Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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Proposal Documents

March 30, 2017

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

TABLE OF CONTENTS

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

A. PROPOSAL DOCUMENT CHECKLIST

Prior to submitting a proposal, prospective bidders should review the checklist below to insure that the proposal is accepted and not declared nonresponsive.

Yes	No	Proposal Document:
□	□	Are you aware if your affiliates are bidding on the same project?

Yes	No	Proposal Document Preparation:
□	□	Is the proposal to be submitted an Official Proposal to a solicitation issued by Hidalgo County Regional Mobility Authority?
□	□	Are you submitting only one (1) proposal for this project?
□	□	Is the proposal signed by your company representative or each joint venture participant?
□	□	Have you entered amounts for all bid items?
□	□	If using a computer printout, has it been signed by your company representative or each joint venture participant?
□	□	Have you completed the Hidalgo County Regional Mobility Authority Attachments in Section F?
□	□	Have you acknowledged every addendum by signing the Receipt of Addenda form?
□	□	Does the proposal document (or computer printout) contain the proper number of bid items?

☐	☐	Does the proposal document contain any conditions not included in the proposal document provided to you?
☐	☐	Did you enter prices for all items?
Yes	No	Bid Bonds:
☐	☐	Is the bid bond signed by the surety?
☐	☐	Is the bid bond signed by the company representative or each joint venture participant?
☐	☐	Is the exact name of the contractor(s) listed as the principal?
☐	☐	Is the impressed surety seal affixed to the bid bond?
☐	☐	Does the name on the surety seal match the name of the surety on the bond?
☐	☐	Is the bond dated on or earlier than the letting date of the project?
☐	☐	Is the signer for the surety listed on the power of attorney attached to the bond?
☐	☐	Is the surety authorized to issue the bond?
Yes	No	Bid Guaranty Checks:
☐	☐	Is the check a cashier's check, bank money order, or tellers check issued by a state or national bank, savings and loan association, or a state or federally chartered credit union?
☐	☐	Is the check dated on or before the letting date?
☐	☐	Is the check less than 90 days old?
☐	☐	Is the check made payable to Hidalgo County Regional Mobility Authority?
☐	☐	Is the check for at least five (5) percent of the Total Bid Amount

Yes	No	Proposal Document Submission:
□	□	Are you aware of the time and date deadline for submission of proposal?
□	□	Are you aware of the proper delivery location for the proposal document?
□	□	Are you submitting a complete proposal document?
□	□	Is the proposal submitted in a sealed envelope?

Yes	No	Signatures:
□	□	If the Proposer is a joint venture, have all the members of the joint venture signed the following documents?
		Company Information and Bid Signature (B-3)
		Company Information and Bid Signature (E-17)
		Bidder Certificate (Attachment A)
		Record Retention Certification (Attachment I)
		Non-Collusion Affidavit (I-2)
		Child Support Statement (J-1)
□	□	Have the following certificates been included for all of the team members?
		No Contact Certificate (Attachment B)
		Delinquent County Tax Questionnaire (Attachment C)
		Conflict of Interest Questionnaire (Attachment D)
		Conflicts Certification and Disclosure Form (Attachment E)
		Debarment Certification (Attachment F)
		Drug Free Workplace Certification (Attachment G)
		Non-Discrimination Certification (Attachment H)
		Lobbying Certifications (G-1, G-2)

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Advertisement and Invitation to Bidders Request for sealed bids for
Hidalgo County Regional Mobility Authority (HCRMA) BID #2017-001
for the CITY OF DONNA VALLEY VIEW ROAD
LIFT STATION SITE IMPROVEMENT PROJECT

Bid date and time:	Tuesday, April 18, 2017 until 2:00 P.M. C.S.T.
Pre-Bid Meeting:	Friday, April 7, 2017 2:30 P.M. C.S.T.
Local Government Sponsor:	Hidalgo County Regional Mobility Authority (HCRMA) Pilar Rodriguez, PE, Executive Director 118 South Cage Boulevard, 4th Floor, Pharr, Texas 78577 Telephone / Fax: (956) 402-4762
General Engineering Consultant:	Halff Associates, Inc. 5000 West Military Highway, Suite 100, McAllen, Texas 78503 Telephone: (956) 686--0286 / Fax: (956) 686-0282

Bid Documents for Construction of the City of Donna Valley View Road Lift Station Site Improvement Project may be obtained from the HCRMA and Halff Associates offices listed above at the contractor's expense which is non-refundable. The City of Donna Valley View Road Lift Station Site Improvement is for the construction of a new lift station and receiving manhole in South Donna, along Valley View Road, with two 15 HP submersible, non-clog pumps in a 8-ft diameter fiberglass wet well with a 10-inch discharge force main to replace an existing lift station that is to be demolished under this contract. Contractor will be responsible for the extension of a 15 inch sanitary sewer line and bypass pumping, as required to maintain the existing lift station in operation until the new lift station in placed into operation.

Sealed Proposals, one (1) original and one (1) copy, for the above project will be received by the HCRMA, Attn: Pilar Rodriguez, PE, 118 South Cage Boulevard, 4th Floor, Pharr, Texas 78577, until 2:00 P.M. C.S.T., Tuesday, April 18, 2017. Bids will be opened and read aloud at the same location within the City Commission Chambers on the 2nd Floor at 2:05 P.M. C.S.T. on deadline due date. Bids received after the previous mentioned date and time will not be considered and will be returned unopened.

The HCRMA reserves the right to accept or reject all or any part of any bid; hold all bids for 45 days from due date of receipt without actions, waive minor technicalities, require statements or evidence of bidder's qualifications, including financial statements, and award the lowest responsive and responsible bidder. Acceptance will be based on low bid and qualification of contractor. Award of bid shall be subject to a final contract award by the HCRMA Board of Directors.

A Pre-bid Meeting will be held for this project on Friday, April 7, 2017 at 2:30 P.M. C.S.T, at the City of Pharr City Hall Chambers located at 118 South Cage Boulevard, Pharr, Texas 78577. HCRMA Staff and General Engineering Consultant will review plans, specifications, details, materials and requirements of the work, and therefore Sub-contractors and materials suppliers who expect to be associated with the project are invited to attend. A DBE Conference will also be held for this project on that same date and in the same room at 4:00 P.M. C.S.T. to allow DBE firms and companies the opportunity to meet and discuss potential teaming opportunities with prospective bidders—while not a requirement for submitting a proposal, the HCRMA strongly encourages participation.

Any Contractor intending to bid on this project must be able to conduct work within State Right-of-Way. Bid security in the amount of 5% of the total bid submitted must accompany each proposal in accordance with the Invitation to Bid. Performance and payment bonds for 100% of the contract value will be required upon issuance of the contract. This project may be financed in part by Federal funds and a DBE goal of 12.0% has been established for this project in accordance with 49 CFR Part 26.

Typed-written RFI's shall be sent accompanied by a transmittal form to the General Engineering Consultant (GEC), and the GEC will return signed transmittal forms signaling receipt of RFI. RFI's will not be answered by phone and non-typed written RFI's will not be answered. All inquiries shall be submitted by 5:00 P.M. C.S.T. on Tuesday, April 11, 2017. Inquiries beyond this date will not be responded, and Addenda will be available wherever Bid Documents are made available.

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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C. LOCATION MAP

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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D. NOTICE TO THE BIDDER

In the space provided below, please enter your total unit price bid amount for this project. Only this figure will be read publicly by Hidalgo County Regional Mobility Authority at the public bid opening.

It is understood and agreed by the bidder in signing this proposal that the total bid amount entered below is not binding on either the bidder or Hidalgo County Regional Mobility Authority. It is further agreed that the official total bid amount for this proposal will be determined by multiplying the unit bid prices for each pay item by the respective estimated quantities shown in this proposal and then totaling all of the extended amounts.

$_____

Total Bid Amount

THIS FORM MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

E. BID

To: Hidalgo County Regional Mobility Authority
Attn: Pilar Rodriguez, P.E.
118 South Cage Boulevard, 4th Floor
Pharr, Texas 78577

Directors:

I/we, the undersigned, declare: that I/we have carefully examined the Plans, Standard Specifications, Special Provisions, and all other documents pertaining to this Contract which form a part of this Bid as if set forth at length herein; that I/we understand that the quantities of items shown herein below are approximate only; that I/we have examined the location of the proposed work; that I/we agree to bind myself/ ourselves, upon award to me/us by Hidalgo County Regional Mobility Authority under this Bid, to enter into and execute a Contract, with the necessary bonds, for the project named above; that I/we agree to start work not later than the date stated in the written Notice to Proceed, to furnish all necessary materials, provide all necessary labor, equipment, tools and plant, pay for all required insurance, bonds, permits, fees and service, and do all required work in strict compliance with the terms of all documents comprising said Contract, and to substantially complete the entire project within one hundred and eighty (180) calendar days after initial notice to proceed (NTP) and up to an additional thirty (30) calendar days for Final Acceptance; and that I/we agree to accept as full compensation for the satisfactory prosecution of this project the following unit prices bid resulting in the Official Total Bid Amount for the various scheduled items of work.

CITY OF DONNA VALLEY VIEW ROAD
LIFT STATION SITE IMPROVEMENT PROJECT **– Unofficial Bid Tab**

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	SUBTOTAL COST
ROW Preparation					
1	Right of Way Preparation	L.S.	1		
2	Construction Staking	L.S.	1		
3	Mobilization	L.S.	1		
Utility Improvements					
4	15-inch Sanitary Sewer, PVC SDR 26, 20' to 30' deep, including trenching, backfill and dewatering, complete in place.	L.F.	164		
5	3/4-inch domestic water service, including trenching, backfill complete in place.	L.F.	25		
6	3/4-inch Meter and Backflow Preventer.	Each	1		
7	Remove, dispose, backfill and compact existing receiving manhole.	Each	1		
8	Remove, dispose, backfill and compact existing 8-inch gravity sewer line.	L.F.	164		
9	Remove, dispose, backfill and compact existing 10-inch force main.	L.F.	180		
10	Trench Safety.	LF	184		

CITY OF DONNA VALLEY VIEW ROAD
LIFT STATION SITE IMPROVEMENT PROJECT **– Unofficial Bid Tab**

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	SUBTOTAL COST
Lift Station Improvements (2 Submersible pumps)					
11	Construct Lift Station, complete in place and operational with all components including all structures, pumps, piping, exposed valves, hatches and safety grates, coatings, exterior lighting, electrical and fencing.	Each	1		
12	Receiving Manhole with 15 inch gravity sewer line connection to wet well.	Each	1		
13	Decommission, Remove, Backfill, and Salvage equipment from existing Lift Station.	Each	1		
14	Caliche Pad for Lift Station.	SY	265		
General					
15	Erosion Control.	LS	1		
				GRAND TOTAL	

The quantities shown in the above schedule of items are derived from the final construction plans. Hidalgo County Regional Mobility Authority may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any increase or decrease in the amount of any item or portion of work will be added or deducted from the total contract bid price on the basis of the unit price provided and the associated quantity for that specific item or work. Hidalgo County Regional Mobility Authority reserves the right to delete, in whole or in part, without prejudice prior to the award of the Contract, any items listed in the Bid. An increase or decrease in the quantity for any unit price item will not be regarded as sufficient ground for an increase or decrease in the unit price, nor in the time allowed for the completion of the work, except as provided for in the Specifications.

The cost of any work performed, materials furnished, services provided or expenses incurred, whether or not specifically delineated in the Contract document but which are incidental to the scope, intent and completion of this Contract, have been included in the price bid for the various items scheduled hereinabove.

Accompanying this Bid is a Bid Guaranty consisting of <u>either</u> a Bid Guaranty Check in the amount of at least five (5) percent of the Total Bid Amount <u>or</u> a Bid Bond (on the form provided) in the amount of at least five (5) percent of the Total Bid Amount. The bid Guarantee Check is a cashier's check, money order, or teller's check issued by a state or national bank, savings and loan association, or a state or federally chartered credit union and made payable to Hidalgo County Regional Mobility Authority. The Bid Guarantee Check is dated on or before the letting date and is less than 90 days old. It is hereby understood and agreed that said check or bond is to be forfeited as liquidated damages in the event that, on the basis of this Bid, Hidalgo County Regional Mobility Authority should award this Contract to me/us and that I/we should fail to execute and deliver said Contract and the prescribed Contract Bond, together with the required progress schedule, proof of proper insurance coverage and other necessary documents, all within the fifteen (15) calendar days after award of the contract; otherwise, said check or bond is to be returned to the undersigned.

Business Name of Bidder

_____

Type of Organization: Individual ☐
Partnership ☐
Corporation ☐
Company ☐

Texas Business Entity Registration No.: _____

Or

Texas Foreign Entity Registration No.: _____

Address of Bidder:

_____

_____

Signature of Authorized Representative:

_____

Title: _____

Date: _____

Witness or Attest _____ (Affix Corporate Seal Here)

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Hidalgo County Regional Mobility Authority
CITY OF DONNA VALLEY VIEW ROAD
LIFT STATION SITE IMPROVEMENT PROJECT
BID #2017-001
****

F. ATTACHMENTS

ATTACHMENT A

The undersigned certifies that the Bid prices contained in this Bid have been carefully checked and are submitted as correct and final and if Bid is accepted (within 90 days), agrees to furnish any and/or all items upon which prices are offered, at the price(s) and upon the conditions contained in the Specifications.

BEFORE ME, the undersigned authority, A Notary Public in and for the State of _____this day Personally appeared _____ who, after having first been duly sworn, upon oath did depose and say; That the foregoing Bid submitted by_____ hereinafter called "Bidder" is the duly authorized agent of said company and that the person signing said Bid has been duly authorized to execute the same. Bidder affirms that they are duly authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this Bid in collusion with any other Bidder. The Bidder is not a member of any trust, pool, or combination to control the price of products or services Bid on, or to influence any person to Bid or not to Bid thereon. I further affirm that the Bidder has not given, offered to give, nor intends to give, at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discounts, trip, favor, or service to a public servant in connection with the submitted Bid. The contents of this Bid as to prices, terms or conditions of said Bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this Bid.

