trades of schedules of concrete pours so as to allow adequate time for installation of their work. Obtain anchor bolts and other miscellaneous steel items to be cast into concrete from material supplier. Coordinate size and location of mechanical equipment concrete pads with applicable trades.

1.7 DELIVERY, STORAGE AND HANDLING
A. Mix and deliver concrete to project ready-mixed in accordance with ASTM C94.
B. Schedule delivery so that continuity of any pour will not be interrupted for over 15 minutes.
C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Portland Cement: ASTM C-150-72, Type I or III
B. Fine Aggregate: Clean, hard, durable, uncoated natural sand, free from silt, loam or clay, meeting requirements of ASTM C-33-71a.

C. Coarse Aggregate: Shall conform to applicable requirements of current edition of ASTM C-33, shall be gravel, washed and screened, well graded and colorful (both gray and buff colors) and shall consist of hard, durable particles without adherent coatings.
D. Water: Potable
E. Admixture: Cement-dispersing, water-reducing compound, ASTM C-494, Type A, made by Master-Builders, Sika, or Gifford-Hill Co. Depending upon weather conditions at time of placing, ASTM C-494, type D (water-retarding) or Type E (water-reducing, accelerating) may be used if approved by Owner's Representative. Utilize type B retarder equal to Burke Company True Etch Form Retarder for exposed aggregate work.
F. Air-Entraining Admixture: ASTM C-260-69.

2.2 PROPORTIONS AND MIXING

A. Mix concrete in accordance with ASTM C94, Alternative No. 2, or ACI 304.
B. Deliver concrete in accordance with ASTM C94.
C. Select proportions for normal weight concrete in accordance with ACI 301 Method 1. Mix not less than one minute after materials are in mixer.
D. Do not transport or use concrete after the following time has expired from time of initial mixing:
   1. 90-minutes when ambient temperatures are below 80 degrees F.
   2. 75-minutes when ambient temperatures are between 80 and 90 degrees F.
   3. 60-minutes when ambient temperatures are over 90 degrees
E. Verify supplier of transit-mixed concrete has a plant of sufficient capacity, and adequate transportation facilities to assure continuous delivery at required rate. Frequency of deliveries to project site shall be such as to provide for continuous concrete placement throughout any one pour.
F. Use accelerating admixtures in cold weather and retarding admixtures in hot weather only when approved by Owner's Representative and testing laboratory. Use retarder for exposed aggregate work. Use of admixtures will not relax cold weather placement requirements.
G. Add air entraining agent to concrete mix for concrete work exposed to exterior (grade beams excluded).
H. Use of calcium chloride and fly ash is strictly prohibited.

I. Proportions and Design: In accordance with approved mix design.
J. Minimum allowable compressive strength

(28 Days)	Cement	% of Air	Maximum Size Aggregate	Minimum Cement Content
3000 PSI	Gray to Buff	4% - 6%	1"	5 Sacks/cubic yard

K. Admixture: Introduce admixtures in quantities and according to methods recommended by admixture manufacturer. Add air-entraining agent to concrete as scheduled.
L. Slump: 3" - 5" - ASTM C-143.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.
B. Correct unsatisfactory work prior to placing concrete.
C. Remove rubbish from formwork immediately prior to placing concrete.
D. Remove ice and excess water from excavations and formwork.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
B. At locations where new concrete is doweled to existing work, drill over-sized holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.

C. Install vapor barrier under interior slabs on fill and under sand leveling bed if present. Lap joints minimum 12 inches and seal with special tape of same permanence as vapor barrier. Do not disturb or damage vapor barrier while placing concrete. Repair damaged vapor barrier.

3.3 PLACING CONCRETE

A. Notify Owner's Representative and testing laboratory a minimum of 24 hours prior to commencement of concreting operations.

B. Placing Concrete:
   1. Convey and place concrete in such a manner that there will be no separation of ingredients in accordance with ACI 304-73 and as specified below.
   2. Maximum height of concrete free fall - 5 feet.
   3. Regulate rate of placement so concrete remains plastic and flows into position.
   4. Deposit concrete continuously until panel or section is completed. Place as near as possible to its final location; do not re-handle or flow.
   5. Place concrete in horizontal layers 18" maximum thickness.
   6. Unless protection is provided, do not place concrete in rain, sleet, or snow.
   7. Do not place concrete, under any circumstances, except in presence of testing laboratory.
   8. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, thoroughly roughen and clean the surfaces of the latter of all foreign matter. Re-tighten forms and re-coat the surface of the previously deposited concrete with specified bonding agent per manufacturer's directions.

C. Consolidation:
   1. Use mechanical vibration equipment for consolidation.
   2. Vertically insert and remove hand-held vibrators at 18" on center for 5 to 15 seconds and in accordance with ACI 309.
   3. Do not use vibrators to transport concrete in forms.
   4. Provide vibrators with a minimum speed of 8000 RPM and with sufficient amplitude to consolidate effectively.
   5. Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.

H. Cold Weather Placement: Do not place concrete when temperature is below 40, F. unless cold weather concrete procedures are followed as specified in ACI 306-66. Calcium chloride shall not be used.

I. Hot Weather Placement: Exercise special care to prevent high temperature in fresh concrete during hot weather in accordance with ACI 305-72. Use water reducing set retarding admixtures in such quantities as especially recommended by manufacturer to assure that concrete remains workable and sift lines will not be visible.

J. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

K. Unless noted otherwise on the Drawings, maintain concrete cover around reinforcing as follows:

Item	Coverage
Beams	2-inch
Footings, Beams and Girders exposed to Earth	3-inch
Slabs on Fill	2-inch (from top of slab)

3.4 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed formed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 7 days.

B. Curing Methods: Perform curing of formed concrete by moist curing, or by moisture retaining cover curing, as herein specified.

C. Provide moisture curing by one of the following methods
   1. Keep concrete surface continuously wet by covering with water.
   2. Use continuous water-fog spray.

3. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.5 FINISHING OF FORMED SURFACES

A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched and fin and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces to be covered with a coating material applied directly to concrete such as waterproofing or veneer plaster. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Architectural Concrete: Light etched form finish for formed concrete surfaces exposed to view. This is an as-cast concrete surface obtained with selected form-facing material and snap ties, arranged in an orderly and symmetrical manner with a minimum of seams, with use of a form retarding agent and water blast.

3.6 PATCHING CONCRETE SURFACES

A. It is the intent of these Specifications to provide for concrete wall, beam, and soffit surfaces of such quality as to require a minimum of pointing.

B. Methods of patching concrete shall be reviewed with the Owner's Representative prior to application.

C. Exercise care in the forming, mixing and placing of the concrete as to assure reasonably uniform dense surfaces, free from blemishes, voids, or honeycombs.

D. Repair and patch defective areas with cement mortar and bonding agent mixture immediately after removal of forms, when acceptable to Owner's Representative.

3.7 CLEANUP

A. Contractor shall keep premises neat and orderly including organization of storage areas. All debris resulting from work shall be removed from site daily.

3.8 CAST-IN-PLACE CONCRETE TESTING

A. Design Mixes:
   1. All concrete mixtures to be designed by testing laboratory and paid for by the Owner.
   2. At the beginning of the work, Contractor shall submit proposed concrete mixes for review by the Owner's Representative and testing laboratory, including the sieve analysis of fine and coarse aggregate - ASTM C-136, dry rodded weight of coarse aggregate - ASTM C-29, and the specific gravity (bulk saturated surface dry), of fine and coarse aggregates ASTM C-127 and C-128. Laboratory will review and make mix modification recommendations.
   3. Do not mix concrete for placing in the work until after laboratory reports reflect that each proposed mix would develop the strength required.

B. Test Cylinders: Make at least one (1) test of each days pouring or each fifty (50) cu. yards, whichever comes first, on each different portion or section of the work. Mold and cure specimens in accordance with ASTM C31, and test in accordance with ASTM C39. Test cylinders shall be made and tested by the laboratory. Footings, walls, and floor systems constitute different sections. Each test shall consist of four (4) specimens, one (1) of which shall be broken at seven (7) days, two (2) at twenty-eight (28) days and one held in reserve. Determine temperature and air content for each set of test cylinders in accordance with ASTM C231.

C. Field Quality Control:
   1. Determine slump for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C143.
   2. Monitor addition of water to concrete and length of time concrete is allowed to remain in truck.

3. Certify delivery tickets indicating class of concrete, amount of water added during initial batching, and time initial batching occurred.
4. Monitor work being performed in accordance with ACI (American Concrete Institute) recommendations as a standard of quality.