Name and Address of Bidder:

_____ Phone Number
(_____)_____

_____

_____ Fax Number
(_____)_____

_____ Email
Signature _____

Name: _____ Title: _____

SWORN TO AND SUBSCRIBE BEFORE ME THIS _____day of
_____20___.

_____ _____
Notary Public in and for County State

THIS FORM MUST BE RETURNED WITH YOUR BID

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT B

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY EXPRESSLY REQUESTS THAT BIDDERS / PROPOSERS NOT DISCUSS THIS ENGAGEMENT OR THIS BIDDER'S / PROPOSER'S PLANS, EXPERIENCE OR CREDENTIALS WITH OTHER BIDDERS / PROPOSERS OR ANY HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY BOARD MEMBER, OR ANY EVALUATION COMMITTEE MEMBER APPOINTED BY THE HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY. EXCLUDED ARE PRE-BID OR DBE CONFERENCES, EVALUATION COMMITTEE SCHEDULED VENDOR PRESENTATIONS OR VENDOR INTERVIEWS, OR EVALUATION COMMITTEE SCHEDULED EQUIPMENT OR SERVICES DEMONSTRATIONS.

1. Has any individual with the firm submitting this Proposal/Bid/Response made any contact with any HCRMA Board Member (listed on the next page), or an Evaluation Committee member (listed on the next page) concerning this Invitation to Bid/RFP/RFQ, other than questions to the General Engineering Consultant?

_____

_____

_____

_____

2. Has any individual with the firm submitting this Proposal/Bid/Response made any contact with any other Bidder or Proposer concerning this Invitation to Bid/RFP/RFQ?

_____

_____

_____

_____

Signature of person submitting this Bid: _____
Date:_____

Hidalgo County Regional Mobility Authority Board Members:

- S. David Deanda, Jr. - Chairman
- Forrest Runnels - Vice Chairman
- Ricardo Perez - Secretary/Treasurer
- Josue Reyes - Director
- David Guerra - Director
- Aquiles J. Garza, Jr. - Director
- Alonzo Cantu - Director

Evaluation Committee Members:

- Pilar Rodriguez, PE – HCRMA, Executive Director
- Ramon Navarro, IV, PE – HCRMA, Chief Construction Engineer
- Louis H. Jones, Jr., PE – Dannenbaum Engineering Corporation, HCRMA Program Manager
- Robert L. Saenz, PE, CFM, PMP – Halff Associates, Inc., Project Manager

THIS FORM MUST BE RETURNED WITH YOUR BID

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT C

PROPOSER/BIDDER represents and warrants that PROPOSER/BIDDER, including any of its partners, members, or owners, is not delinquent in the payment of any taxes owed to Hidalgo County or the State of Texas.

_____

Signature of person submitting this Bid

Date:_____

THIS FORM MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT D

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

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

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

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

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

OFFICE USE ONLY

Date Received

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

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

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

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

_____

Name of Officer

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

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

☐ Yes ☐ No

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

☐ Yes ☐ No

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

☐ Yes ☐ No

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

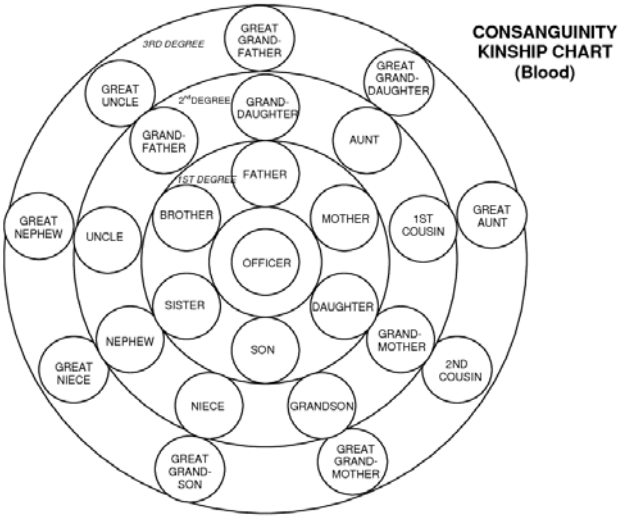
4

Signature of person doing business with the governmental entity _____ Date _____

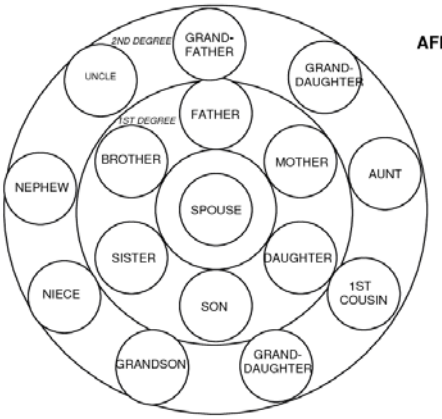
Adopted 06/29/2007

5. Does any individual with the firm submitting BID, RFP, RFQ have any business relationship with any Hidalgo County Regional Mobility Authority Board Member, Official or employee within the third degree of Consanguinity kinship or the second degree of Affinity kinship (as defined by V.T.C.A., Local Government Code, Section 573.021 and the Consanguinity and Affinity Relationship Chart below)? □ **Y / □ N**

IF DISCLOSING: BIDDER / PROPOSER MUST ALSO FILE WITH THE COUNTY CLERK'S OFFICE AS THE HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY WILL NOT BE FILING ON THE BIDDER'S BEHALF.



CONSANGUINITY KINSHIP CHART (Blood)



AFFINITY KINSHIP CHART (Marriage)

Signature of person submitting this Bid: _____
Date:_____

THIS FORM MUST BE RETURNED WITH YOUR BID

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT E

CONFLICTS CERTIFICATION

1. Business Relationships: The Hidalgo County Regional Mobility Authority (HCRMA) has adopted a conflict of interest policy which generally requires disclosure of any business relationships with HCRMA board members or key personnel, as designated on the Authority's website. The Conflict of Interest Policy, the list of Board Members and Key Personnel, and the Conflict of Interest Questionnaire can be obtained from the HCRMA website under the "Forms" section (www.hcrma.net/forms.html) and should be returned with your bid. Any subconsultants to the Bidder shall adhere to this policy and provide any required disclosures.

2. Adverse Matters: Bidder must disclose conflicts of interest by identifying any matter in which the Bidder becomes adverse to the HCRMA or the Texas Department of Transportation or to the State of Texas or any of its boards, agencies, commissions, universities, elected or appointed officials, or Hidalgo County during the term of the Agreement.

3. Direct and Indirect Interest: During the term of the Agreement, the Bidder, including any of its principals, will have no undisclosed interest, direct or indirect, that would conflict in any manner or degree with the performance of Bidder's obligations under the agreement, including, but not limited to, ownership of property in the right-of-way of any of the independent projects of the Hidalgo County Roadway System. The Bidder warrants that, in the performance of the Agreement, the Bidder shall not employ any person, or subcontractor with any entity, having such known, undisclosed interest.

_____ _____

Signature of person submitting this Bid Date

THIS FORM, THE REFERENCED FORM FROM THE HCRMA WEBSITE, & ANY RELEVANT DISCLOSURE STATEMENTS MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT F

Certification Regarding Debarment, Suspension Ineligibility

PROPOSER/BIDDER certifies that the responding entity and its principals are eligible to participate in the proposed contract and have not been subjected to suspension, debarment, or similar ineligibility determined by any federal, state or local governmental entity and the PROPOSER/BIDDER is in compliance with the State of Texas statutes and rules relating to procurement and that PROPOSER/BIDDER is not listed on the federal government's terrorism watch list as described in Executive Order 13224.

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

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency;
b. Have not within a three-year period preceding this bid/proposal and/or application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under a public transaction, violation of federal or state antitrust statutes or commission of embezzlement, theft, theory, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
c. Are not presently indicted for or otherwise criminally or civilly charged by a government entity with commission of any of the offenses enumerated herein; and
d. Have not within a three-year period preceding this bid/proposal and/or application had one or more public transactions terminated of cause or default.

_____ _____

Signature of person submitting this Bid Date

THIS FORM MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT G

The PROPOSER/BIDDER warrants its compliance with the applicable provisions of the Drug-Free Work Place Act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701 ET SEQ.) and represents that it maintains a drug-free work environment. The PROPOSER/BIDDER further warrants its compliance with the final rule, government-wide requirements for drug-free work place (grants), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 280, Subpart F) to implement the provisions of the Drug-Free Work Place Act of 1988 which rule shall be incorporated by reference into any contract with the HCRMA.

_____

Signature of person submitting this Bid

Date:_____

THIS FORM MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT H

The PROPOSER/BIDDER agrees that no person shall, on the ground of race, color, religion, sex, national origin, age, disability, political affiliation, or religious belief, be excluded from the participation in, be denied the benefits of, be subjected to discrimination under, or be denied employment in the administration of, or in connection with, any program or activity funded in whole or in part with funds available under any Contract with the HCRMA.

_____

Signature of person submitting this Bid

Date:_____

THIS FORM MUST BE RETURNED WITH YOUR BID

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID # 2017-001

****

ATTACHMENT I

The PROPOSER/BIDDER agrees that if it enters into any contract with the HCRMA, it shall retain all financial records, supporting documents, statistical records, and any other records or books relating to the performances called for in such contract. The PROPOSER/BIDDER warrants that it will retain all such records for a period of four (4) years after the expiration of the contract, or until the HCRMA, TxDOT, or State Auditor's Office is satisfied that all audit and litigation matters are resolved, whichever period is longer. The PROPOSER/BIDDER agrees to grant access to all books, records and documents pertinent to the contract to the HCRMA, TxDOT, the State Auditor of Texas, and any federal governmental entity that has authority to review records due to federal funds being spent under the Contract.

_____

Signature of person submitting this Bid

Date:_____

THIS FORM MUST BE RETURNED WITH YOUR BID

THIS SHEET INTENTIONALLY LEFT BLANK

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

G. DISCLOSURE OF LOBBYING ACTIVITIES

CERTIFICATION OF LOBBYING ACTIVITIES

49 CFR Part 20 – Appendix A

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans And Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

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

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form –LLL, “Disclosure Form to Report Lobbying”, pursuant to 31 U.S.C. 1352 in accordance with its instructions.

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

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title

31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____	_____
Signature/Authorized Certifying Official	Typed Name and Title
_____	_____
Applicant/Organization	Date Signed

CERTIFICATION OF LOBBYING ACTIVITIES

Statement for Loan Guarantees and Loan Insurance

The undersigned certifies, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with their commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form – LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____	_____
Signature/Authorized Certifying Official	Typed Name and Title
_____	_____
Applicant/Organization	Date Signed

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:
- ☐ a. contract
- b. grant
- c. cooperative agreement
- d. loan
- e. loan guarantee
- f. loan insurance

2. Status of Federal Action:
- ☐ a. bid/offer/application
- b. initial award
- c. post-award

3. Report Type:
- ☐ a. initial filing
- b. material change

For Material Change Only:
year _____ quarter _____
date of last report _____

4. Name and Address of Reporting Entity:
☐ **Prime** ☐ **Subawardee**
Tier _____, *if known*:

Congressional District, *if known*:

5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime:

Congressional District, *if known*:

6. Federal Department/Agency:

7. Federal Program Name/Description:

CFDA Number, *if applicable*: _____

8. Federal Action Number, *if known*:

9. Award Amount, *if known*:
$

10. a. Name and Address of Lobbying Entity
(*if individual, last name, first name, MI*):

b. Individuals Performing Services (*including address if different from No. 10a*)
(*last name, first name, MI*):

(attach Continuation Sheet(s) SF-LLLA, if necessary)

11. Amount of Payment (*check all that apply*):
$ _____ ☐ **actual** ☐ **planned**

12. Form of Payment (*check all that apply*):
- ☐ **a. cash**
- ☐ **b. in-kind; specify:** nature _____
  value _____

13. Type of Payment (*check all that apply*):
- ☐ **a. retainer**
- ☐ **b. one-time fee**
- ☐ **c. commission**
- ☐ **d. contingent fee**
- ☐ **e. deferred**
- ☐ **f. other; specify:** _____

14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11:

(attach Continuation Sheet(s) SF-LLLA, if necessary)

15. Continuation Sheet(s) SF-LLLA attached: ☐ **Yes** ☐ **No**

16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less that $10,000 and not more than $100,000 for each such failure.

Signature: _____
Print Name: _____
Title: _____
Telephone No.: _____ Date: _____

Federal Use Only:

Authorized for Local Reproduction
Standard Form LLL (Rev. 7-97)

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLLA Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, State and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

    (b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.

12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.

13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.

14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.

15. Check whether or not a SF-LLLA Continuation Sheet(s) is attached.

16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Approved by OMB
0348-0046

DISCLOSURE OF LOBBYING ACTIVITIES
CONTINUATION SHEET

Reporting Entity: _____ Page _____ of _____

CERTIFICATION OF LOBBYING ACTIVITIES

49 CFR Part 20 – Appendix A

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans And Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

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

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

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

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

_____	_____
Signature/Authorized Certifying Official	Typed Name and Title
_____	_____
Applicant/Organization	Date Signed

CERTIFICATION OF LOBBYING ACTIVITIES

Statement for Loan Guarantees and Loan Insurance

The undersigned certifies, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with their commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form – LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____	_____
Signature/Authorized Certifying Official	Typed Name and Title
_____	_____
Applicant/Organization	Date Signed

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

H. CONTRACTOR'S ASSURANCE

By signing this proposal, the contractor is giving assurances that all subcontract agreements will comply with the Hidalgo County Regional Mobility Authority's Procurement Policies regarding Disadvantaged Business Participation and the required contract provisions for Federal-aid construction contracts.