END OF SECTION

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SECTION 040526
MASONRY CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Final cleaning of exposed clay brick and cast stone masonry surfaces.
   1. For cleaning of concrete masonry units, refer to product and method recommended in the specific section.

1.2 SUBMITTALS

A. Cleaning Plan: Written plan for cleaning exposed masonry surfaces prepared by masonry installer; include following information:
   1. If commercial cleaning compounds are used, manufacturer's technical literature; include application procedures.
   2. Qualifications of applicators.
   3. Masonry surfaces to be cleaned and required preparations.
   4. Sequence of cleaning activities, including precautions, if any.
   5. Environmental requirements by authorities having jurisdiction for use and discharge of cleaning effluents.
   6. Protection of surrounding areas, landscaping, building surfaces adjacent to area of cleaning.

B. Field Quality Control Test Reports: Reports of manufacturers field service required by PART 3 "Field Quality Control" Article.

C. Maintenance Data: For inclusion in maintenance information.
   1. Include instructions for periodic cleaning of masonry, including methods and frequency recommended for maintaining optimum condition under anticipated use.
   2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.3 QUALITY ASSURANCE

A. Cleaning Requirements: Comply with one or both of the following:
   1. Brick manufacturer recommendations.
   2. BIA Technical Note 20.

B. Manufacturers Technical Representative Qualifications: Direct employee of technical services department of manufacturer of cleaning compounds with not less than 5 years' experience in providing recommendations, evaluations, inspections, and problem diagnostics. Sales representatives are not acceptable.

C. Trial Cleaning: Prior to pre-cleaning conference, clean not less than 20 square feet of each masonry type.
   1. Use same workers, including supervisors, which will perform work on Project.
   2. Work on mock-ups shall be representative of those to be expected.
   3. Approval is for aesthetic quality of cleaning compounds to remove imperfects and blemishes caused by masonry construction.
   4. Obtain Architect's approval before starting work of this Section.
   5. Maintain mock-ups during construction in an undisturbed condition as a standard for judging completed Work.

D. Pre-Cleaning Conference: Before beginning Work of this Section, conduct single masonry conference, for this Section and other Masonry Sections, at site to comply with requirements of Division 01 specifications.
   1. Required Attendees:
      a. Owner.
      b. Architect.
      c. Contractor, including superintendent.
      d. Masonry veneer installer, including supervisor.
      e. Thin stone masonry veneer installer, including supervisor.
      f. Cast stone installer, including supervisor.
      g. Cleaning applicator, including supervisor.

h. Cleaning products manufacturer representative.

2. Minimum Agenda: Applicator shall demonstrate understanding of Work required by reviewing and discussing procedures for, but not limited to, following:
   a. Tour mock-up and representative areas of required Work, discuss and evaluate for compliance with Contract Documents, including substrate conditions prior to cleaning and after cleaning.
   b. Handling, storing and protecting cleaning products.
   c. Cleaning procedures, including weather provisions.
   d. Evaluation of masonry to be cleaned.
   e. Environmental requirements by authorities having jurisdiction for use and discharge of cleaning products.
   f. Review sample panels, discuss and evaluate dilution rates, dwell times, number of applications, effects of pressure rinsing, and desired results.
   g. Tour project and discuss masonry conditions to be cleaned.
3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

E. Cleaning Training: Manufacturer's qualified technical representative, not a sales representative, shall train installer's personnel, including supervisor, at Project on proper cleaning procedures prior to start of Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers for Cleaning Compounds: Subject to compliance with requirements of Contract Documents, manufacturers offering products that may be incorporated into Work include, but are not limited to, those listed alphabetically below:
   1. Diedrich Technologies, Inc.
   2. EaCoChem.
   3. Prosoco, Inc.

2.2 MASONRY CLEANERS

A. Commercial Cleaning Compounds: Manufacturer formulated cleaner for removing mortar stains, efflorescence, and other construction related stains from new masonry surfaces, with following suitability requirements:
   1. Suitable for masonry units and mortar installed, without discoloring or damaging masonry materials.
   2. Suitable for conditions at project site, including, but not limited to, windows, doors, other exterior wall elements, and adjacent walks or landscaping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:
   1. Examine masonry substrates to be cleaned for compliance with requirements and other conditions affecting performance.
   2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
   3. Starting Work within a particular area will be construed as acceptance.

3.2 FIELD QUALITY CONTROL

A. Manufacturers Field Service: Qualified technical representative shall be available to provide on-call technical support during entire course of masonry cleaning, and shall periodically inspect masonry cleaning activities to insure cleaning is proceeding in accordance with manufacturer's recommendations and cleaning plan. Representative shall submit written report of each visit indicating observations, findings and conclusions of inspection.

3.3 PROTECTION

A. Adjacent Surfaces: During cleaning operations, protect surrounding areas, landscaping, adjacent surfaces, and vehicles from contact with cleaning products. Avoid drifting of spray caused by wind.

3.4 CLEANING

A. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry according to

cleaning plan and lessons learned from trial cleaning.

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SECTION 04 2000
CLAY MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Exterior, non-load bearing and load bearing, face brick masonry veneer and accessories indicated, specified, or required for installation.

1.2 DEFINITIONS

A. Masonry Terminology: Refer to BIA 2 and other referenced quality standards.

1.3 SUBMITTALS

A. Product Data: Manufacturers technical literature for each type of product indicated, specified or required, including, but not limited to, following:
   1. Kind, size, and color of masonry unit.
   2. Manufactured accessory product.

B. Samples for Verification:
   1. Face Brick: Full-size samples for each different unit indicated showing full range of exposed color, texture, and dimensions to be expected.
   2. Accessories: Samples of manufactured products, including anchors, ties, cavity drainage material, flashing materials, weeps, vents, and other accessories.

C. Hot and Cold Weather Work Plan: Submit written plan detailing methods, materials and equipment to be used to comply with weather requirements.

1.4 QUALITY ASSURANCE

A. Masonry Installer Qualifications:
   1. Experience: Company with not less than 10 years' experience in performing specified Work similar to scope of this Project, and with a record of successful in-service performance, and sufficient production capability, facilities and personnel, to produce required Work.
   2. Supervision: Installer shall maintain a full time supervisor on job site during times specified Work is in progress and who has minimum 10 years' experience in installing systems similar to type and scope required for this project.

B. Quality Standards: In addition to specified requirements, comply with TMS 402/ACI 530/ASCE 5 for veneered masonry classification and prescriptive requirements, unless local building code has jurisdiction, whichever is more stringent.

C. Field Sample for Aesthetic Purposes: Before beginning work of this Section, build as many field samples as required to verify selections made under submittals and to demonstrate aesthetic effects and work execution. Approval does not constitute approval of deviations from Contract Documents, unless such deviations are specifically approved by Architect in writing.
   1. Build separate field samples approximately 48 inch square of brick masonry veneer.
   2. Locate facing south.
   3. Use same Subcontractors, including supervisors, which will perform work on Project.
   4. Where necessary, provide foundations and structural frame for support of field samples.
   5. Install products and materials according to specified requirements of respective Specification Sections.
   6. Work on field samples shall be representative of those to be expected for work.
   7. Finish various components to show maximum variation that will exist in work.
   8. Approval is for following aesthetic qualities:
      a. Color, texture, and blending of masonry units.
      b. Color and blending of mortar.
      c. Relationship of mortar and sealant colors to masonry unit colors.
      d. Tooling of joints.
      e. Other aesthetic qualities as determined by Architect.
   9. Obtain Architect's approval before starting work.
   10. Protect approved field samples from elements with weather resistant covering.
   11. Maintain field samples during construction in an undisturbed condition as a standard for judging completed work.

12. Do not demolish, alter, or remove field samples until acceptable to Owner and Architect.
13. When directed, demolish and remove field samples from Project.

D. Pre-Installation Conference: Before beginning work of this Section, conduct conference for Division 04 work at site to comply with requirements of Division 01 Sections.
   1. Required Attendees:
      a. Owner.
      b. Architect.
      c. Contractor, including superintendent.
      d. Masonry installer, including supervisor.
      e. Flashing installer, including supervisor.
      f. Cold-formed steel stud framing installer, including supervisor.
      g. Sheathing installer, including supervisor.
   2. Minimum Agenda: Installer shall demonstrate understanding of Work required by reviewing and discussing procedures for, but not limited to, following:
      a. Tour representative areas of required Work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of installation and other preparatory Work performed by other installers.
      b. Review Contract Document requirements.
      c. Review approved submittals.
      d. Review installation procedures, including, but not limited to:
         1) Handling, storing and protecting products and materials.
         2) Evaluation of substrates on which masonry will be installed.
         3) Fabrication and placement of flashings.
         4) Preparation and mixing of mortar, including testing.
         5) Laying masonry units.
         6) Anchoring and attaching masonry.
         7) Keeping masonry cavity clean.
         8) Protecting installed masonry, including stain prevention.
         9) Cleaning installed masonry.
      e. Review required inspection, testing, certifying, and material usage accounting procedures.
      f. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
   3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Label pallets of masonry units with manufacturers name, product name, and information required to identify products.

B. Storage:
   1. Masonry Units: Store on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
   2. Cementitious Materials: Store on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
   3. Aggregates: Store where grading and other required characteristics can be maintained and contamination avoided.
   4. Accessories: Store to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection During Work: Prevent excess moisture from entering Work in progress.
   1. Cover tops of walls, projections, and sills with water-repellent tarps or heavy plastic sheets at end of each day's Work.
   2. Cover partially completed masonry when construction is not in progress.
   3. Extend cover minimum of 24 in down both sides and hold cover securely in place.
   4. Protect door frames from damage.

B. Stain Prevention: Prevent mortar and soil from staining exposed masonry. Immediately remove

mortar and soil from exposed masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, and other adjacent with painted and integral finishes from mortar droppings.
4. Turn scaffolding planks near Work on edge at end of each day to prevent rain from splashing mortar droppings or dirt onto face of exposed masonry.

C. Hot and Cold Weather Requirements: Comply with building code or TMS 602/ACI 530.1/ASCE 6 whichever is more stringent, and following:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen substrates.
3. Remove and replace masonry damaged by frost or freezing conditions.
4. Use liquid cleaning methods only when air temperature is 40 deg F (4.4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Basis of Design: Contract Documents are based on products specified to establish a standard of quality. Other acceptable or available manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and do not change intended aesthetic, functional and performance requirements as judged by Architect.

B. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Specification Sections.

C. Available Manufacturers and Products: Subject to compliance with requirements of Contract Documents, manufacturers offering products that may be incorporated into Work include, but are not limited to, those listed alphabetically below.

2.2 MASONRY UNITS, GENERAL

A. Defective Units: Referenced standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in standard. Do not install units where defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in completed Work or will impair quality of completed masonry.

B. Special Brick Shapes: Provide shapes indicated and as follows for each form of unit required:

1. For applications requiring units of form, color, texture, and size on exposed surfaces that cannot be produced by sawing standard unit sizes.
2. For applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
3. For applications where stretcher units cannot accommodate special conditions including those at corners, movement joints, bond beams, sashes, and lintels.
4. For units without cores or frogs and with exposed surfaces finished for ends of sills, caps, and similar applications that would otherwise expose unfinished unit surfaces.

C. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

D. Source Limitations for Cementitious Materials: Obtain mortar ingredients of a uniform quality from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

2.3 FACE BRICK MASONRY UNITS

A. Product Quality Standard: ASTM C 216 or ASTM C 652, Grade SW, Type FBS, with following physical properties:

1. Unit Compressive Strength: Minimum 3000 psi for average of 5 bricks, and 2500 psi for individual brick, gross area, according to ASTM C 67, Section 7.
2. Hot and Cold Water Testing:

a. Water Absorption: Maximum 17.0 percent for average of 5 bricks, and 20.0 percent for individual brick, according to ASTM C 67, Section 8 for 5 hour boiling test.
b. Saturation Coefficient: Maximum 0.78 for average of 5 brick, and 0.80 for individual brick.
c. Requirement Waivers:
1) Absorption: Saturation coefficient requirement may be waived if there is maximum 8.0 percent absorption of random sampling of 5 bricks according to ASTM C 67, Section 8 for 24 hour submersion test.
2) Freezing and Thawing: Water absorption and saturation coefficient requirements may both be waived if there is maximum 0.5 percent loss in dry weight of any individual brick according to ASTM C 67, Section 9, for 50 cycles of freezing and thawing.

3. Initial Rate of Absorption: Between 5 and 25 g/m per 30 sq in according to ASTM C 67, Section 10. Use of coating to establish initial rate of absorption is not permitted and will not be allowed.
4. Efflorescence: Rated “not effloresced” according to ASTM C 67, Section 11.

B. Exterior Building Walls – Brick Type 1:
1. Size:
a. Width: 3-5/8 inch.
b. Height: 3-5/8 inch.
c. Length: 7-5/8 inch.
2. Basis of Design:
a. Supplier: Blackson Brick Company, Inc.
b. Manufacturer: Interstate Brick.
c. Selection: Emperor - Park Rose.

C. Exterior Building Walls – Brick Type 2:
1. Size:
a. Width: 3-5/8 inch.
b. Height: 3-5/8 inch.
c. Length: 7-5/8 inch.
2. Basis of Design:
a. Supplier: Blackson Brick Company, Inc.
b. Manufacturer: Interstate Brick.
c. Selection: Emperor - Ironstone.

2.4 LINTELS

A. Angles: Steel angles and shapes as specified in Section 05 5000 - Metal Fabrications.

2.5 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I; except Type III may be used for cold-weather construction.
B. Hydrated Lime Product Quality Standard: ASTM C 207, Type S.
C. Masonry Cement and Mortar Cement: ASTM C 91 and ASTM C 1329 products are not acceptable.
D. Color Pigments:
1. Description: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes; with record of satisfactory performance.
2. Quantity Limitations: Pigments shall not exceed 10 percent of portland cement by weight for mineral oxides nor 2 percent for carbon black.
3. Available Manufacturers and Products:
a. Bayer Corp., Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
b. Davis Colors; True Tone Mortar Colors.
c. Solomon Grind-Chem Service, Inc.; SGS Mortar Colors.

E. Colored Portland Cement-Lime Mix:

1. Description: Packaged blend made from portland cement and lime and color pigments complying with specified requirements, and containing no other ingredients. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
2. Quantity Limitations: Pigments shall not exceed 10 percent of portland cement by weight nor 2 percent for carbon black.
3. Available Manufacturers and Products:
   a. Capital Materials Corp.; Riverton Portland Cement Lime Custom Color.
   b. Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
   c. Lafarge North America Inc.; Eaglebond.
   d. Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

F. Aggregate for Colored Mortar: Natural sand or ground marble, granite, or other sound stone, as required to match approved sample.

G. Water: Potable.

2.6 TIES

A. General Type: For attaching masonry veneer to a back-up structure, use two-piece assemblies that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall; suitable for attachment conditions indicated. Corrugated ties are not permitted nor will be allowed.

B. Structural Performance Characteristics: Capable of withstanding a 100 lb load in both tension or compression without deforming, or developing play in excess of, 0.05 in.

C. Materials for Veneer Wall Ties:
1. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82 with ASTM A 153, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008 commercial sheet, hot-dip galvanized after fabrication to comply with ASTM A 153, Class B coating.

D. Wall Ties for Concrete Masonry:
1. Description:
   a. Anchor Plate: Minimum 0.0713 in (14 ga) uncoated base metal thickness, L-shaped section with ribs for added strength, one screw hole, and slot for pintle; with expansion bolt for attaching to wall. Size as required to accommodate insulation board.
   b. Pintle: Minimum 3/16 in diameter; length as required to extend at least halfway through masonry veneer but with minimum 5/8 in cover on outside face of masonry.
2. Basis of Design: Hohmann & Bernard, Inc.; HB-5213 Adjustable Veneer Anchor with BL-523 Brass Expansion Bolt.

E. Wall Ties for Sheathed Steel Studs Walls:
1. Description:
   a. Anchor Plate: Minimum 0.0713 in (14 ga) uncoated base metal thickness, L-shaped section with ribs for added strength, two screw holes, and slot for pintle. Size as required to accommodate insulation board.
   b. Pintle: Minimum 3/16 in diameter; length as required to extend at least halfway through masonry veneer but with minimum 5/8 in cover on outside face of masonry.
2. Basis of Design: Hohmann & Barnard, Inc.; HB-213 Adjustable Veneer Anchor.