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

I. NON-COLLUSION AFFIDAVIT

STATE OF TEXAS

COUNTY OF _____

I, _____, of the City of _____, County of _____, and State of _____, being of full age and duly sworn according to law on my oath depose and say:

That I am _____ (Title) of _____the Bidder making the Bid submitted to Hidalgo County Regional Mobility Authority, on the _____ day of 20_____, for BID #2017-001, Etc. in connection with the CITY OF DONNA VALLEY VIEW ROAD LIFT STATION SITE IMPROVEMENT project; that I executed the said Bid with full authority to do so;

The said Bidder has not, directly or indirectly, entered into any combination or arrangement with any person, firm or corporation or entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding or which would increase the cost of construction or maintenance in connection with the said Contract; that no person or selling agency has been employed or retained to solicit or secure the said Contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bonafide full-time employees;

And that said Bidder is or has been a member of the following highway contractors association during the preceding twelve (12) months:

NAME OF ASSOCIATION	LOCATION OF PRINCIPAL OFFICE
_____	_____
_____	_____
_____	_____

I further warrant that all statements contained in said Bid and in this Affidavit are true and correct and made with full knowledge that the said Hidalgo County Regional Mobility Authority relies upon the truth of the statements contained in said Bid and in this Affidavit in awarding the said Contract.

SWORN TO AND SUBSCRIBED
BEFORE ME THIS _____ DAY
OF _____, 20_____.

_____
NOTARY PUBLIC

MY COMMISSION EXPIRES:

_____

BY: _____
PERSON SIGNING BID

PRINT NAME: _____

TITLE:
_____

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

J. CHILD SUPPORT STATEMENT

Under Family Code, Section 231.006, (name of individual) certifies that (name of business), (vendor #), as of (enter date) is eligible to receive a grant, loan, or payment and acknowledges that any contract may be terminated and payment may be withheld if this certification is inaccurate.

List below the name and social security number of the individual or sole proprietor and each partner, shareholder, or owner with an ownership interest of at least 25% of the business entity submitting the bid or application. This form must be updated whenever any party obtains a 25% ownership interest in the business entity.

Name *(please print legibly, if handwritten)*	**Social Security Number**	
		Add Row
		Delete
		Delete
		Delete
		Delete
		Delete
		Delete
		Delete
		Delete
		Delete
		Delete

Family Code, Section 231.006, specifies that a child support obligor who is more than thirty (30) days delinquent in paying child support and a business entity in which the obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least 25% percent is not eligible to receive payments from state funds under a contract to provide property, materials, or services; or receive a state-funded grant or loan.

A child support obligor or business entity ineligible to receive payments described above remains ineligible until all arrearage have been paid or the obligor is in compliance with a written repayment agreement or court order as to any existing delinquency.

Except as provided by Family Code, Section 231.302(d), a social security number is confidential and may be disclosed only for the purposes of responding to a request for information from an agency operating under the provisions of Subchapters A and D of Title IV of the federal Social Security Act (42 U.S.C. Sections 601 et seq. and 651 et seq.)

With few exceptions, you are entitled on request to be informed about the information that we collect about you. Under Sections 552.021 and 552.023 of the Texas Government Code, you also are entitled to receive and review the information. Under Section 559.004 of the Government Code, you are also entitled to have us correct information about you that is incorrect.

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Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

K. DISADVANTED BUSINESS ENTERPRISES REQUIREMENTS

The following goal for disadvantaged business enterprises is established:

DBE – 12.0%

Certification of DBE Goal Attainment

By signing the proposal, the Bidder certifies that the above DBE goal will be met by obtaining commitments equal to or exceeding the DBE percentage or that the Bidder will provide a good faith effort to substantiate the attempt to meet the goal.

Failure to comply commitments to meet the stated goal or provide a satisfactory good faith effort will be considered a breach of the requirements of the proposal. As a result, the Bid Guaranty or Bid Bond of the bidder will become property of the Hidalgo County Regional Mobility Authority and the bidder will be excluded for rebidding on the project when it is re-advertised.

THIS SHEET INTENTIONALLY LEFT BLANK

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

L. BID BOND

KNOW ALL PERSONS MEN BY THESE PRESENTS, that _____, as Principal/Contractor, and _____, as Surety, legally authorized to do business in the State of Texas, are held and firmly bounded unto the Hidalgo County Regional Mobility Authority, as Authority, in the amount of at least FIVE (5) PERCENT OF THE TOTAL BID AMOUNT, on which the Contract is awarded lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally and firmly by these presents:

WHEREAS, the Contractor is herewith submitting its Bid for BID #2017-001, entitled City of Donna Lift Station Site Improvement project; and

NOW, THEREFORE, the condition of this obligation is such, that if the Contractor shall be awarded the Contract upon said Bid and shall, within fifteen (15) calendar days after the date of written notice of such award, enter into and deliver a signed Contract and the prescribed Performance Bond for the faithful performance of the Contract, together with the required proof of proper insurance coverage and other necessary documents, then this obligation shall be null and void; otherwise, to remain in full force and effect, and the Contractor and Surety will pay unto Hidalgo County Regional Mobility Authority the difference in money between the amount of the Total Amount written in the Bid of said Contractor and the amount for which Hidalgo County Regional Mobility Authority may legally contract with another party to perform the said work, if the latter amount be in excess of the former; but in no event shall the Surety's liability exceed the penal sum hereof.

SIGNED AND SEALED this _____day of _____, 20_____.

PRINCIPAL/CONTRACTOR:

_____
BUSINESS NAME

_____
ADDRESS

_____

WITNESS OR ATTEST:

_____

BY:
_____
TITLE

(AFFIX CORPORATE SEAL HERE)

SURETY:

_____
BUSINESS NAME

_____
ADDRESS

_____

WITNESS OR ATTEST:

_____

BY:
_____
TITLE

(ATTACH EVIDENCE OF
POWER OF ATTORNEY)
(AFFIX CORPORATE SEAL HERE)

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

M. CONTRACT AGREEMENT

THIS AGREEMENT, made this ____day of _____, 20___, between Hidalgo County Regional Mobility Authority, 118 S. Cage Blvd, 4th Floor Pharr, Texas 78577, hereinafter called the Authority and _____, or his, its or their successors, executors, administrators and assigns, hereinafter called the Contractor.

WITNESSETH, that the Contractor agrees with Hidalgo County Regional Mobility Authority for the consideration herein mentioned, and at his, its or their own proper cost and expense, to do all the work and furnish all the materials, equipment, teams and labor necessary to prosecute and complete and to extinguish all liens therefore, BID #2017-001, entitled City of Donna Valley View Road Lift Station Site Improvement project, in the manner and to the full extent as set forth in the Plans, Standard Specifications, Special Provisions, Bid (for the basis of award stated herein below) and other documents related to said Contract which are on file at the office of Hidalgo County Regional Mobility Authority and which are hereby adopted and made part of this Agreement as completely as if incorporated herein, and to the satisfaction of the Authority or its duly authorized representative who shall have at all times full opportunity to inspect the materials to be furnished and the work to be done under this Agreement.

This Contract is awarded on the basis of the Official Total Bid Amount based on the unit prices bid of _____ dollars and _____Cents ($_____).

In consideration of the foregoing premise, the Authority agrees to pay the Contractor for all items of work performed and materials furnished at the amount of the unit prices bid prices bid therefore in the Bid submitted for this Contract, subject to any percentage reductions in the total Contract amount that may be named in the Bid corresponding to the basis of award stated in the above paragraph, and subject to the conditions set forth in the Specifications.

The Contractor agrees as follows:

a. I/WE will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor.
b. I/WE agree to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
c. I/WE in any solicitations or advertising for employees placed by or on behalf of itself, will state that it is an equal opportunity employer.
d. Notices and advertisements and solicitations placed in accordance with federal law, rule or regulation, shall be deemed sufficient for the purposes of meeting the requirements of this section.
e. Contract Time - The Work will be Substantial Complete within one hundred and eighty (180) calendar days after receipt of the initial Notice to Proceed (NTP). The Contractor will be allowed up to an additional thirty (30) calendar days for Final Acceptance.
f. Failure by Contractor to fulfill these requirements is a material breach of the Contract, which may result in the termination of this Contract, or such other remedy, as the Authority deems appropriate.
g. All notices to Hidalgo County Regional Mobility Authority shall be sent by certified or registered mail, addressed to: Hidalgo County Regional Mobility Authority Executive Director, 118 S. Cage Blvd, 4th Floor Pharr, Texas 78577 or at such other address as the Authority may otherwise designate. All notices to Contractor shall be sent certified or registered mail, addressed to: _____ or at such other address as said Contractor may otherwise designate in writing.
h. This Agreement shall be governed by the laws of the State of Texas and venue shall be in Hidalgo County, Texas.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement the day and year written above.

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

By: _____

S. David Deanda, Jr.

Hidalgo County Regional Mobility Authority Chairman

Attested By:

_____

PILAR RIDRIGUEZ, PE
HCRMA EXECUTIVE DIRECTOR

SWORN TO AND SUBSCRIBED
BEFORE ME THIS
_____ DAY OF
_____, 20_____.

_____
NOTRARY PUBLIC

MY COMISSION EXPIRES:

_____

CONTRACTOR:

_____
BUSINESS NAME

_____
ADDRESS

_____

BY:
_____
TITLE

(AFFIX CORPORATE SEAL HERE)

THIS SHEET INTENTIONALLY LEFT BLANK

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

N. PERFORMANCE BOND

STATE OF TEXAS

COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____of the City of_____County of_____, and State of_____, as Principal (hereinafter referred to as the "Principal"), and _____ authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as the "Surety"), are held and firmly bound unto Hidalgo County Regional Mobility Authority, (hereinafter referred to as the "Authority"), in the penal sum of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Authority, dated the _____ day of_____, 20_____, to _____ (hereinafter referred to as the "Contract"), which said Contract and the Contract Documents incorporated therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a

subcontractor in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work performed there under, or to the other Contract Documents accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or to the other Contract Documents accompanying the same.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of_____, 20_____.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____)_____	(_____)_____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____)_____ _____

Phone Number SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Article 21.09 of the Insurance Code)

****

I, _____, having executed Bonds

SIGNATURE

for _____do hereby affirm I have

NAME OF SURETY

verified that said Surety is now certified with authority from either: (a) the Secretary of the Treasury of the United States if the project funding includes Federal monies; or (b) the State of Texas if none of the project funding is from Federal sources; and further, said Surety is in no way limited or restricted from furnishing Bond in the State of Texas for the amount and under conditions stated herein.

THIS SHEET INTENTIONALLY LEFT BLANK

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

****

O. PAYMENT BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of_____

County of_____, and State of_____, as Principal

(hereinafter referred to as the "Principal"), and _____

authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as the "Surety"), are held and firmly bound unto Hidalgo County Regional Mobility Authority, (hereinafter referred to as the "Authority"), in the penal sum of _____ Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Authority, dated the _____ day of_____, 20_____, to _____

_____(hereinafter referred to as the "Contract"), which said Contract and the Contract Documents incorporated therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work performed there under, or to the other Contract Documents accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or to the other Contract Documents accompanying the same.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of_____, 20_____.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____)_____	(_____)_____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

(_____)_____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT APPOINTED TO COUNTERSIGN ON BEHALF OF SURETY (REQUIRED BY ARTICLE 21.09 OF THE INSURANCE CODE)

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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P. RECEIPT OF ADDENDA

I/We hereby acknowledge receipt of the following addenda and have made the necessary revisions to the Contractor's Proposal, plans, and specifications, etc., and agree that these addenda are included in the Contractor's Proposal.

Addenda #	Signature	Date
1.		
2.		
3.		
4.		
5.		
6.		

I understand that failure to confirm Receipt of Addenda may result in the bid not being accepted.

THIS SHEET INTENTIONALLY LEFT BLANK

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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Q. ENGINEER'S SEAL

The enclosed Technical Specifications, Special Provisions, General Notes, and Specification data in this document have been selected by the design team, as being applicable to this project. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

STATE OF TEXAS
ROBERT L. SAENZ
82072
REGISTERED
PROFESSIONAL ENGINEER
1-9-2015

PROJECT MANAGER/
CIVIL ENGINEER
5000 WEST MILITARY HWY., STE. 100
McALLEN, TEXAS 78503
956-664-0286

The Seal appearing on this document was authorized by Robert L. Saenz, P.E. Number 82072 on January 9, 2015. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act. The Record Copy of this document is on file at the offices of Halff Associates, Inc., 5000 W. Military Suite 100, McAllen, TX 78503. TBPE FIRM #F-312

1-9-15
STATE OF TEXAS
JOSE F. LEAL
117241
LICENSED
PROFESSIONAL ENGINEER

CIVIL ENGINEER
5000 WEST MILITARY HWY., STE. 100
McALLEN, TEXAS 78503
956-664-0286

The Seal appearing on this document was authorized by Jose F. Leal, P.E. Number 117241 on January 9, 2015. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act. The Record Copy of this document is on file at the offices of Halff Associates, Inc., 5000 W. Military Suite 100, McAllen, TX 78503. TBPE FIRM #F-312

STATE OF TEXAS
THOMAS E. DEARMIN
54352
REGISTERED
PROFESSIONAL ENGINEER
1/9/15

ELECTRICAL ENGINEER
5000 WEST MILITARY HWY., STE. 100
McALLEN, TEXAS 78503
956-664-0286

The Seal appearing on this document was authorized by Thomas E. Dearmin, P.E. Number 51352 on January 9, 2015. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act. The Record Copy of this document is on file at the offices of Halff Associates, Inc., 5000 W. Military Suite 100, McAllen, TX 78503. TBPE FIRM #F-312

STATE OF TEXAS
PAUL J. RIELLY
61307
LICENSED
PROFESSIONAL ENGINEER
1.9.15

STRUCTURAL ENGINEER
4000 FOSSIL CREEK BLVD.
FORT WORTH, TEXAS 76137-2720
817-232-9784

The Seal appearing on this document was authorized by Paul J. Rielly, P.E. Number 61307 on January 9, 2015. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act. The Record Copy of this document is on file at the offices of Halff Associates, Inc., 5000 W. Military Suite 100, McAllen, TX 78503. TBPE FIRM #F-312

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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R. GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION

SEC. 1 – CONSTRUCTION DOCUMENTS

The Contract Documents shall consist of Advertisement and Invitation to Bidders, form of Bid or Proposal, the signed Contract Agreement, the General and Special conditions of contract, the Drawings, and the Specifications, including all modifications thereof incorporated in any of the documents before the execution of the Agreement.

SEC. 2 - COPIES OF DRAWINGS FURNISHED

Unless otherwise provided in the Contract Documents, the Engineer/Architect will furnish to the Contractor, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the work.

SEC. 3 - ORDER OF COMPLETION

On the first day of every month in which any portion of the work is to be completed, and at such times thereafter as may be reasonably requested by the Owner's Representative, the contractor shall submit schedules that show the order in which the Contractor proposes to carry out the work for the duration of the project and, in particular, for the current month, with dates at which the Contractor will start each portion or part of the work, and specific estimated dates of completion of each portion or part of the work, and a detailed description of the specific portion or part of the work to be completed by the end of the current month. Contractor's failure to timely complete the specific portion or part of the work to be completed by the end of the current month will entitle the Owner to withhold liquidated damages from the payment otherwise owed to the Contractor for that particular month, as further provided in the Special Provisions.

SEC. 4 - OWNER OF DRAWINGS

All drawings, Specifications and copies thereof furnished by the Engineer/Architect shall not be reused on other work and, with the exception of the signed Contract, sets are to be returned to him on request, at the completion of the work.

SEC. 5 - FAMILIARITY WITH WORK

The Owner shall make known to all prospective bidders, prior to the receipt of bids, all information that he may have as to subsurface conditions in the vicinity of the work, topographical maps, or other information that might assist the bidder in properly evaluating the amount and character of the work that might be required. Such information is given, however, as being the best factual information available to the Owner. The Contractor, by careful examination, shall satisfy himself as to the nature and location of the work, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract.

SEC. 6 - CHANGED CONDITIONS

Before such conditions are disturbed, the Contractor shall notify the Owner in writing of: (1) Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or (2) previously unknown physical or other conditions at the site, or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer/Architect shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or the time required for, performance of this Contract the Contractor shall submit a claim for an adjustment in compensation and/or time. Any claim of the Contractor for an adjustment of compensation and/or time hereunder shall not be allowed or approved, and the Contractor waives all right to additional compensation or time, unless the Contractor provides written notice to the Owner of any physical or other conditions at the site differing materially from those indicated in this Contract, or differing materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in this Contract, within seven (7) days after the Contractor knew, or reasonably should have known, of such condition(s). If the Contractor timely provides written notice in accordance with this Section 6 and the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Section 39 hereof.

SEC. 7 - MATERIALS AND APPLIANCES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

SEC. 8 - EMPLOYEES

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or

anyone not skilled in the work assigned to him. The Owner shall have the authority to request that Contractor remove any objectionable employee from project site.

Adequate sanitary facilities shall be provided by the Contractor.

SEC. 9 - ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof except that the Owner shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the Owner has notified the Contractor prior to the signing of the contract that the particular process or product is patented or is believed to be patented.

SEC. 10 - SURVEYS

Unless otherwise specified, the Owner shall furnish all land surveys and establish all base lines for locating the principal component parts of the work together with a suitable number of bench marks adjacent to the work. From the information provided by the Owner, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines and elevations.

The contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

SEC. 11 - PERMITS, LICENSES AND REGULATIONS

Permits and licenses of a temporary nature necessary for the prosecution and completion of the work shall be secured and paid for by the Contractor. Permits, licenses and easements of a permanent nature, that will be required after the completion of the project, will be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Engineer/Architect in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

SEC. 12 - PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

The Contractor shall provide and maintain all necessary watchmen, barricades, warning lights and signs and take all necessary precautions for the protection, and safety of the public. He shall take all reasonable precautions to protect the Owner's

property from injury or loss arising in connection with this contract. He shall make good any damage, injury or loss to his work and to the property of the Owner resulting from lack of reasonable protective precautions, except such as resulting from lack of reasonable protective precautions, except such as may be due to errors in the Contract Documents, or caused by agents or employees of the Owner. He shall adequately protect adjacent private and public property, as provided by law and the Contract Documents.

In an emergency affecting the safety of life, of the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Engineer/Architect, hereby permitted to act at his discretion to prevent such threatened loss or injury. He shall also so act, without appeal, if so authorized or instructed by the Engineer/Architect.

Any compensation claimed by the Contractor on account of emergency work, shall be determined by agreement, litigation or arbitration.

SEC. 13 - INSPECTION OF WORK

The Owner shall provide sufficient competent personnel, working under the supervision of a qualified Engineer/Architect, for the inspection of the work while such work is in progress to ascertain that the completed work will comply in all respects with the standards and requirements set forth in the Specifications. Notwithstanding such inspection, the Contractor will be held responsible for the acceptability of the finished work.

The Engineer/Architect and his representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access, and for inspection.

If the Specifications, the Engineer's/Architect's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer/Architect timely notice of its readiness for inspection, and if the inspected is by an authority other than the Engineer/Architect of the date fixed for such inspection. Inspections by the Engineer/Architect shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Engineer/Architect, it must be uncovered if required by the Engineer/Architect at the Contractor's expense, unless the Engineer/Architect has unreasonably delayed inspection.

Re-examination of the work may be ordered by the Engineer/Architect, and, if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost of re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

SEC. 14 - SUPERINTENDENCE

The Contractor shall keep on his work, during its progress, a competent superintendent and any necessary assistants. The superintendent shall represent the Contractor, and all directions given to him shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions shall be so confirmed on written request in each case. The Contractor shall give efficient superintendence to the work, using his best skill and attention.

SEC. 15 - DISCREPANCIES

If the Contractor, in the course of the work, finds any discrepancy between the Drawings and the physical conditions of the locality, or any errors or omissions in Drawings or in the layout as given by survey points and instructions, he shall immediately inform the Engineer/Architect, in writing, and the Engineer/Architect shall promptly verify the same. Any work done after such discovery, until authorized will be done at the Contractor's risk.

SEC. 16 - CHANGES IN THE WORK

The Owner may make changes in the Drawings and Specifications of scheduling of the Contract within the general scope at any time by a written order. If such changes add to or deduct from the contractor's cost of the work, the Contract shall be adjusted accordingly. All such work shall be executed under the conditions of the original Contract **except that any claim for extension of time or additional compensation caused thereby shall be adjusted only at the time of ordering such change.**

In giving instructions, the Engineer/Architect shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer/Architect, and no claim for an addition to the Contract Sum shall be valid unless the additional work was so ordered.

The Contractor shall proceed with the work as changed and the value of any such extra or decreased work or change shall be determined as provided in the Agreement. The Contractor's acceptance of any written order(s) for changes in the work constitutes the Contractor's acknowledgement that all extensions, increases or deductions of time and/or compensation, and claims and disputes related to the subject of the written order(s), have been or were resolved by the written order(s). By accepting the written order(s) for changes in the work, the Contractor waives and releases any and all claims and causes of action, including, but not limited to, claims for additional compensation or extensions of time, related to or arising from any work added to, deducted from, or affected by the written order(s).

SEC. 17 - EXTENSION OF TIME

Extension of time stipulated in the Contract for completion of the Work may be made only when changes in the work occur, as provided in Section 16; and when the work is suspended as provided in Section 21. Extension of time for completion may also be allowed for any delays in the progress of the work caused by any act (except as provided elsewhere in these General Conditions) or neglect of the Owner or of his employees, or by any delay in the furnishing of Drawings and necessary information by the Owner's Representative, or by any other cause which in the opinion of the Engineer/Architect entitled the Contractor to an extension of time, including but not restricted to, acts of the public enemy, acts of any government in either its sovereign or any applicable contractual capacity, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, freight embargoes, usually severe weather, or labor disputes.

The Contractor shall notify the Owner's Representative within seven (7) days of any occurrence or conditions which in the Contractor's opinion entitle him to an extension of time. Such notice shall be in writing and shall be submitted in ample time to permit full investigation and evaluation of the contractor's claim. The Engineer/Architect shall acknowledge receipt of the Contractor's notice within 5 days of its receipt. The Contractor's failure to provide such notice shall constitute a waiver by the Contractor of any claim.

SEC. 18 - CLAIMS

If the Contractor claims that any instructions by Drawings or other media issued after the date of the Contract involve extra cost under this Contract, he shall give the Engineer/Architect written notice thereof within __7__ days after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

SEC. 19 - DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer/Architect deems it inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore, unless the Contractor elects to correct to work.

SEC. 20 - CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer/Architect as failing to meet Contract requirements, whether incorporated in the work or not. The Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the

Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

SEC. 20 - CORRECTION OF WORK BEFORE FINAL PAYMENT Continued:

If the Contractor does not take action to remove such condemned materials and work within 10 days after written notice, the Owner may remove such condemned materials and may store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within ten days' time thereafter, the Owner may, upon ten days' written notice, sell such materials at auction or private sale and shall pay to the Contractor any net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

SEC. 21 - SUSPENSION OF WORK

The Owner may at any time suspend the work, or any part thereof by giving 1 days' notice to the Contractor in writing. The work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the Owner to the Contractor so to do. The Owner may reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of such suspension, eligibility and amount of disbursement to be determined by the Engineer/Architect.

If the work, or any part thereof, shall be stopped by notice in writing aforesaid, and if the Owner does not give notice in writing to the Contractor to resume work at a date within 15 days of the date fixed in the written notice to suspend, then the contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payments for all work done on the portions so abandoned, if any, but Contractor is not entitled to any compensation for loss of overhead, plant expense, and anticipated profit.

SEC. 22 - THE OWNER'S RIGHT TO TERMINATE CONTRACT

If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed as a result of his insolvency, or if he should be guilty of a substantial violation of the Contract, then the Owner, upon the certificate of the Engineer/Architect that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor and his Surety seven days' written notice terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, 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. If the unpaid balance of the Contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid

balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Engineer/Architect.

SEC. 23 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the work should be stopped under an order of any court, or other public authority, for a period of more than three months, through no act or fault of the contractor or of anyone employed by him, or if the Engineer/Architect should fail to issue any estimate for payment within seven days after it is due, then the Contractor, may, upon seven day's written notice to the Owner's Representative, stop work or terminate this Contract and recover from the Owner payment for all work executed, plus any loss sustained upon any plant or material plus reasonable profit and damages.

SEC. 24 - REMOVAL OF EQUIPMENT

In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the property of the Owner, failing which the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

SEC. 25 - RESPONSIBILITY FOR WORK

The Contractor assumes full responsibility for the work. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the work (except for any part covered by partial acceptance as set forth in Sec. 26). He agrees to make no claims against the Owner for damages to the work from any cause except negligence or willful acts of the Owner, acts of an Enemy, acts of war or as provided in Sec. 32.

Existing Structures: The Contractor shall, at his own expense immediately make permanent repairs and restore to original condition any and all utility lines, irrigation lines, pipe lines, pavement, or structures that are to remain in place and damaged by the Contractor's equipment or workmen during the performance of work under this contract, or damaged as a result of improperly executed work.

Traffic Areas, Driveways, and Entrances: All traffic areas, driveways and entrances shall be restored to usable condition at the Contractor's expense as the work progresses. The Contractor shall make every effort to cooperate with the wishes of the individual property owners in providing access to private property along the site of the work.

Detours: The Contractor shall do such work as may be necessary to provide and maintain a detour adjacent to all road structures for public travel. The Contractor shall maintain the detours in such condition that the public can travel over same in comfort

and safety, and shall at his own expense perform such work as may be required to keep said detours open to the public at all times. The Contractor shall cooperate with the Engineer/Architect in the regulation of traffic and shall so govern his work that when it becomes necessary to suspend construction for a considerable period of time, the roadways will be re-opened to public travel. Materials and equipment shall be stored and the work shall be so conducted as to obstruct public travel as little as possible, and in no case shall there be less than twenty (20) feet in width of unobstructed roadway for the use of traffic. Materials and equipment stored in or near the path of traffic shall be protected with applicable traffic control devices in compliance with the Texas MUTCD.

Traffic Control Devices: When any section of the contraction site is closed to traffic, the Contractor shall furnish and maintain at each end of the closed section and at all intersecting streets - roads - construction site within the section, standard barricades, adequate warning signs and directional signs. All lights shall be kept burning from sunset to sunrise. If at any time the barricades are not, in the opinion of the Engineer/Architect, sufficient to prevent traffic from entering the closed portions of the street-road-construction site, the Contractor shall provide and maintain watchmen at such points and for such periods of time as the Engineer/Architect may direct. When directed by the Engineer/Architect, the Contractor shall provide and maintain such standard barricades, signs, lights and flags within the closed portion of the street-road-construction site as may be necessary to protect the work and safeguard local traffic.

No direct compensation except as specifically provided in these specifications will be made to the Contractor for the work and material involved in constructing and maintaining detours and approaches; furnishing, installing and maintaining barricades, danger, warning, and necessary for the proper direction, safety, and convenience of traffic during the Contract period, as this work is to be considered subsidiary to the several items for which unit prices are requested in the proposal.

SEC. 26 - PARTIAL COMPLETION AND ACCEPTANCE

If at any time prior to the issuance of the final certificate referred to in Section 39 hereinafter, any portion of the permanent construction has been satisfactorily completed, and if the Engineer/Architect determines that such portion of the permanent construction is not required for the operations of the Contractor but is needed by the Owner, the Engineer/Architect shall issue to the Contractor a certificate of partial completion, and thereupon or at any time thereafter the Owner may take over and use the portion of the permanent construction described in such certificate, and exclude the Contractor therefrom.

The issuance of a certificate of partial completion shall not be constructed to constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if he has failed to complete it in accordance with the terms of this contract. The issuance of such a certificate shall not operate to release the Contractor or his sureties from any obligations under this contract or the

performance bond. If any prior use increases the cost of or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Engineer/Architect may determine, unless otherwise provided.