2.7 EMBEDDED FLASHING MATERIALS

A. Drip Plate:
1. Product Quality Standard: ASTM A 240 or A 666, Type 304.
2. Description: Stainless steel, 2D annealed finish, not less than 0.0250 in (24 ga) thick, 3 inch wide plate with smooth, factory-formed hemmed turned-down edge with continuous 1/8 inch thick strip of factory-installed compressible foam on bottom; with prefabricated inside and outside corners.
3. Basis of Design: Hohmann & Barnard, Inc.; DP-FTS

B. Fabric/Metal Flashing:
1. Product Quality Standard: ASTM A 240 or A 666, Type 304

2. Description: Layer of polymer fabric, 0.004 in thick, with a single sheet of stainless steel, 0.003 in thick, bonded to one side; with following physical properties:
   a. Puncture Resistance: Not less than 2,500 psi when tested according to ASTM E 154.
   b. Heat Resistant: No degradation in high heat applications.
   c. Ultraviolet Light Exposure: Not more than 180 days.
3. Basis of Design: Hohmann & Barnard, Inc.; Mighty-Flash Stainless Steel Fabric Flashing.

C. Termination Bars:
1. Product Quality Standard: ASTM A 666, Type 304.
2. Description: 1/8 in thick by 1 in wide continuous stainless steel bar with 1/4 in diameter holes spaced at 16 in on centers.
3. Anchors: Same type screws as used to attach veneer wall ties.
4. Basis of Design: Hohmann & Barnard, Inc.; T1.

2.8 ACCESSORIES

A. Weeps: One of following:
1. Plastic Weep:
   a. Description: One-piece, flexible extrusion made from ultraviolet light resistant polypropylene copolymer, consisting of honeycomb matrix of multiple cells, designed to fill head joint with outside face held back 1/8 in (3 mm) from exterior face of masonry.
   b. Color: As selected from manufacturer's standard colors available.
   c. Acceptable Manufacturers and Products:
      1) Advanced Building Products, Inc.; Mortar Maze Weep Vents.
      2) Dur-O-Wal, Inc.; Cell Vent, D/A 1006.
      3) Heckman Building Products, Inc.; Cell Vent, 85.
      4) Hohmann & Barnard, Inc.; QV – Quadro-Vent.
2. Mesh Weep:
   a. Description: Compressed, 200 denier polyester with 90 percent open mesh and bonded with flame retardant adhesive.
   b. Color: As selected from manufacturer's standard colors available.
   c. Acceptable Manufacturer and Product:
      1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

B. Bond Breaker Strips:
1. Product Quality Standard: ASTM D 226, Type I.
2. Description: Asphalt-saturated organic roofing felt (No. 15 asphalt felt).

2.9 MORTAR MIXES

A. General: Mix cementitious materials in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency for minimum 3 minutes to 5 minutes; do not hand mix.
1. Admixture Limitation: Do not use admixtures including air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, calcium chloride or other admixtures.
2. Cementitious Limitation: Limit cementitious materials in mortar to portland cement and lime.
3. Ingredient Measurement: Measure in a one cubic foot batching box before mixing for component materials not preblended, prepackaged or containerized.
4. Aggregate Moisture Content: Monitor moisture content of aggregates and exercise caution when mixing to avoid over or understanding of mortar.

B. Mortar Mix:
1. Mix Quality Standard: ASTM C 270, Proportion Specification for portland cement-lime mortars, Type N.
2. Mortar Color: As selected from manufacturers standard colors available.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:
1. Examine substrates to which brick masonry veneer will be placed for compliance with requirements, installation tolerances and other conditions affecting performance.

2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance.

3.2 PREPARATION

A. Substrate Cleaning: Remove construction debris, dust, dirt, mud, oil, and other materials on surfaces that would adversely affect or reduce bond of masonry and mortar.

3.3 INSTALLATION, GENERAL

A. Installation Performance Requirements: Ensure masonry cavity is properly isolated from building interior to prevent water infiltration from infiltrating out of masonry cavity into other components of building such as window and door jambs and building interiors.

B. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
1. TMS 602/ACI 530.1/ASCE 6, unless local building code has jurisdiction.
2. Applicable portions of BIA “Technical Notes on Brick Construction”.
3. Respective manufacturer’s written installation instructions.
4. Approved submittals.
5. Contract Documents.

C. Openings: Leave for equipment to be installed before completion of masonry; after installation of equipment, complete masonry to match construction immediately adjacent to opening.

D. Brick Masonry Units:
1. Use full-size units without cutting where possible.
2. Cut with motor-driven saws to provide clean, sharp, unchipped edges.
3. Cut units as required to provide continuous pattern and to fit adjoining construction.
4. Install cut units with cut surfaces concealed.

E. Blending of Masonry Units: Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

F. Mortar Workability:
1. Maintain by remixing or retempering.
2. Discard mortar that has begun to stiffen or is not used within 2.5 hours after initial mixing.

3.4 LINTELS

A. Steel Shelf Angles: Erection as specified in Division 05 Section “Metal Fabrications”.

3.5 LAYING MASONRY WALLS

A. General: Lay out walls in advance for accurate spacing of surface bond patterns, uniform joint thicknesses for brick veneer, accurate location of openings, movement-type joints, returns, and offsets. Avoid using of less than half-size units at corners, jambs, and where possible at other locations.

B. Brick Bond Patterns:
1. Exposed Masonry: One-half running bond.
2. Concealed Masonry: Lay units in a wythe in running bond or bonded by lapping not less than 2 in lap.
3. Corners: Bond and interlock each course of each wythe. Do not use units with less than nominal 4 in horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: In each course, rack back one-half unit length; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar.

D. Built-In Work:
1. As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
2. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

3.6 MORTAR BEDDING AND JOINTING

A. General Procedures:
1. Do not disturb previously laid units.
2. Spread mortar for bed joint only so far ahead of laying units that mortar will be plastic when units are laid.

3. Butter end of unit with ample mortar so that head joint is completely filled with mortar when shoved into place.
4. Do not deeply furrow bed joints or slush head joints.
5. Avoid over-plumbing and pounding of corners and jambs to fit stretcher unit after setting in place. Where adjustments must be made after initial setting, remove mortar and replace with fresh mortar.
6. Rock closures into place with both head joints and closure space spread with ample mortar. Shove against adjacent units so that both horizontal and vertical joints are completely filled.

B. Mortar Joint Thickness:
1. Brick: Minimum 3/8 in wide for head and bed joints.

C. Joint Tooling:
1. Finish joints that will remain exposed with a tool slightly larger than joint width to form a concave profile.
2. Tool joints after mortar has taken its initial set and in such a manner as to squeeze mortar back into joint.
3. Tool vertical joint first.

3.7 MASONRY CAVITIES AND WEEPS

A. Clean Cavity: Keep cavities clean of mortar droppings and other materials. Strike joints facing cavities flush.

B. Mortar Protection: Install cavity drainage material at base of cavity to protect bottom of cavity from mortar droppings that would prevent weeps from draining infiltrated water.

C. Weeps: Install weeps at maximum 24 in on centers in head joints of first course of masonry immediately above embedded flashings.

3.8 ANCHORING MASONRY VENEER

A. General: Coordinate installation of wall ties with rigid insulation specified in Division 07 Section “Thermal Insulation.”

B. Wall Ties to Concrete Masonry:
1. Unless otherwise indicated, provide an open space not less than 2 in width between back of masonry veneer and concrete masonry. Keep open space free of mortar or other rigid materials.
2. Space anchors vertically and horizontally as required for coursing with one anchor for every 2 sq ft of masonry veneer; stagger alternating anchors in each row.
3. Install additional anchors within 12 in of openings and at maximum 18 in on center around perimeter.
4. Embed wall tie, in proper orientation, at least halfway through masonry veneer but with at least 5/8 in cover on outside face of masonry.

C. Wall Ties to Sheathed Steel Studs: Anchor masonry veneer to sheathed steel studs.
1. Unless otherwise indicated, provide an open space not less than 2 in width between back of masonry veneer and face of sheathing. Keep open space free of mortar or other rigid materials.
2. Locate anchor plate portion of wall tie to allow maximum vertical differential movement of tie up and down.
3. Space anchors at 16 in on center vertically and 16 in on center horizontally as required for coursing.
4. Install additional anchors within 12 in of openings and at maximum 8 in on center around perimeter.
5. Attach each anchor through sheathing to steel studs with 2 metal fasteners each.
6. Embed wall tie, in proper orientation, at least halfway through masonry veneer but with at least 5/8 in cover on outside face of masonry.

3.9 EMBEDDED FLASHINGS

A. General: Drawings may not necessarily indicate or describe full extent of Work required for completion of embedded flashing.

B. Install drip plate flashing in proper locations with hemmed edge oriented to exterior and aligned with face of masonry. Overlap joints in flashing not less than 3 inches. Install inside and outside corners.