SEC. 27 - PAYMENTS WITHHELD PRIOR TO FINAL ACCEPTANCE OF WORK

The Owner, as a result of subsequently discovered evidence, may withhold or nullify the whole or part of any payment certificate to such extent as may be necessary to protect himself from loss caused by:

(a) Defective work not remedied.

(b) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor.

(c) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.

(d) Damage to another contractor.

(e) Claims filed or reasonable evidence indicating probable filing of claims by Contractor against Owner.

No money may be withheld under (b) and (c) above if a payment bond is included in the Contract.

SEC. 28 - CONTRACTOR'S INSURANCE

The Contractor shall secure and maintain such insurance policies as will protect himself, his Subcontractors, and unless otherwise specified, the Owner, from claims for bodily injuries, death or property damage which may arise from operations under this Contract whether such operations be by himself or by any Subcontractor or anyone employed by them directly or indirectly.

The Certificate of Insurance should be made to the Hidalgo County Regional Mobility Authority, 118 South Cage Boulevard, 4th Floor, Pharr, Texas 78577 and should reference the operation.

All certificates must be received prior to commencement of service/work. All Certificates of insurance shall be approved by the Risk Manager and/or his/her designated representative prior to the commencement of any work.

In the event the insurance coverage expires prior to the completion of this contract, a renewal certificate shall be issued thirty (30) days prior to said expiration date. The Authority must be notified at least thirty (30) days prior to any material change in and/or cancellation and/or non-renewals of such policies.

The term “Authority” shall include the Hidalgo County Regional Mobility Authority and their employees, officers, officials, agent, and volunteers in respect to the contracted services. Any failure on the part of the Authority to request required insurance documentation shall not constitute a waiver of the insurance requirement.

The Authority reserves the right to make reasonable requests or revisions pertaining to the types and limits of that coverage.

During the term of the Contract, the successful contractor/respondent/selected firm shall acquire and maintain, for the duration of the contract period the following insurances:

A. Comprehensive Commercial General Liability:
The Contractor/Respondent/Selected Firm shall provide minimum limits of $250,000 each occurrence, $500,000 annual aggregate combined single limit for bodily injury and property damage liability. This shall include premises/operations, independent contractors, products, completed operations, personal and advertising injury, and contractual liability. This insurance shall apply as primary insurance with respect to any other insurance or self-insurance programs maintained by the Authority and shall name the “Hidalgo County Regional Mobility Authority” as an additional insured with a waiver of subrogation. The policy of insurance shall be written on an “occurrence” form.

- Blanket “XCU” – Explosion, Collapse & Underground
- Independent Contractors
- Care, Custody and Control
- Contractual Liability

No endorsements excluding these coverage’s are allowed.

Additional Insured Requirement:

To the fullest extent of coverage allowed under Chapter 151 of the Texas Insurance Code, the Hidalgo County Regional Mobility Authority shall be included as additional insured under the CGL policy, using ISO Additional Insured Endorsements CG20101001 and CG20371001, or endorsements providing equivalent coverage, including products completed operations

B. Business Automobile Liability:
The Contractor/Respondent/Selected Firm shall maintain limits of no less than $250,000 combined single limit per occurrence for bodily injury and property damage, and $500,000 annual aggregate. This insurance shall apply as primary insurance with respect to any other insurance or self-insurance programs maintained by the Authority and shall name the “Hidalgo County Regional Mobility Authority” as an additional insured with a waiver of subrogation. The policy of insurance shall be written on an “occurrence” form.

Applicable as long as no fragile or perishable products are transported; otherwise, Cargo Insurance is required.

Additional Insured Requirement:

To the fullest extent of coverage allowed under Chapter 151 of the Texas Insurance Code, the Hidalgo County Regional Mobility Authority shall be included as additional insured under the CGL policy, using ISO Additional Insured Endorsements CG20101001 and CG20371001, or endorsements providing equivalent coverage, including products completed operations

C. Builder's Risk/Fire & Extended Coverage:
The Contractor shall insure the building or other work included in this contract on an all-risk (special causes of loss) policy, with an insurance company or companies acceptable to the Owner. The amount of the insurance at all times to be at least equal to the amount paid on account of work and material and plus the value of the work or materials furnished or delivered but not yet paid for by the Owner. Builder's Risk Policies shall cover loss of materials by theft, vandalism, malicious mischief or other loss whether materials are incorporated in the work or not.

The policies shall be in the names of the Authority and the Contractor, as their interests may appear, and certificates of insurance shall be delivered to the Owner before monthly partial payments are made. The policy shall provide for the inclusion of names of all other contractors, subcontractors and other employed on the premises as ensured and shall stipulate that the insurance companies shall have no right to subrogation against any contractors, subcontractors or other parties employed on the premises for any work building alterations, construction or erection to the described property.

D. Workers' Compensation: The contractor/respondent/selected firm shall provide and maintain workers' compensation insurance for all employees in the full amount required by statute and full compliance with the applicable laws of the State of Texas. Employer's Liability insurance shall be provided in amounts not less than $500,000 per accident for bodily injury by accident; $500,000 policy limit by disease; and $500,000 per employee for bodily injury by disease."

In addition, a Waiver of Subrogation Endorsement shall be provided by the contractor naming the Hidalgo County Regional Mobility Authority in said policy for Worker's Compensation Insurance.

Contractor/Respondent/Selected Firm shall further ensure that all of its sub-contractors maintain appropriate levels of workers' compensation insurance.

E. Professional Services - Insurance Provisions: Errors & Omissions (Professional Liability): $1,000,000 Each Claim Limit $1,000,000 Aggregate Limit. If coverage

is written on a claims-made basis, the retroactive date shall be on or prior to the date of the contractual Agreement. The certificate of insurance shall state that the coverage is claims-made and include the retroactive date. The insurance shall be maintained for the duration of the contractual Agreement and for four (4) years following completion of the services provides under the contractual Agreement or for the warranty period, whichever is longer. An annual certificate of insurance submitted to the Authority shall evidence coverage.

F. Deductible Clause: Contractor/Respondent/Selected Firm to declare self-insured retention or deductible amounts in excess of $25,000.

G. Other Provisions: All insurance carriers shall be rated A6 or better and be published on a current A.M. Best Rating Guide, or some other recognized equivalent rating service (e.g., Moody's, Standard & Poor's). The Authority may request a copy of the insurance policy according to the nature of the project. Authority reserves the right to accept or reject the insurance carrier. All Certificates of Insurance shall be provided on the Acord Form 25. All insurance requirements are imposed and must be complied with by any and all sub-contractors, and/or lower-tier sub-contractors. A copy of endorsements providing Additional Insured, Primary Insurance and Waiver of Subrogation wording shall be attached to the certificates of insurance.

All policies shall be for not less than the amounts set forth above or stated in the Special Conditions. Other forms of insurance shall also be provided if called for by the Special Conditions.

Certificates and/or copies of policy of such insurance shall be filed with the Engineer/Architect, and shall be subject to his approval as to adequacy of protection, within the requirements of the Specifications. Said certificates of insurance shall contain a 10 day's written notice of cancellation in favor of the Owner.

SEC. 29 - SURETY BONDS

The Owner shall have the right, prior to the signing of the Contract, to require the Contractor to furnish bond covering the faithful performance of the Contract and the payment of all obligations arising thereunder, in such form as the Owner may prescribe in the bidding documents and executed by one or more financially responsible sureties. If such bonds are required, the premium shall be paid by the Contractor. The Owner may require additional bond if the contract is increased appreciably.

SEC. 30 - ASSIGNMENT

Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due to him or to become due to him hereunder, except to bank or financial institution acceptable to the Owner.

SEC. 31 - RIGHTS OF VARIOUS INTERESTS

Whenever work being done by the Owners or by other contractor's forces is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer/Architect, to secure the completion of the various portions of the work in general harmony.

SEC. 32 - SEPARATE CONTRACTS

The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs. The parties agree that the Owner shall not be responsible or liable for any delays in Contractor's progress or completion of the work that are caused, in whole or in part, by the acts or omissions of other contractors, subcontractors, or third parties.

If the proper execution or results of any part of the Contractor's work depends upon the work of any other contract, the Contractor shall inspect and promptly report to the Engineer/Architect any defects in such work that render it unsuitable for such proper execution and results.

SEC. 33 - SUBCONTRACTS

The Contractor shall, as soon as practical after signing of the Contract, notify the Engineer/Architect in writing of the names of Subcontractors proposed for the work.

The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Owner.

SEC. 34 - ENGINEER'S/ARCHITECT'S STATUS

The Engineer/Architect shall perform technical observation of the work. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the contract. He shall also have authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

SEC. 35 - ENGINEER'S/ARCHITECT'S DECISION

The Engineer/Architect shall, within a reasonable time after their presentation to him, make decisions in writing on all claims of the Owner or the Contractor and on all

other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

SEC. 36 – JURISDICTION AND VENUE; MEDIATION, LITIGATION AND ARBITRATION

As a condition precedent to any suit or arbitration being filed or initiated, any controversy or claim arising out of or relating to this contract, or the breach thereof, is subject to mandatory mediation to take place in Hidalgo County, Texas at a time agreed upon by the parties. Such mediation must be held within thirty (30) days after the date either party requests mediation, unless otherwise agreed. The Parties agree that any dispute arising out of or related to this Contract would likely involve an inquiry and interpretation of a substantial federal issue. Accordingly, the parties further agree that, if such mediation is unsuccessful, the proper and exclusive forum and venue in all legal actions brought to enforce or construe any of the provisions of this Contract shall be in the United States District Court for the Southern District of Texas, McAllen Division. The Owner and Contractor agree and stipulate that the United States District Court for the Southern District of Texas, McAllen Division, has personal jurisdiction over the parties. However, if federal subject matter jurisdiction is found to be lacking in any legal action, or if a federal court otherwise refuses or fails to exercise jurisdiction over the parties or the dispute, the Parties agree to submit any dispute arising out of or related to this Contract to binding arbitration pursuant to the Texas General Arbitration Act, Chapter 171 of the Texas Civil Practice and Remedies Code ("TAA") and the terms of this Section 36. To the extent that TAA and this Section 36 conflict, the provisions of this Section 36 will apply.

The parties will select a single arbitrator in accordance with the rules of the American Arbitration Association. The parties further agree that all depositions in any arbitration shall be limited to a total of 24 hours for each party. The parties further agree that the parties shall not serve interrogatories or requests for admission on the other party. The parties further agree that the parties will instruct the Arbitrator, and the Arbitrator is required, to follow the substantive law of the State of Texas and to issue a reasoned award with findings of fact and conclusions of law. **The Arbitrator does not have authority to render a decision which contains a reversible error of state or federal law; the Arbitrator exceeds the Arbitrator's powers if the Arbitrator renders a decision which contains a reversible error of state or federal law.** The parties further agree that a court reporter shall be present and keep a record of all hearings, which shall be conducted in Hidalgo County, Texas, and the cost of which will be divided equally among the parties notwithstanding any final award entered by the Arbitrator. The parties further agree that the award of the Arbitrator may be reviewed based on the record by a state district court having jurisdiction over the parties and the subject matter and that, notwithstanding the applicability of the TAA, such district court shall conduct a *de novo* review of the award of the Arbitrator and consider any improper application of the law, and/or abuse of discretion by the Arbitrator, in considering the award of the Arbitrator and determining whether to confirm, vacate or modify the award of the Arbitrator. The parties further agree that any judgment or final order entered by

the district court is subject to further appellate review consistent with applicable rules of appellate procedure that otherwise would be followed upon a judgment or final order being issued by such district court.

SEC. 37 - COORDINATION WITH OTHER PARTIES

The Contractor shall coordinate the Contractor's schedule with the schedule, work, labor, materials and/or equipment provided by all other contractors, subcontractors, manufacturers and suppliers to ensure timely completion of the project. The Contractor shall be responsible for reducing, mitigating, eliminating or limiting any delays or damages caused, in whole or in part, by all other contractors, subcontractors, manufacturers, suppliers and any other third parties, including, but not limited to, delays or damages caused by a lack of access to the lands upon which the work under the Contract is to be done. The parties agree that the Owner is not liable for any delays or damages caused, in whole or in part, by any other contractors, subcontractors, manufacturers, suppliers and/or any other third parties. The Contractor shall provide at his own expense and without liability to the Owner any land and access thereto that may be required for temporary construction facilities, or for storage of material.

SEC. 38 - LAND FOR WORK

The Owner shall provide as indicated on Drawings and not later than the date when needed by the Contractor the lands upon which the work under this Contract is to be done, right-of-ways for access to same, and such other lands which are designated on the Drawings for the use of the Contractor. Such lands and right-of-ways shall be adequate for the performance of the Contract. Any delay in the furnishing of these lands by the Owner shall be deemed proper cause for an equitable adjustment in both Contract price and time of completion.

The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that may be required for temporary construction facilities, or for storage of material.

SEC. 39 - CLEANING UP

The Contractor shall remove at his own expense from the Owner's property and from all public and private property all temporary structures, rubbish and waste materials resulting from his operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste, materials in accordance with permission of such disposal granted to the Contractor by the Owner thereof.

SEC. 40 - ACCEPTANCE AND FINAL PAYMENT

(a) Upon receipt of written notice that the work is substantially completed or ready for final inspection and acceptance, the Engineer/Architect will promptly make such inspection, and when he finds the work acceptable under the Contract and the

Contract fully performed or substantially completed he shall promptly issue a certificate, over his own signature, stating that the work required by this Contract has been completed or substantially completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the Contractor, including the retained percentage, less a retention based on the Engineer's/Architect's estimate of the fair value of the claims against the Contractor and the cost completing the incomplete or unsatisfactory items of work with specified amounts for each incomplete or defective item of work, is due and payable. The date of substantial completion of a project or specified area of a project is the date when the construction is sufficiently completed in accordance with the Contract Documents as modified by any change orders agreed to by the parties so that the Owner can occupy the project for the use for which it was intended.

(b) Before issuance of final payment, the Contractor, if required in the Special Conditions, shall certify in writing to the Engineer/Architect that all payrolls, material bills, and other indebtedness or liens, with the work have been paid, or otherwise satisfied, except that in case of disputed indebtedness or liens, if the Contract does not include a payment of all such disputed amounts, including all related costs and interest in connection with said disputed indebtedness or lien which the Owner may be compelled to pay upon adjudication.

(c) The making and acceptance of the final payment shall constitute a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work appearing within a one year guarantee period from date of acceptance, from the requirements of the Drawings and Specifications, or from the manufacturer's guarantees. It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled. In the event that the Contractor has previously made a claim that is still unsettled, the Owner shall be entitled to withhold from the final payment, as an offset, any amounts that the Owner, in its sole discretion, believes that the Contractor may owe to the Owner for liquidated damages or for the Contractor's failure to timely complete the project. Notwithstanding anything to the contrary herein, the Owner shall not be liable, in any event, for any interest that accrues on any amount(s) withheld from the final payment, as an offset, that the Owner, in its sole discretion, believes that the Contractor may owe to the Owner for liquidated damages or for the Contractor's failure to timely complete the project.

(d) If after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor's and the Engineer/Architect so certified, the Owner shall, upon certificate of the Engineer/Architect, and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted.

Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

(e) If the Owner fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of 6 per cent annum commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor. The Owner shall not be responsible for paying any interest on

any amount(s) withheld from any progress payments or from final payment that the Owner, in its sole discretion, believes that the Contractor may owe to the Owner for liquidated damages or for the Contractor's failure to timely complete the project.

SEC. 41 - GENERAL GUARANTY

Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Final Acceptance of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system or other work resulting from such defects.

The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

SEC. 42 - SHOP DRAWINGS

The approval of (shop) drawings by the Engineer/Architect shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility for any error which may exist as the contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work.

SEC. 43 - TESTING

All testing authorized by the Engineer/Architect that meets specification requirements will be paid for by the Owner; however, tests on materials that fail will be billed to and paid for by the Contractor.

SEC. 44 - PAYMENT SCHEDULE

Contractor to submit to the Authority, Certificate for Payment on or before the 1st of the month. Authority to reciprocate with payment by mail on or before the 30th of the same month.

SEC. 45 - RETAINAGE

Contracts equaling a total amount of $400,000.00 or over will bear a retainage of five (5) percent (%) on each partial disbursement. Contracts totaling less than $400,000.00 will bear a retainage of ten (10) percent (%) on each partial disbursement.

SEC. 46 - OVERTIME

Time and one half will be paid for all hours worked in excess of forty (40) hours in one work week.

SEC. 47 - INDEMNITY AND HOLD HARMLESS AGREEMENT

TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR WILL DEFEND, INDEMNIFY AND HOLD HARMLESS THE OWNER, THE OWNER'S REPRESENTATIVE, THE ARCHITECT AND THEIR AGENTS AND EMPLOYEES FROM ANY AND ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES, INCLUDING ATTORNEYS' FEES, ARISING OUT OF OR RESULTING FROM THE PERFORMANCE OF THE WORK, INCLUDING, BUT NOT LIMITED TO, CLAIMS, DAMAGE, LOSS OR EXPENSES ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DEATH OR TO ANY INJURY TO DESTRUCTION OF TANGIBLE PROPERTY, INCLUDING THE LOSS OF USE RESULTING THEREFROM, CAUSED IN WHOLE OR IN PART BY ANY NEGLIGENT OR WILLFUL ACT OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.

SEC. 48 - RIGHT TO AUDIT

The Hidalgo County Regional Mobility Authority reserves the right to audit the bidder's books and records relating to the performance of this contract. The Hidalgo County Regional Mobility Authority, at its own expense, shall have the right at all reasonable times during normal business hours and upon at least twenty-four (24) hours' advance notice, to audit, to examine, and to make copies of or extracts from the books of account and records maintained by the vendor(s) with respect to the Construction Contract. If such audit shall disclose overpayment by Authority to vendor, written notice of such overpayment shall be provided to the vendor and the amount of overpayment shall be promptly reimbursed by vendor to the Authority. In the event any such overpayment is not paid within ten (10) business days after receipt of such notice, the unpaid amount of such overpayment shall bear interest at the rate of one percent (1%) per month from the date of such notice until paid.

SEC. 49 – LIMITATION OF LIABILITY

THE OWNER'S LIABILITY TO CONTRACTOR UNDER ANY CLAIM FOR BREACH OF CONTRACT IS LIMITED PURSUANT SECTION 271.153 OF THE TEXAS LOCAL GOVERNMENT CODE.

NOTWITHSTANDING THE FOREGOING, AND TO THE FULLEST EXTENT PERMITTED BY LAW, THE OWNER'S LIABILITY TO CONTRACTOR SHALL NOT EXCEED THE DIFFERENCE BETWEEN CONTRACTOR'S ACTUAL COSTS TO COMPLETE THE WORK, ON ONE HAND, AND THE TOTAL AMOUNT OF COMPENSATION FOR WHICH CONTRACTOR AGREED TO PERFORM ALL OF THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS AS REFERENCED IN THE BID SCHEDULE AND IN SECTION 4 OF THE CONTRACT AGREEMENT, ALLOWING FOR ADJUSTMENTS IN THE COMPENSATION OWED TO CONTRACTOR PURSUANT TO ANY CHANGE ORDERS AGREED UPON BY THE PARTIES IN WRITING, ON THE OTHER HAND. ADDITIONALLY, REGARDLESS OF THE NATURE OF ANY CLAIM(S) ASSERTED AGAINST THE OWNER, THE PARTIES AGREE THAT THE OWNER SHALL NOT BE LIABLE TO THE CONTRACTOR FOR ANY LABOR OVERRUN, EQUIPMENT OVERRUN, MATERIAL ESCALATION, EXTENDED FIELD COSTS, DELAYS CAUSED BY THE SUBMISSION OF INCORRECT OR INCOMPLETE SUBMITTALS, CONSEQUENTIAL DAMAGES, INDIRECT DAMAGES, INCIDENTAL DAMAGES, PUNITIVE OR EXEMPLARY DAMAGES, OR ANY OTHER NON-DIRECT DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, LOSS OF BONDING CAPACITY, UNABSORBED HOME OFFICE OVERHEAD, LOSS IN LABOR PRODUCTIVITY, OR ANY CONSEQUENTIAL DAMAGES THAT OTHERWISE WOULD BE ALLOWED UNDER SECTION 271.153(A)(1) OF THE TEXAS LOCAL GOVERNMENT CODE.

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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S. GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS

GOVERNING SPECIFICATIONS:

All Specifications and special provisions applicable to this project are identified as follows. The listed technical specifications shall govern the performance of the contract.

TECHNICAL SPECIFICATIONS:

Division 1 Specifications

Section 01000 – Summary of Work

Section 01005 – Definitions & Terminology

Section 01030 – Special Procedures

Section 01039 – Coordination & Meetings

Section 01300 – Submittals

Section 01310 – Progress Schedules

Section 01340 – Shop Drawings, Product Data & Samples, O&M Manuals

Section 01400 – Quality Control

Section 01420 – Geotechnical Engineering Study

Section 01510 – Temporary Facilities

Section 01563 – Groundwater Handling

Section 01568 – Erosion and Sediment Control during Construction

Section 01600 – Products

Section 01601 – Job Conditions

Section 01640 – Product Substitutions

Section 01650 – Starting Systems

Section 01700 - Contract Closeout

Section 01730 – Operation and Maintenance Manuals

Section 01732 – Demolition of Civil Site Improvements

Section 01900 – References and Standards

Division 2 Specifications

Section 02110 – Site Clearing and Grubbing

Section 02200 – Earthwork for Top Soil Requirements

Section 02221 – Excavating, Backfilling and Compacting for Utilities

Section 02300 – Structural Earthwork

Section 02500 – Flexible Base

Section 02515 – Wetwell and Manhole Structures

Section 02556 – Water Transmission Lines and/or Pressure Sewer Lines

Section 02570 – Sanitary Sewer

Section 02572 – Combination Air Valves

Section 02590 – Polyurethane Protective Coatings

Section 02831 – Chain Link Fences and Gates

Division 3 Specifications

Section 03200 – Concrete Reinforcement

Section 03300 – Cast-in-Place Concrete for Site Work

Section 03301 – Cast-in-Place Concrete (Limited Applications)

Division 7 Specifications

Section 07900 – Joint Sealers

Division 9 Specifications

Section 09865 – Shop Coatings

Section 09900 – Field Coatings

Division 11 Specifications

Section 11005 – Equipment: General Requirements

Section 11060 – Pumping Equipment: General Requirements

Section 11322 – Submersible Lift Station

Division 13 Specifications

Section 13443 – Lift Station Controls

Section 13450 – Portable Hoist

Division 15 Specifications

Section 15076 – Tagging

Section 15100 – Valves and Appurtenances

Division 16 Specifications

Section 16010 – Electrical: General Requirements

Section 16052 - Hazardous Classified Area Construction

Section 16073 – Hangers and Supports for Electrical Systems

Section 16075 – Identification for Electrical Systems

Section 16100 – Basic Electrical Materials and Methods

Section 16123 – 600 Volt or Less Wires and Cables

Section 16130 – Conduits

Section 16140 – Wiring Devices

Section 16210 – Utility Coordination

Section 16289 – Transient Voltage Suppression for Low Voltage Electrical Power Circuits

Section 16410 – Enclosed Switches and Circuit Breakers

Section 16422 – Motor Starters

Section 16450 – Grounding and Bonding for Electrical Systems

Section 16491 – Fuses

Section 16504 – Analyzers: Gas Monitors

Section 16521 – Exterior Lighting

Division 19 Specifications

Section 19000 – Trench Protection

SPECIAL PROVISIONS

INTENT OF PLANS AND SPECIFICATIONS: The intent of the plans and specifications is to prescribe a complete work or improvement which the Contractor undertakes to do, in full compliance with the plans, specifications, special provisions, proposal and contract. The Contractor shall do all work as provided in the plans, specifications, special provisions, proposal and contract and shall do such additional work as may be considered necessary to complete the work in a satisfactory and acceptable manner. The Contractor shall furnish all labor, tools, materials, machinery, equipment and incidentals necessary to the prosecution of the work.

FINAL CLEAN-UP: Upon the completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work, surplus and discarded materials, temporary structures and debris of every kind. He shall leave the site of the work in a neat and orderly condition equal to that which originally existed. Surplus and waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer/Architect. Grounds around any structure shall be dressed to final grade as shown on plans.

EXISTING STRUCTURES: The plans show the locations of all known surface and sub-surface structures. However, the exact location of gas mains, water mains, conduits, sewers, etc., is unknown and the Owner assumed no responsibility for failure to show any or all of these structures on the plans or to show them in their exact location. It is mutually agreed that such failure will not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as necessitates, or requires the building of special work, provision for which is not made in the plans and proposal, in which case the provisions in these specifications for extra work shall apply.

COORDINATION OF PROJECT: The plans, the general conditions of the contract for construction, these specifications, the proposal, special provisions and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over specifications; special provisions shall govern over both general and standard specifications; and plans and quantities shown on the plans shall govern over those shown in the proposal. The Contractor shall not take advantage of any apparent error or omission in the plans and specifications and the Engineer/Architect shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications. In the event the Contractor discovers an apparent error or discrepancy, he shall immediately call this to the attention of the Engineer/Architect.

COOPERATION OF CONTRACTOR: The Contractor shall give to the work the consistent attention necessary to facilitate the progress thereof, and he shall cooperate with the Engineer/Architect, his inspectors, and with other contractors in every way possible.

WAGES: All employees directly employed on the work shall be paid the prevailing wage scale for work of a similar character in this locality. Minimum wage scale is also included in these specifications.

MATERIALS - GENERAL: The materials shall be the best procurable, as required by the plans, specifications and special provisions. The Contractor shall not start delivery of materials until the Engineer/Architect has approved the source of supply. Only materials conforming to these specifications shall be used in the work and such materials shall be used only after approval has been given by the Engineer/Architect and only so long as the quality of said materials remains equal to the requirements of the specifications. The Contractor shall furnish approved materials from other sources, if for any reason the product from any source at any time before commencement or during the prosecution of the work proves unacceptable. After approval, any material which has become mixed with or coated with dirt or any other foreign substances during its delivery and handling will not be permitted to be used in the work.

MATERIAL STORAGE: Any and all materials, such as cement, lime, mill work, or other materials or equipment subject to deterioration by exposure to weather or other factors, shall be stored in such a manner to protect them from deterioration or damage preceding the time they become a permanent part of final structures.

"OR EQUAL" CLAUSE: Whenever a material, or article required is specified or shown on the plans by using the name of the proprietary product, or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, provided the material or article so proposed is of equal substance and function. It shall not be purchased or installed by the Contractor without the written approval of the Architect and/or Owner's Representative.

CONSTRUCTION JOINTS: Construction joints are to be kept to a minimum number, but when necessary they shall be designated in the plans or upon the approval of the Engineer/Architect. When pouring is stopped, dowels and 6-inch dumbbell shaped polyvinyl plastic waterstops are to be inserted. Construction joints in walls shall be horizontal, unless otherwise allowed by the Engineer/Architect.

WALL AND FLOOR OPENINGS: Openings may be left in walls and floors while forms are being built, so that piping or wall sleeves may later be inserted in the openings when piping is put in place. Provision shall be made in these openings for concreting the piping and thimbles securely in place so that water tight joints will be secured.

All wall and floor openings are to be closed by general Contractor regardless of whether piping or fittings are furnished or installed by others.

PAINTING: All exposed metal surfaces of every nature, such as pumps, piping, general equipment, window frames, valves, fittings, gratings, etc., shall receive on rust inhibitive primer coat followed by two coats of machinery enamel. Colors for enamel finish coats to be selected by Owner or Engineer/Architect.