C. Install continuous fabric/metal flashing with 2 inch overlap over drip plate flashing; extend flashing horizontally on base of wall and turn up onto wall and extend not less than 8 inches up wall and install termination bar at top of flashing.

D. Form end dams of fabric/metal flashing with a depth of not less than 1 brick course at following locations:
   1. At ends of lintels.
   2. At ends of shelf angles.
   3. At ends of flashing at base of wall and penetrations, such as door frames.

3.10 MASONRY EXPANSION JOINTS

A. General:
   1. Install masonry expansion joints materials as Work progresses.
   2. Do not allow materials to span masonry expansion joints without provision to allow for in-plane wall or partition movement.
   3. Maintain joints free and clear of mortar.

B. Vertical Joints:
   1. Locate where indicated but not to exceed 26 ft on center, and within 4 ft of each side of outside corner.
   2. Keep vertical joints straight, true and continuous from top to bottom of masonry.
   3. Form open joint of width indicated for installation of sealant and backer rod specified in Division 07 Section “Joint Sealants.”

3.11 BRICK VENEER TOLERANCES

A. Conspicuous Lines:
   1. Vertical: For such conditions as external corners, door and window jambs, reveals, and masonry expansion joints, maximum variation of one of following from plumb:
      a. 1/8 in in 10 ft.
      b. 1/4 in in 20 ft.
      c. 1/2 in overall.
   2. Horizontal: For such conditions as exposed lintels, sills, door and window heads, parapets, and reveals, maximum variation of one of following from level:
      a. 1/8 in in 10 ft.
      b. 1/4 in in 20 ft.
      c. 1/2 in overall.

B. Exposed Head Joints:
   1. Vertical Alignment: Maximum variation of one of following from plumb:
      a. 1/4 in in 10 ft.
      b. 1/2 in from plumb top to bottom of wall.
   2. Thickness: Maximum variation from width indicated of plus or minus 1/8 in; maximum variation from adjacent bed joint and head joint thicknesses 1/8 in.

C. Exposed Bed Joints: Maximum variation from width indicated of plus or minus 1/8 in, with a maximum thickness limited to 1/2 in; maximum variation from bed joint thickness of adjacent courses of 1/8 in.

D. Flush Alignment: Maximum variation of 1/16 in except due to warpage of masonry units with tolerances specified for warpage of units.

3.12 ADJUSTING

A. Repairs for Damage: Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units and install fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During tooling of joints, enlarge any voids or holes, except weeps and vents, and completely fill with mortar. Point up all joints including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants, where indicated.

3.13 CLEANING

A. In-Progress Cleaning: As soon as practical, clean masonry as Work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

B. Final Cleaning: Comply with Division 04 Section “Masonry Cleaning.”

END OF SECTION

SECTION 04 2200
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Concrete masonry units.
   2. Mortar and grout.
   3. Steel reinforcing bars.
   4. Masonry joint reinforcement.
   5. Ties and anchors.

B. Related Sections:
   1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
   2. Section 047200 "Cast Stone Masonry" for furnishing cast stone trim.
   3. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural-steel frame.
   4. Section 071900 "Water Repellents" for water repellents applied to concrete unit masonry.
   5. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
   6. Section 097523 "Stone Window Stools" for stone window stools.
   7. Section 321400 "Unit Paving" for exterior concrete unit masonry paving.
   8. Section 323223 "Segmental Retaining Walls" for dry-laid, concrete unit retaining walls.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
   1. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
   1. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
   2. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
   3. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.
   4. Prism Test: For each type of construction required, according to ASTM C 1314.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type and color of the following:
   1. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include data on material properties material test reports substantiating compliance with requirements.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost

or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.

1. Density Classification: Normal weight unless otherwise indicated.
2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
3. Size (Width): Manufactured to the following dimensions:
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.3 CONCRETE and MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.187-inch diameter.
4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Wire Size for Veneer Ties: 0.187-inch diameter.

6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 641/A 641M, Class 1 coating.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch-thick, steel sheet, galvanized after fabrication
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch diameter, hot-dip galvanized steel wire.
3. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch-thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.

C. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.7 MISCELLANEOUS ANCHORS

A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.

B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.

C. Anchor Bolts: Headed L-shaped steel bolts complying with ASTM A 307, Grade A ; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

D. Postinstalled Anchors: chemical anchors.
1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group (1) stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.8 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.
3. For exterior masonry, use portland cement-lime mortar.
4. For reinforced masonry, use portland cement-lime mortar.
5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade or in contact with earth, use Type M.
   2. For reinforced masonry, use Type N.
   3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
   4. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
   2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
   3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Allow cleaned surfaces to dry before setting.
3. Wet joint surfaces thoroughly before applying mortar.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at [corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.9 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Continuous special inspections according to the "International Building Code."
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.12 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.13 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.14 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

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SECTION 04 7200
CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cast stone shapes and accessories indicated, specified, or required for installation.

1.2 DELEGATED ENGINEERING REQUIREMENTS

A. Contract Document Concept: Drawings and Specifications express concept of cast stone masonry work, however, they may not indicate or specify total work that may be required, nor shall they be construed as engineered.

B. Delegated Engineering Responsibility: Employ delegated engineering professional to provide engineering for each member and component, including attachment to building structural frame, required to comply with concept expressed in Contract Documents that includes, but is not limited to, following:

1. Comprehensive engineering analysis indicating location, type, magnitude, and direction of loads imposed on building structural frame.

2. Preparation of engineering calculations, shop drawings, and other submittals with professional seal affixed according to respective jurisdictional licensing regulations.

1.3 PERFORMANCE REQUIREMENTS

A. Wind Criteria: Engineer to withstand load effects of wind acting inward and outward, normal to plane of wall, for wind loads indicated on Drawings.

1.4 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Detailed and dimensioned plans, elevations, and large-scale details showing fabrication and installation details.

1. Include building elevations showing layout of units and locations of joints and anchors.
2. Include profiles and shapes of units.
3. Include details of reinforcement and indication of finished faces.
4. Include anchors and anchoring methods to supporting substrates.

C. Samples for Verification: 10 in square for each color and texture of cast stone specified until approved.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, which has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.

B. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated that have resulted in installations of cast stone masonry similar to this Project, and, that has a record of successful in-service performance.

C. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Quality Standards:

1. ASTM C 1364.
2. CSI’s Technical Manual.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship cast stone units in suitable packs or pallets.
   1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
   2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
C. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.7 PROJECT CONDITIONS
A. Cold-Weather Requirements: Comply with ACI 530.1/ASCE 6/TMS 602.
   1. Do not use frozen materials or materials mixed or coated with ice or frost.
   2. Do not build on frozen substrates.
B. Hot-Weather Requirements: Comply with ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 PRIMARY MATERIALS FOR CAST STONE
A. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast stone color indicated.
B. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
C. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.
D. Admixtures: Use only admixtures specified or approved in writing by Architect.
   1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
   2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
   3. Air-entraining admixture, ASTM C 260; add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
   4. Water-reducing, retarding, accelerating and high range admixtures, ASTM C 494, Types A – G.
E. Reinforcement:
   1. Deformed Steel Bars: ASTM A 615, Grade 40 or 60; use one of following when covered with less than 1-1/2 in of cast stone material.
      a. Epoxy Coating: ASTM A 775.
      b. Galvanized Coating: ASTM A 767.
   2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.

2.2 FASTENERS AND ANCHORS
A. Selection Criteria:
   1. Only domestically manufactured anchors and fasteners are acceptable.
   2. Diameter, material thicknesses, and lengths as determined by application, and as indicated below, sufficient to attach or anchor item to substrate indicated without failure.
B. Powder Actuated Fasteners:
   1. Product Quality Standard: ANSI A10.3.
   2. Product Description: Low velocity, powder actuated fasteners, stainless steel drive pins, length as required for minimum 3/4 in long penetration, with washers sized engage 3 strands of lath; powder loads suitable for application indicated; sufficient to correctly attach or anchor metal lath to substrate indicated without failure.
   3. Available Manufacturers:
      a. Hilti Corp.
      b. ITW Ramset/Red Head.
      c. Powers Fasteners.

d. Simpson Strong Tie Anchor Systems.