All wood surfaces are to receive one primer coat and two coats of first grade outside oil paint. Colors to be selected by Owner or Engineer/Architect.

Any specific structure, or portions of structure, which provides for occupancy or use by operations, or houses general equipment or supplies; whether structure is masonry or concrete; shall be painted inside and outside as directed by Engineer/Architect. An alkali resisting primer coat shall be first applied followed by two coats of first class oil paint especially prepared for concrete or masonry surfaces. Any questions regarding foregoing shall be clarified to his satisfaction by bidding Contractor before submitting a bid on project. Colors to be selected by Owner or Engineer/Architect.

HARDWARE: All hardware must be strictly standard first grade, Contractor's choice, and approved by Engineer/Architect.

TELEPHONE CABLES: Contractor shall notify Telephone Co. 24 hours in advance of work in the vicinity of buried telephone cables. No work shall be performed in vicinity of cable except in presence of telephone company representatives. The Contractor shall be responsible for reducing, mitigating, eliminating or limiting any delays or damages caused, in whole or in part, by the telephone company, including, but not limited to, delays or damages caused by a lack of access to the lands upon which the work under the Contract is to be done. The parties agree that the Owner is not liable for any delays or damages caused, in whole or in part, by the telephone company.

GAS LINES: Contractor shall notify Gas Co. 24 hours in advance of work in the vicinity of gas distribution lines and the proper transmission company in the case of transmission gas lines. The Contractor shall be responsible for reducing, mitigating, eliminating or limiting any delays or damages caused, in whole or in part, by the gas company, including, but not limited to, delays or damages caused by a lack of access to the lands upon which the work under the Contract is to be done. The parties agree that the Owner is not liable for any delays or damages caused, in whole or in part, by the gas company.

ELECTRICAL: Contractor shall notify Power Company (AEP) 24 hours in advance of work in the vicinity of power distribution lines, for the necessity of securing power within the construction site, or for the any activity which will require coordination with the Power Company. The Contractor shall be responsible for reducing, mitigating, eliminating or limiting any delays or damages caused, in whole or in part, by AEP or those acting on its behalf, including, but not limited to, delays or damages caused by a lack of access to the lands upon which the work under the Contract is to be done. The parties agree that the Owner is not liable for any delays or damages caused, in whole or in part, by AEP or those acting on its behalf.

RAILROAD CROSSINGS: Construction methods and materials for railroad crossings shall be in strict compliance with railroad company requirements. No work shall be started on railroad crossings until properly coordinated with the roadmaster 48 hours prior to beginning work.

CANAL CROSSINGS: Construction methods and materials for canal crossings shall be in strict compliance with water district requirements. No work shall be started on canal right-of-ways until properly coordinated with the water district.

DISINFECTION OF NEW OR REPAIRED FACILITIES, WATERWORKS CONSTRUCTION ONLY: When repairs are made to existing mains or when new main extensions are provided,

they must be disinfected using such amounts of chlorine or chlorine compounds as to fill the repaired or new mains and appurtenances with water containing 40-60 ppm chlorine. After the water containing this amount of chlorine, which is greater than that normally present in drinking water, has been in contact with the pipe and appurtenances at least six hours, the water shall be replaced with water to be transported normally, and samples of water from the new or repaired facilities submitted to laboratories for bacteriological examination so as to be assured that the disinfection procedure was effective. Foregoing shall also apply to treatment plant basins, piping, conduits, filters, clearwells, etc. Procedure will be under the direction and supervision of the Consulting Engineer/Architect.

Hidalgo County Regional Mobility Authority

CITY OF DONNA VALLEY VIEW ROAD

LIFT STATION SITE IMPROVEMENT PROJECT

BID #2017-001

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T. REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

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

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

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

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

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

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

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

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

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

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

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

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

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

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

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

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

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

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

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

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

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

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

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

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

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

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

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

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

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

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

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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

1. Minimum wages

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

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification

may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

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

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

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

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

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

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

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

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

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

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

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

the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

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

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

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

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

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

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

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

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

b. Trainees (programs of the USDOL).

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

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

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

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

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

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

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

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

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

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

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

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

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

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

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

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

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

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

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

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

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

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

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

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

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

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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

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

1**. Instructions for Certification – First Tier Participants:**

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

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

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

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

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

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

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

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

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

* * * * *

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

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

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

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or

destruction of records, making false statements, or receiving stolen property;

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

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

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

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

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

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

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

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

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

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

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

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

* * * * *

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

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

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

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

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

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

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

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

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

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

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

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

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

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

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

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

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

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

WAGE RATES

General Decision Number: TX170305 01/06/2017 TX305

Superseded General Decision Number: TX20160305

State: Texas

Construction Type: Building

County: Hidalgo County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually.
Additional information on contractor requirements and worker protections under the EO is available at
www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

BOIL0074-003 01/01/2014

	Rates	Fringes
BOILERMAKER	$ 23.14	21.55

ENGI0178-005 06/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 29.00	10.60
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic		

Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 27.50	10.60

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* IRON0084-011 06/01/2015

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 23.02	6.35

PLUM0412-004 04/01/2013

	Rates	Fringes
PLUMBER	$ 31.14	12.43

SUTX2014-031 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 16.17	0.00
CARPENTER	$ 14.21	2.22
CEMENT MASON/CONCRETE FINISHER	$ 12.46	0.00
ELECTRICIAN	$ 18.44	4.53
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 11.54	2.17
IRONWORKER, REINFORCING	$ 12.01	0.00
IRONWORKER, STRUCTURAL	$ 15.04	4.34
LABORER: Common or General	$ 8.00	0.00
LABORER: Mason Tender – Brick	$ 10.00	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.89	0.96
LABORER: Pipelayer	$ 11.00	3.47
LABORER: Roof Tearoff	$ 10.06	0.00

OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.04	1.01
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 10.00	0.00
OPERATOR: Loader	$ 12.87	0.70
OPERATOR: Mechanic	$ 17.00	0.00
OPERATOR: Paver (Asphalt, Aggregate, and Concrete	$ 16.03	0.00
OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 11.27	0.00
PIPEFITTER	$ 15.22	3.16
ROOFER	$ 11.42	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 18.40	2.12
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 21.13	6.53
TILE FINISHER	$ 11.22	0.00
TILE SETTER	$ 12.15	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer		

Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor

200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

General Decision Number: TX170008 01/06/2017 TX8

Superseded General Decision Number: TX20160008

State: Texas

Construction Types: Heavy and Highway

Counties: Cameron, Hidalgo and Webb Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

* SUTX2011-003 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)	$ 12.46	
FORM BUILDER/FORM SETTER (Structures)	$ 12.30	
FORM SETTER (Paving & Curb)	$ 12.16	
LABORER		
Asphalt Raker	$ 10.61	
Flagger	$ 9.10	
Laborer, Common	$ 9.86	
Laborer, Utility	$ 11.53	
Pipelayer	$ 11.87	
Work Zone Barricade		

Servicer	$ 12.88
POWER EQUIPMENT OPERATOR:	
Asphalt Distributor	$ 13.48
Asphalt Paving Machine	$ 12.25
Broom or Sweeper	$ 10.33
Crane, Lattice Boom 80 Tons or Less	$ 14.39
Crawler Tractor	$ 16.63
Excavator, 50,000 lbs or Less	$ 12.56
Excavator, over 50,000 lbs	$ 15.23
Foundation Drill, Truck Mounted	$ 16.86
Front End Loader Operator, Over 3 CY	$ 13.69
Front End Loader, 3 CY or Less	$ 13.49
Loader/Backhoe	$ 12.77
Mechanic	$ 15.47
Milling Machine	$ 14.64
Motor Grader Operator, Rough	$ 14.62
Motor Grader, Fine Grade	$ 16.52
Scraper	$ 11.07
Servicer	$ 12.34
Steel Worker (Reinforcing)	$ 14.07
TRUCK DRIVER	
Lowboy-Float	$ 13.63
Single Axle	$ 10.82
Single or Tandem Axle Dump	$ 14.53
Tandem Axle Tractor with Semi Trailer	$ 12.12
WELDER	$ 14.02

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the

Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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CITY OF DONNA
Heart of the Valley

TECHNICAL SPECIFICATIONS

FOR

CITY OF DONNA
VALLEY VIEW ROAD LIFT STATION SITE IMPROVEMENTS

IN

DONNA, TEXAS

STATE OF TEXAS
ROBERT L. SAENZ
82072
REGISTERED
PROFESSIONAL ENGINEER
3.30.2017

DATED:

March 30, 2017

BIDDING / CONSTRUCTION SET

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

HALFF

Technical Specifications Index

Division 1 Specifications

Division 2 Specifications

Division 3 Specifications

Division 7 Specifications

Division 9 Specifications

Technical Specifications Index

Division 11 Specifications

Division 13 Specifications

Division 15 Specifications

Division 16 Specifications

Division 19 Specifications

SECTION 01000 – SUMMARY OF WORK

1.00 PART 1 GENERAL

1.01 SECTION INCLUDES

Summary of the Work including any work by OWNER, OWNER furnished products, work sequence and future work.

1.02 DESCRIPTION OF WORK

A. Location of Work: Hidalgo County, Texas, West of Donna, Texas

B. Description of Work: Construction of a Sanitary Sewer Lift Station and Receiving Manhole.

1. Under this Contract, CONTRACTOR shall furnish all materials, appliances, tools, equipment, transportation, services, and all labor and superintendence for the construction of the work as described in these TECHNICAL SPECIFICATIONS and as shown on the PLANS. The completed installation shall not lack any part which can be reasonably implied as necessary to its proper functioning or any subsidiary item which is customarily furnished, and CONTRACTOR shall deliver the installation to OWNER in operating condition.

2. Work, in general, under this Contract consists of furnishing, installing and constructing a a new lift station, a new receiving manhole, extending a 15" sanitary sewer line, and a force main including all related appurtenances, as indicated on the PLANS. Major items of construction and services required are designed as follows:

   a. Install a new lift station with two 15 HP submersible, non-clog pumps in a 8 feet diameter fiberglass wet well with a 10 inch discharge forcemain.

3. Clean up project area upon completion including repair of staging area and other areas damaged as a result of the CONTRACTOR's activities.

4. Sequence of Work: OWNER reserves the right to schedule sequence of construction; that is, which portion of the project will be constructed first. The contractor may perform construction operations during daylight hours only, unless written approval is given by the ENGINEER and the OWNER. All existing utilities to remain operational during all construction activities.

   a. Demolition of existing lift station:

      1. Extension of 15" sanitary sewer line has same alignment as existing 8" sanitary sewer line.
      2. Existing lift station to be in operation simultaneously with new lift station before it is taken out of service. Provide bypass pumping as required to maintain all sewer lines in service.
      3. Contractor to provide a construction sequence to ensure sanitary sewer flows do not overflow.

5. Attend monthly progress meetings of project.

6. Plans: Table of Contents listed below.

COVER SHEET/ SHEET INDEX
G-1 GENERAL NOTES
D-1 DEMOLITION PLAN
C-1 SITE PLAN/ LIFT STATION PLAN
C-2 WASTEWATER PLAN & PROFILE
C-3 MISCELLANEOUS DETAILS
C-4 SUGGESTED EROSION CONTROL

MECHANICAL
M-1 LIFT STATION DETAIL

STRUCTURAL
S1.0 GENERAL NOTES
S2.0 PLANS AND DETAILS

ELECTRICAL
EG- 1 ELECTRICAL GENERAL LEGEND
E-1 ELECTRICAL SITE PLAN
E-2 ELECTRICAL FLOOR PLAN
E-3 ELECTRICAL SECTION VIEW
E-4 ELECTRICAL RISER DIAGRAM
E-5 ELECTRICAL DETAILS

1.03 ALTERNATES – (Not Used)

1.04 CASH ALLOWANCES – (Not Used)

1.05 WORK SEQUENCE

A. Contractor shall submit a schedule with monthly updates outlining the start and completion of major tasks.

1.06 CONTRACTOR RESPONSIBILITIES

A. Under this Contract, CONTRACTOR shall furnish all materials, appliances, tools, equipment, transportation, services, and all labor and superintendence for the construction of the work as described in these TECHNICAL SPECIFICATIONS and as shown on the PLANS. The completed installation shall not lack any part which can be reasonably implied as necessary to its proper functioning or any subsidiary item which is customarily furnished, and CONTRACTOR shall deliver the installation to OWNER in operating condition.

B. Contractor shall make provisions to host a monthly meeting at the site for the duration of the project.

1.07 PAYMENT – (Not Used)

END OF SECTION

SECTION 01005 – DEFINITIONS AND TERMINOLOGY

1.00 PART 1 - GENERAL

1.01 SPECIFICATION TERMINOLOGY

A. "Certified" used in context with materials and equipment means the material and equipment has been tested and found by a nationally recognized testing laboratory to meet specification requirements, or nationally recognized standards if requirements are not specified, and is safe for use in the specified manner. A nationally recognized testing laboratory must periodically inspect production of the equipment and the equipment must bear a label, tag, or other record of certification.

B. "Certified" used in context with labor performance or ability to install materials and equipment means that the abilities of the proposed installer have been tested by an representative of the specified testing agency authorized to issue certificates of competency and has met the prescribed standards for certification.

C. "Certified" used in context with test reports, payment requests or other statements of fact means that the statements made on the document are a true statement as attested to by the certifying entity.

D. "Engineer" refers to the Consulting Engineering Firm under contract with the Hidalgo County Regional Mobility Authority (HCRMA) for this particular project, or its designated representative.

E. "Furnish" means to supply, deliver and unload materials and equipment at the project site ready to install.

F. "Indicated" means graphic representations, notes, or schedules on drawings, or other requirements in Contract Documents. Words such as "shown", "noted", "scheduled", are used to help locate the reference. No limitation on the location is intended unless specifically noted.

G. "Install" means the operations at the project site including unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, training and similar operations required to prepare the materials and equipment for use, verify conformance with Contract Documents and prepare for acceptance and operation by the Owner.