C. Screw Fasteners:
1. Product Quality Standard: SAE J429, Grade 5 and ASTM A 449, with following physical properties:
a. Load Bearing Thread Hardness: Not less than HRC 28, nor more than HRC 34.
b. Drill Point and Lead Thread Hardness: Not less than HRC 52.
2. Description: Self-drilling screws with pan or wafer type head of size to engage 3 strands of lath; fabricated from carbon steel with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117; in lengths required to achieve minimum penetration of 3/8 in beyond metal framing flange.
3. Acceptable Manufacturers and Products:
a. Elco Industries, Inc.; Dril-Flex Structural Fasteners with Silver Stalgard finish.
b. Hilti, Inc.; Kwik-Flex Self-Drilling Fasteners with Kwik-Cote finish.

D. Post-Installed Expansion Anchors:
1. Product Quality Standards: ACI 318, D.1 and ICC-ES AC193; approved for cracked concrete conditions when used in concrete that is cracked or may become cracked under connected load.
2. Material and Finish: ASTM F 593, Group 1, Alloy 304 stainless steel.
3. Acceptable Manufacturers and Products:
a. ITW; Redhead Truebolt Wedge Anchor.
b. Powers; Bull Wedge Anchor.
c. Simpson; Strong-Bolt Wedge Anchor.
4. Not Acceptable: Chemical type anchors.

E. Dowels: Round bars, fabricated from Type 304 stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666.

F. Anchors: Type and size required by conditions, fabricated from Type 304 stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666.

2.3 MORTAR MATERIALS

A. General: As specified in Section 04 2000 – Masonry Veneer.

2.4 JOINT SEALANT AND BACKERS

A. Sealant: Exterior non-sag silicone sealant specified in Section 07 9200 - Joint Sealants.

B. Backers: Foam backer rods and bond-breaker tape specified in other Section 07 9200 - Joint Sealants.

2.5 MORTAR MIXES

A. General: As specified in Section 04 2000 – Masonry Veneer.

2.6 MANUFACTURING CAST STONE

A. Performance Criteria: ASTM C 1364.

B. Shop Fabrication: Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

C. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 in.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of length of unit or 1/8 in, whichever is greater, but in no case by more than 1/4 in.
3. Warp, Bow, and Twist: Not to exceed 1/360 of length of unit or 1/8 in, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 in on formed surfaces of units and 3/8 in on unformed surfaces.

D. Curing:
1. Cure units in curing chamber according to one of following:
a. At 100 percent relative humidity and temperature of 100 deg F for 12 hours.
b. At 95 percent relative humidity and temperature of 70 deg F for 16 hours.
2. Keep units damp and continue curing for not less than 5 days at mean daily temperature

of 70 deg F.

3. Protect units from moisture evaporation with curing blankets or curing compounds after casting.

E. Treatment for Exposed Faces: Acid etch units after curing to remove cement film from surfaces to be exposed to view.

F. Colors: As selected from manufacturers standard colors available.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which cast stone will be applied for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 SETTING CAST STONE IN MORTAR

A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:

1. CSI's Technical Manual.
2. Respective manufacturer's written installation instructions.
3. Approved submittals.
4. Contract Documents.

B. Install anchors, supports, and other attachments indicated or necessary to secure units in place using following fasteners:

1. Sheathed Stud Walls: Screw fasteners.
2. Concrete Masonry: Post-installed expansion anchors.

C. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

D. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Build anchors and ties into mortar joints as units are set.
2. Fill dowel holes and anchor slots with mortar.
3. Fill collar joints solid as units are set.
4. Build concealed flashing into mortar joints as units are set.
5. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
6. Keep joints at shelf angles open to receive sealant.

E. Rake out joints for sealant to depths of not less than 3/4 in. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

F. Provide sealant at joints.

1. Keep joints free of mortar and other rigid materials.
2. Form joint of width indicated, but not less than 3/8 in.
3. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
4. Prepare and apply sealant to comply with applicable requirements in appropriate Section 07 9200 - Joint Sealants.

G. Tolerances:

1. Variation from Plumb: Do not exceed 1/8 in in 10 ft, 1/4 in in 20 ft, or more.
2. Variation from Level: Do not exceed 1/8 in in 10 ft, 1/4 in in 20 ft, or 3/8 in maximum.
3. Variation in Joint Width: Do not vary joint thickness more than 1/8 in in 36 in or one-fourth of nominal joint width, whichever is less.
4. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 in.

3.3 ADJUSTING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
B. Replace units in a manner that results in cast stone matching approved samples, complying with other requirements, and showing no evidence of replacement.

3.4 CLEANING

A. In-Progress Cleaning: Clean cast stone as work progresses.
   1. Remove mortar fins and smears.
   2. Remove excess sealant immediately, including spills, smears, and spatter.
B. Final Cleaning: Comply with Section 04 0526 – Masonry Cleaning.

END OF SECTION

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SECTION 07 2726
FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fluid-applied, vapor permeable membrane air barrier assembly, and accessories indicated, specified, or required to complete application.

1.2 DEFINITIONS

A. Air Barrier Assembly: Collection of air barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required; include following:
   1. Manufacturer's written application instructions.
   2. Manufacturer's written instructions for evaluating, preparing, and treating substrate onto which work will be applied.
   3. Manufacturer's written approval of products not manufactured by primary manufacturer.
   4. Manufacturer's written statement that materials are compatible with adjacent materials that connect to or that come in contact with the barrier.

B. Shop Drawings: Show locations and extent of air barrier assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated, how materials that cover the air barrier assemblies are secured with air-tight condition maintained, and how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.

C. Compatibility Certification: Submit letter from primary material manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications:
   1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.
   2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and, who is experienced in installing work similar in design, products, and extent to scope of this Project.
   3. Manufacturer Qualification: Trained and certified by manufacturer to apply specified products.

B. Manufacturers Technical Representative Qualifications: Direct employee of technical services department of manufacturer with minimum of 5 years experience in providing recommendations, observations, evaluations, and problem diagnostics. Sales representatives are not acceptable.

C. Mock-Up:
   1. Install mock-up using approved air barrier system including membrane, flashing, joint and detailing compound and related accessories according to manufacturer's written instructions.
      a. Mock-up size of 10 foot square area of wall assembly construction, including a window opening.
      b. Mock-up may remain as part of the work.
   2. Contact manufacturer's representative prior to air barrier application, to perform required mock-up visual inspection and analysis as required by warranty.

D. Pre-Application Conference: Before beginning work of this Section, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.
   1. Required Attendees:

a. Owner.
b. Architect.
c. Contractor, including supervisor.
d. Installers of adjacent work, including supervisors.
e. Manufacturer's technical representative.

2. Minimum Agenda:
a. Review Contract Document requirements.
b. Review approved submittals.
c. Review application procedures, including, but not limited to, following:
1) Surface preparation.
2) Substrate condition and pretreatment.
3) Special details and sheet flashings.
4) Sequence of installation.
5) Protection and repairs.
6) Areas of potential conflict and interface.
d. Review required inspection.
e. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
f. Tour representative areas of required work, discuss and evaluate for compliance with Contract Documents and approved submittals, including substrate conditions, surface preparations, sequence of application, and other preparatory work performed by other installers.

3. Reports: Record discussions, including decisions and agreements reached, and prepare report.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.
B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
C. Store rolls according to manufacturer's written instructions.
D. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Limitations:
1. Apply air barrier assembly components within the range of ambient and substrate temperatures recommended by air barrier manufacturer.
2. Protect substrates from environmental conditions that affect performance of air barrier.
3. Do not apply air barrier assembly components to a damp or wet substrate or during snow, rain, fog, or mist.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Furnish warranty for a period of 10 years from date of substantial completion agreeing to repair or replace air barrier, signed by an authorized representative using manufacturer's standard form.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products manufactured by Dupont Building Innovations to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.
1. Fluid-Applied Air Barrier: Tyvek Fluid Applied WB.
2. Through Wall Flashing: Tyvek Thru-Wall Flashing with preformed corners and end dams.
3. Penetration and Termination Sealant: Sealant for Tyvek Fluid Applied System.
4. Transition, Termination, and Detailing Membrane: One of following:
a. StraightFlash.
b. Tyvek Fluid Applied Flashing and Joint Compound.
5. Window Flashing Membrane: One of following:
a. Tyvek Fluid Applied Flashing and Joint Compound.

b. Tyvek Fluid Applied Flashing - Brush Formulation.
c. StraightFlash and FlexWrap.

6. Joint Treatment: One of following depending on size of gap:
   a. 1/4 inch: Tyvek Fluid Applied Flashing and Joint Compound.
   b. 1/2 inch: Tyvek Fluid Applied Flashing and Joint Compound with fiberglass mesh tape.
   c. 1 inch: StraightFlash.

B. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents, provide products by one of manufacturers named alphabetically below. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.
1. BASF Corp.; Enershield-HP.
2. Carlisle Coatings and Waterproofing, Inc.; Barritech VP.
3. Dupont Building Innovations; Tyvek Fluid Applied WB.
4. Grace Construction Products; Perm-A-Barrier VP.
5. Henry Company, Inc.; Air-Bloc 31MR.
6. PROSOCO, Inc.; R-Guard Cat 5.

2.2 PERFORMANCE REQUIREMENTS

A. General:
1. Capable of performing as a continuous vapor-permeable air barrier and as a liquid water drainage plane flashed to discharge to the exterior.
2. Capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air Penetration: Not more than 0.004 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. pressure difference according to ASTM E 2178 (unmodified).

C. Vapor Permeance: Not less than 10 perms according to ASTM E 96, Method B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:
1. Examine substrates to which fluid-applied membrane air barriers will be applied for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to air barrier manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier assembly application.
1. Ensure that penetrating work by other trades is in place and complete.
2. Prepare surfaces by brushing, scrubbing, scraping, grinding or compressed air to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the fluid-applied membrane.
3. Wipe down metal surfaces to remove release agents or other non-compatible coatings using clean sponges or with a material chemically compatible with the primary air material.

B. Mask off adjoining surfaces not covered by air barrier assemblies to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings.

D. At changes in substrate plane, apply sealant at sharp corners and edges to form a smooth transition from one plane to another.

E. Prepare, treat, rout, and fill cracks, and gaps in substrate according to air barrier manufacturer's written instructions.

F. Treat joints in sheathing according to manufacturer’s instructions.

3.3 APPLICATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
   1. Manufacturer's written instructions.
   2. Approved submittals.
   3. Contract Documents.

B. Apply air barrier assembly products using methods recommended by manufacturer, to achieve a continuous air barrier and a dry film thickness as recommended by the manufacturer.

C. Do not expose air barrier assemblies to sunlight longer than as recommended by the manufacturer.

D. Inspect installation and repair voids, holidays, damaged or non-uniform areas prior to installation of exterior cladding.

3.4 FIELD QUALITY CONTROL

A. Manufacturers Field Inspection: Manufacturers technical representative shall periodically inspect work to ensure application is proceeding in accordance with manufacturer's designs, recommendations, instructions and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings and conclusions of inspection.

3.5 CLEANING AND PROTECTION

A. Protect air barrier assemblies from damage during installation of exterior cladding and for remainder of construction period, according to manufacturer's written instructions.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Joint sealants, backing materials, and accessories indicated, specified, or required to complete installation.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each joint sealant product and accessory indicated, specified, or required.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing full range of colors available for each product exposed to view.

C. Samples for Verification: Samples for each kind and color of joint sealants in 1/2 in wide joints formed between two 6 in strips of material matching appearance of exposed surfaces adjacent to joint sealants.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. Experience: Installer with minimum of 5 years specialized experience in performing specified Work similar in design, material and extent to scope of Project, and with a record of successful in-service performance.
2. Supervision: Installer shall maintain a competent supervisor who is on job site during times specified Work is in progress, and, who is experienced in installing systems similar to type and scope required.

B. Mock-Ups:

1. Before beginning Work of this Section, install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section.
2. Use materials and installation methods specified in this Section.
3. Provide as many mock-ups as required until approved.

1.4 FIELD CONDITIONS

A. Ambient Conditions: Proceed with installation of joint sealants under following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

B. Weather Conditions Limitation: Proceed with Work only when existing and forecasted weather conditions will permit installation according to manufacturer's instructions and warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements of Contract Documents, manufacturers offering products that may be incorporated into the Work include, but are not limited to, those listed alphabetically below.

2.2 MATERIALS, GENERAL

A. Compatibility: Joint sealants, backings, and other related materials shall be compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint sealant manufacturer based on testing and field experience.

B. Single Source Responsibility: Furnish each type of joint sealant from single manufacturer.

C. Suitability for Contact with Food: Comply with authorities having jurisdiction for joints in repeated contact with food.

2.3 EXTERIOR ELASTOMERIC SEALANTS

A. Exterior Non-sag Silicone Sealant – Class 50:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 50.

2. Description: Single component, non-sag, neutral cure, non-staining as determined by pre-construction stain testing, and non-bleeding, silicone sealant.
3. Joint Movement Capability: Plus 50 percent, minus 50 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Available Manufacturers and Products:
   a. Dow Corning; 795 Silicone Building Sealant.
   b. May National Associates, Inc.; Bondaflex Sil 295.
   c. Momentive Performance Materials, GE Silicones; Silpruf SCS2000.
   d. Pecora Corp.; 864NST.
   e. Tremco Commercial Sealants & Waterproofing; Spectrem 3.
   f. Sika; SikaSil 295.
6. Color: As selected from manufacturer's standard colors.

2.4 INTERIOR ELASTOMERIC SEALANTS

A. Interior Non-sag Silicone Sealant:
1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25.
2. Description: Single component, non-sag, moisture curing, silicone sealant specially formulated with fungicide for use in sanitary non-porous applications.
3. Available Manufacturers and Products:
   a. Dow Corning; 786 Silicone Sealant.
   b. Momentive Performance Materials, GE Silicones; Sanitary SCS1700.
   c. Pecora Corp.; 898.
   d. Tremco Commercial Sealants & Waterproofing; Tremsil 200.
   e. Sika; SikaSil GP or SikaSil GN Plus.
4. Color: As selected from manufacturer's standard colors.

B. Interior Non-sag Acrylic Latex Sealant:
1. Product Quality Standard: ASTM C 834, Type and Grade as required by conditions.
2. Description: Single component, non-sag, moisture curing, general purpose, paintable, siliconized acrylic latex sealant.
3. Joint Movement Capability: Plus 7.5 percent, minus 7.5 percent
4. Available Manufacturers and Products:
   a. BASF; Sonolac.
   b. Pecora Corp.; AC 20.
   c. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
5. Color: As selected from manufacturer's standard colors.

C. Interior Non-sag Urethane Sealant:
1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25 or 35.
2. Description: Single component, non-sag, moisture curing, non-staining as determined by pre-construction stain testing if exposed, polyurethane sealant.
3. Joint Movement Capability: Plus 25 percent, minus 25 percent, or plus 35 percent, minus 35 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Available Manufacturers and Products:
   a. BASF; Sonolastic NP 1.
   b. Pecora Corp.; Dynatrol I-XL.
   c. Tremco Commercial Sealants & Waterproofing; Dymonic or Vulkem 116.
6. Color: As selected from manufacturer's standard colors.

2.5 JOINT SEALANT BACKING

A. Foam Backer Rods:
1. Product Quality Standard: ASTM C 1330, Type C, Type O, Type B.
2. Description: Extruded polyethylene, polyurethane, or polyolefin in either closed cell structure (Type C), open cell structure (Type O), or bicellular structure with surface skin (Type B) as defined by ASTM Terminology C 717.
3. Size: Diameter approximately 25 percent larger than joint width, unless otherwise directed by manufacturer.
4. Available Manufacturers and Products:

a. Type C:
   1) BASF; Sonneborn, Closed-Cell Backer Rod.
   2) Nomaco Inc.; Green Rod or HBR.
b. Type O:
   1) Backer Rod Mfg. Inc.; Denver Foam.
   2) Nomaco Inc.; Foam-Pak II.
c. Type B:
   1) BASF; Sonneborn, Soft Backer Rod.
   2) Nomaco Inc.; Dual-Rod or Sof-Rod.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 ACCESSORIES

A. Cleaners for Non-porous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent non-porous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

B. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:
   1. Examine substrates to receive joint sealants and associated Work to which joint sealants will be applied for compliance with requirements and other conditions affecting performance.
   2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
   3. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

A. Cleaning of Joints: Clean out joints immediately before installing joint backings and sealants to comply with joint sealant manufacturer's written instructions and following requirements:
   1. Remove foreign material that could interfere with adhesion of joint sealant, including, but not limited to, dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
   3. Remove laitance and form-release agents from concrete.
   4. Clean non-porous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming:
   1. Prime joint substrates where recommended by joint sealant manufacturer, or as indicated by prior experience, or as required by pre-construction compatibility and adhesion testing. Apply primer to comply with joint sealant manufacturer's written instructions.
   2. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape:
   1. Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.

2. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
   1. ASTM C 1193 for use of joint sealants as applicable to materials, applications, conditions indicated, and following profile configurations:
      a. Fillet: Figure 5.
      b. Bridge: Figure 6.
      c. Butt: Figure 8A (concave tooling), generally hour-glass shape with 2:1 width-to-depth ratio.
   2. Substrate material allowed by sealant's ASTM C 920 Use Classification.
   3. Respective manufacturer's written installation instructions.
   4. Approved submittals.
   5. Contract Documents.

B. Joint Sealant Backings: Install of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretching, twisting, puncturing, or tearing backings.
   3. Remove absorbent sealant backings that have become wet or damaged before sealant application and replace with dry materials.
   4. Install bond-breaker tape behind sealants where backings are not used between sealants and backs of joints.

C. Joint Sealants: Install at same time as backings using proven techniques that comply with following:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
   4. Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
      a. Remove excess sealant from surfaces adjacent to joints.
      b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
      c. Use masking tape to protect surfaces adjacent to recessed tooled joints.

D. Expanding Foam Sealants:
   1. Install each length of sealant immediately after removing protective wrapping.
   2. Do not pull or stretch material.
   3. Produce seal continuity at ends, turns, and intersections of joints.
   4. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 CLEANING

A. In-Progress Cleaning: Remove excess sealant or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. General Requirements:
   1. Protect during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion.
   2. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original Work.

3.6 JOINT SEALANT SCHEDULE

A. Exterior Elastomeric Sealant Schedule:
   1. Exterior Non-sag Silicone Sealant – Class 50: Moving joints on exterior side of exterior walls.

B. Interior Elastomeric Sealant Schedule:
   1. Interior Non-sag Silicone Sealant:
      a. Non-moving joints in moist or damp areas which are susceptible to mildew.
      b. Non-moving joints in kitchens and toilet rooms.
      c. Non-moving joints in repeated contact with food.
   2. Interior Non-sag Acrylic Latex Sealant: Non-moving joints where another type of sealant is not otherwise specified or scheduled.
   3. Interior Non-sag Urethane Sealant: Joints on interior side of exterior walls where joint movement is anticipated.

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SECTION 32 1413
PAVERS

PART 1 - GENERAL

1.1 DESCRIPTION
A. Furnish all labor, materials, tools, equipment, and services for all pavers, bedding and edge restraints as indicated, in accord with provisions of Contract Documents.
B. Completely coordinate with work of all other trades.

1.2 RELATED SECTIONS
A. Section 03 21 01 - Concrete Reinforcement
B. Section 03 31 01 - Cast-in-Place Concrete

1.3 QUALITY ASSURANCE
A. Build sample section 10' x 20' for Owner's Representative approval of color range and workmanship. Mockup shall conform to Contract Documents in size, materials, finishes, connections and detailing, exhibit pavers, grain and grain direction, and required jointing as shown on documents.
B. Construct sample panel of concrete paving, on specified base, prior to start of any concrete paving. The Contractor supplied sample shall be basis of comparison to establish equal quality of materials and workmanship.
C. Sample panel shall be inspected by the Owner's Representative. If the original sample is not acceptable, construct additional panels at no cost to the Owner until an acceptable panel is constructed. The acceptable panel shall become the standard for the entire job.
D. Approved mockup will be used as standard to judge quality and workmanship of completed work. Do not remove mockup.
E. Begin work only after receiving approval in writing of mockup quality from Owner's Representative.
F. All required testing should be performed on the sample panel to determine if it meets specifications. All testing will be performed and approved prior to any construction.

1.4 REFERENCE STANDARDS
A. ASTM C-33-84 - Bedding
B. ASTM C-140 - Sampling and testing of concrete masonry units.
C. ASTM C-936-82 - Specifications for Solid Concrete Interlocking Paving Units
D. ASTM D 1557-78 - Base and sub-base compaction testing
E. 612-A - Tested in accord with Texas Department of Highways and Public Transportation.

1.5 WARRANTY
A. Pavers to be free from breaks, fissures, chips or other defects.
B. Pavers are to be replaced at Contractor's expense for a period of two years from final acceptance, which exhibit such defects.
C. The general conditions and supplementary conditions of these specifications shall be filed with the Owner's Representative prior to the acceptance of the pavers.

1.6 SUBMITTALS
A. Shop drawings: Not required
B. Product data:
   1. Sieve analysis of bedding material
   2. Compaction test of sub grade/sub base
   3. Product manufacturer's literature
C. Samples: Paver: Three samples of unit proposed for use of each color indicated.
D. Project Information: Paver installation contractor submit a list of 5 successfully completed projects of similar scope for reference check.
E. Warranty.

1.7 PRODUCT DELIVERIES, STORAGE AND HANDLING

A. Deliver and store in accord with manufacturer's recommendations.
B. Store protected to avoid damage.
C. Deliver product on pallets.

PART 2 - PRODUCTS

2.1 MATERIALS

Pavers by;
A. Endicott Manganese Ironspot 4” (nom) x 8” (nom) x 1 ¼” (nom) brick pavers.

PART 3 - EXECUTION

3.1 GENERAL

A. Protection of Existing Work: Exercise all required precautions necessary to protect all portions of the building, exterior construction, and existing plant material. Repair or replace, to the satisfaction of the Owner's Representative, all damage to existing work and plant material caused by the work under this contract.

3.2 INSPECTION

A. Verify acceptability of sub base to accept installation.
B. Assure that sub base grade is 3-1/2 inch below finish grade for 2-3/8 inch (6 cm) pavers, and 3-3/4 inch below for 2-3/4 inch (7 cm) pavers.
C. Report deficiencies to Owner's Representative.
D. Assure that sub base is level to within 1/4 inch in 10 feet (1 in 500).
E. Assure overall positive slope per grading plans. Notify Owner's Representative of deficiencies.
F. Assure that compacted sub base has proper compaction.
G. Rework as required to maintain compaction.
H. Re-level as required.

3.3 PREPARATION FOR BEDDING

A. If sub base surface is sufficiently dense to prevent infiltration of bedding, install bedding.
B. If sub base surface does not meet this requirement, choke upper surface of sub base with crushed fines, watered and vibra-tamped.
C. If crushed rock was used, install engineering fabric, per Section 02246.
D. Assure that level tolerances are maintained.

3.4 BEDDING INSTALLATION

A. Spread and screed level to specified tolerance of 1/4 inch in 10 feet
B. Maximum un-compacted thickness 1-1/2 inch; optimum is 1 inch; minimum 3/4 inch
C. Do not allow foot or vehicular traffic on bedding sand.
D. Do not use bedding as leveling course or to correct deviations in base.
E. Do not compact bedding prior to paver installation.
F. Do not screed bedding sand in advance of work, which will be completed in a 24-hour period.

3.5 PAVER INSTALLATION

A. Install specified edging around entire perimeter. Refer to drawings for location of each type of edging.
B. Level top of edging to 1/4 inch in 10 feet (1 in 500); maintain side of edging plus/minus 1/4 inch of drawing dimensions.
C. Establish pattern layout direction and create permanent markings for directional reference of joints and string lines.
D. Set first course of pavers 1/8 inch from edge restraint.

E. Set pavers with nominal 1/8-inch joints between abutting units.
F. Carefully align joints to maintain straight lines.
G. Cut and fit closure units leaving residual gaps not exceeding 1/4 inch
H. Use mechanical splitter or power masonry saw to provide a clean continuous edge cut.
I. Using a flat plate compactor (minimum 3500 pounds compaction force and covering minimum of 3 square feet), tamp pavers into place, with 1/4 inch in 10 feet surface tolerance (1 in 500).
K. Resulting surface level adjacent to drainage outlets or curbs to be 1/8 to 1/16 inch high to assure positive drainage.
L. Assure that construction traffic is not allowed on pavers during installation; other than paving contractor's equipment required for installation.
M. Remove structurally damaged pavers and replace.
N. Surface tolerance of tamped pavers is 1/4 inch in 10 feet (1 in 500).
O. Maximum variation between adjacent paver levels is not over 1/16 inch.

3.6 CLEANUP AND DISPOSAL OF WASTE

A. All debris and waste resulting from the work shall be removed daily from the site by the Contractor. The material shall not be allowed to accumulate.
B. Disposal area off site shall be the responsibility of the Contractor. All fees, permits and other costs for disposal shall be arranged for and paid for by the Contractor.
C. The Contractor shall comply with all local and state laws and regulations governing hauling, and the prevention of spillage on streets and adjacent areas.

END OF SECTION

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