H. "Installer" means an entity engaged by Contractor, either as an employee, subcontractor, or sub-subcontractor to install materials and/or equipment. Installers are to have successfully completed a minimum of five projects similar in size and scope to this project, have a minimum of five years of experience in the installation of similar materials and equipment, and comply with the requirements of the authority having jurisdiction.

I. "Labeled" means equipment that embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories, Inc. and production is periodically inspected in accordance with nationally recognized standards or tests to determine safe use in a specified manner.

J. "Listed" means equipment is included in a list published by a nationally recognized laboratory which makes periodic inspection of production of such equipment and states that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.

K. "Manufacturer" means an entity engaged by Contractor, as a subcontractor, or sub-subcontractor to furnish materials and/or equipment. Manufacturers are to have a

minimum of five years experience in the manufacture of materials and equipment similar in size, capacity and scope to the specified materials and equipment.

L. "Perform" means to complete the operations necessary to comply with the Contract Documents.

M. “Owner” means Hidalgo County Regional Mobility Authority and the City of Donna. “City” means City of Donna.

N. "Project site" means the space available to perform the work, either exclusively or in conjunction with others performing construction at the project site.

O. "Provide" means to furnish and install materials and equipment.

P. "Regulation" means laws, statutes, ordinances, and lawful orders issued by authorities having jurisdiction, as well as, rules, conventions, and agreements within the construction industry that control performance of work, whether they are lawfully imposed by authorities having jurisdiction or not.

Q. "Specified" means written representations in the bid documents or the technical specifications.

1.02 SPECIFICATION SENTENCE STRUCTURE

A. Specifications are written in modified brief style. Requirements apply to all work of the same kind, class, and type even though the word "all" is not stated.

B. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words "furnish", "install", "provide", or similar words include the meaning of the phrase "The Contractor shall." before these words.

C. It is understood that the words "directed", "designated", "requested", "authorized", "approved", "selected", or similar words include the meaning of the phrase "by the Engineer" after these words unless otherwise stated. Use of these words does not extend the Engineer's responsibility for construction supervision or responsibilities beyond those defined in the General Conditions.

D. "At no additional cost to Owner", "With no extra compensation to Contractor", "At Contractor's own expense", or similar words mean that the Contractor will perform or provide specified operation of work without any increase in the Contract Amount. It is understood that the cost for performing all work is included in the amount bid and will be performed at no additional cost to the Owner unless specifically stated otherwise.

1.03 DOCUMENT ORGANIZATION

A. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing work among subcontractors, or to establish the extent of work to be performed by any trade, subcontractor or vendor. Specification or details do not need to be indicated or specified in each specification or drawing. Items shown in the contract documents are applicable regardless of location in the Contract Documents.

B. Standard paragraph titles and other identifications of subject matter in the specifications are intended to aid in locating and recognizing various requirements of the specifications. Titles do not define, limit, or otherwise restrict specification text.

C. Capitalizing words in the text does not mean that these words convey special or unique meanings or have precedence over other parts of the Contract Documents. Specification text governs over titling and it is understood that the specification is to be interpreted as a whole.

D. Drawings and specifications do not indicate or describe all of the work required to complete the project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials or equipment required for a complete and functional system even if they are not detailed or specified.

1.04 INTERPRETATIONS OF DOCUMENTS

A. Comply with the most stringent requirements where compliance with two (2) or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.
   1. Quantity or quality level shown or indicated shall be minimum to be provided or performed in every instance.

   2. Actual installation may comply exactly with minimum quality indicated, or it may exceed that minimum within reasonable limits.

   3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.

   4. Refer instances of uncertainty to the Engineer for a decision before proceeding.

B. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the drawings but are not included in the specifications.

1.05 REFERENCE STANDARDS

A. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than the referenced standards.

   1. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.

   2. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.

B. Consider a referenced standard to be the latest edition with supplements or amendments when a standard is referred to in an individual specification section but is not listed by title and date.

C. Trade association names and title of general standards are frequently abbreviated. Acronyms or abbreviations used in the Contract Documents mean the recognized name of trade association, standards generating organization, authority having jurisdiction, or other entity applicable in the context of the Contract Documents. Refer to "Encyclopedia of Associations," published by Gale Research Company.

D. Make copies of reference standards available as requested by Engineer or Owner.

1.06 SUBSTITUTIONS AND EQUAL PRODUCTS

Provide materials and equipment manufactured by the entities specifically listed in each technical specification section. Submit a Contractor's Modification Request per Section 01300, SUBMITTALS for substitution of materials and equipment of manufacturers not specifically listed or for materials and equipment that does not strictly comply with the Contract Documents.

Contractor may provide "equal" products manufactured by manufacturers other than those specifically listed in the technical specification section unless it is specifically stated that only the materials and equipment of the specified manufacturers shall be provided. Provide a request for approval of proposed equals per Section 01300 SUBMITTALS for any materials or equipment not specifically listed. Submit a Contractor's Modification Request for substitution of materials and equipment of other manufacturers or for materials and equipment that does not strictly comply with the Contract Documents. A Field Order or Change Order will be issued if the contract modification is approved.

END OF SECTION

SECTION 01030 – SPECIAL PROCEDURES

1.00 PART 1 - GENERAL

A. Consider the sequences, duration limitations, and governing factors outlined in this Section to prepare the schedule for the work.

B. Perform the work not specifically described in this Section as required to complete the entire project within the contract time.

1.01 SHUT DOWNS AND PLANS OF ACTION

A. Shut-downs of operations or equipment must be planned and scheduled.

1. Submit a written plan of action for approval for shutting down essential services. These include:

   a. Water or Wastewater service
   b. Electrical power
   c. Control power
   d. Process piping
   e. Treatment equipment
   f. Communications equipment
   g. Other designated functions

2. Describe the following in the Plan of Action:
   a. Construction necessary
   b. Utilities, piping, or services affected
   c. Length of time the service or utility will be disturbed
   d. Procedures to be used to carry out the work
   e. Plan of Action to handle emergencies
   f. Contingency plan that will be used if the original schedule cannot be met

3. Plan must be received by the Owner and the City two (2) weeks **prior** to beginning the work.

B. The Owner has identified "Critical Operations" that must not be out of service longer than the designated maximum out of service time and/or must be performed only during the designated times.

1. Work affecting "Critical Operations" is to be performed on a 24-hour a day basis until operations have been restored.

2. Provide additional work force and equipment as required to complete the work affecting "Critical Operations" within the allotted time.

3. Include the cost for work affecting "Critical Operations" in the contract proposal.

END OF SECTION

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SECTION 01039 – COORDINATION AND MEETINGS

1.00 PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination.

B. Preconstruction Conference.

C. Site Mobilization Conference.

D. Progress Meetings.

1.03 COORDINATION

A. The General Contractor shall have primary responsibility to coordinate and schedule the Work. However, the contractor shall be responsible for adhering to the schedule and coordinating submittals and installation of the Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements. Accordingly, each Contractor shall, as applicable, perform the following tasks.

1. Verify that all utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
2. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
3. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 PRECONSTRUCTION CONFERENCE

A. Owner, City, and Engineer will schedule a preconstruction conference after Notice of Award.

B. Attendance Required - Owner, City, Engineer, and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, unit prices and construction work schedule in accordance with the General Conditions of the Contract, Sections 01300 and Section 01310.
5. Designation of personnel representing the parties in Contract and the Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
7. Scheduling.

1.05 SITE MOBILIZATION CONFERENCE

A. Engineer, City, and Owner will schedule a conference at the Project site prior to Contractor occupancy.

B. Attendance Required - Owner, City, Engineer, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.

C. Agenda:

1. Use of premises by Owner, City and Contractor.
2. Owner's and City's requirements and partial occupancy.
3. Construction facilities and controls provided by the City.
4. Temporary utilities provided by Owner and/or City, if any, not by Contractor.
5. Survey layout.
6. Security and housekeeping procedures.
7. Schedules and sequence for construction and wastewater flow management.
8. Procedures for testing.
9. Procedures for maintaining Record Documents.

1.06 PROGRESS MEETINGS

A. The Owner will schedule and administer meetings throughout progress of the Work.

B. The Owner will make arrangements for meetings, preside at meetings, record minutes, and distribute copies to Owner, Contractor, participants, and those affected by decisions made.

C. Attendance Required - Job superintendent, major Subcontractors and suppliers, Owner, City, and Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain lost progress.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

2.00 PART 2 – PRODUCTS [NOT USED]

3.00 PART 3 – EXECUTION [NOT USED]

END OF SECTION

SECTION 01300 – SUBMITTALS

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Submit documentation as required by the Contract Documents and as reasonably requested by the Owner and Engineer to:

1. Record the products incorporated into the Project for the Owner.

2. Provide information for operation and maintenance of the Project.

3. Provide information for the administration of the Contract.

4. Allow the Engineer to advise the Owner if products proposed for the project by the Contractor conform, in general, with the design concepts of the Contract Documents.

B. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the Engineer's review of submittals. Contract modifications may only be approved by Change Order or Field Order.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. Review all submittals prior to submission.

B. Determine and verify:

1. Field measurements.

2. Field construction requirements.

3. Location of all existing structures, utilities and equipment related to the submittals.

4. Submittals are complete for their intended purpose.

5. Conflicts between the submittals related to the various subcontractors and suppliers have been resolved.

6. Quantities and dimensions shown on the submittals.

C. Submit information per the procedures described in this section and the detailed specifications.

D. Furnish the following submittals:

1. As specified in the attached Submittal Schedule.

2. Schedules, data and other documentation as described in detail in this section or referenced in the General Conditions.

3. Submittals as required in the detailed specifications.

4. Submittals not required will be returned without Engineer's review.

E. Submit a schedule indicating the date submittals will be sent to the Engineer and proposed dates that the product will be incorporated into the project. Make submittals promptly in accordance with the schedule so as to cause no delay in the project.

1. Submittals shall be sent to Engineer allowing a reasonable time for delivery, review and marking submittals. Time for review is to include time for resubmission if necessary and to allow adequate time for the ordering, fabrication, and delivery of the product.

2. Schedule submittal to provide all information for interrelated work at one time. No review will be performed on submittals requiring coordination with other submittals. Engineer will return submittals for resubmission as a complete package.

F. Installation of any products prior to the approval of shop drawings is done at the Contractor's risk. Products not meeting the requirements of Contract Documents are defective and may be rejected at the Owner's option.

G. Payment will not be made for products for which submittals are required until the submittals have been received. Payment will not be made for products for which shop drawings or samples are required until these are approved by the Engineer.

1.03 QUALITY ASSURANCE

A. Submit legible, accurate, complete documents presented in a clear, easily understood manner. Submittals not meeting this criteria will be returned without review.

B. Demonstrate that the proposed products are in full and complete compliance with the design criteria and requirements of the Contract Documents including drawings and specifications as modified by Addenda, Field Orders, and Change Orders.

C. Furnish and install products that fully comply with the information included in the submittal.

D. Review and approve submittals prior to submitting them to the Engineer for review. Submittals will not be accepted from subcontractors, suppliers, or anyone other than the Contractor.

1.04 SUBMITTAL PROCEDURES

A. Deliver submittals to the Engineer.

B. Assign a number to the documents originated to allow tracking of the submittal during the review process.

1. Assign a number consisting of a prefix, a sequence number, and a letter suffix. Prefixes shall be as follows:

Prefix	Description	Originator
CO	Change Order	Contractor
CTR	Certified Test Report	Contractor
EIR	Equipment Installation Report	Contractor
FO	Field Order	Engineer
NBC	Notification by Contractor	Contractor
O&M	Operation & Maintenance Manuals	Contractor
PCM	Proposed Contract Modification	Engineer

PR	Payment Request	Contractor
PP	Project Photographs	Contractor
RD	Record Data	Contractor
RFI	Request for Information	Contractor
SAM	Sample	Contractor
SD	Shop Drawing	Contractor
SCH	Schedule of Progress	Contractor

2. Issue sequence numbers in chronological order for each type of submittal.

3. Issue numbers for re-submittals that have the same number as the original submittal followed by an alphabetical suffix indicating the number of times the same submittal has been sent to the Engineer for processing. For example: SD-025-A represents a shop drawing that is the twenty-fifth submittal of this type and is the second time this submittal has been sent for review.

4. Clearly note the submittal number on each page or sheet of the submittal.

5. Correct assignment of numbers is essential since different submittal types are processed in different ways.

D. Submit documents with uniform markings and page sizes.

1. Paper size shall allow for ease of reproduction.

a. Submit documents on 8-1/2" X 11" paper where practical.

b. Use 11" X 17" paper for larger drawings and schematics.

c. Use full size blueline sheets for fabrications and layout drawings. Reproducible drawings may be submitted in lieu of bluelines.

2. Mark submittals to:

a. Indicate Contractor's corrections in green.

b. Highlight items pertinent to the products being furnished in yellow and delete items that are not when the Manufacturer's standard drawings or information sheets are provided.

c. Cloud items and highlight in yellow where selections by the Engineer or Owner are required.

d. Mark dimensions with the prefix FD to indicate field verified dimensions on the drawings.

e. Provide a blank space 8" x 3" for Contractor's and Engineer's stamp.

E. Mark submittals to reference the drawing number and/or section of the specifications, detail designation, schedule or location that corresponds with the data submitted. Other

identification may also be required, such as layout drawings or schedules to allow the reviewer to determine where a particular product is to be used.

F. The number of copies of each submittal to be sent by the Contractor and the number of copies of each submittal to be returned are:

Prefix	Description	No. of Copies Sent	No. of Copies Returned
CO	Change Order	4	1
CTR	Certified Test Report	4	0
EIR	Equipment Installation Report	2	0
NBC	Notification by Contractor	2	1
O&M	Preliminary O&M Manuals	2	1
O&M	Final O&M Manuals	4	0
PR	Payment Request	4	1
PP	Project Photographs (including videotapes)	2	0
RD	Record Data	2	0
RFI	Request for Information	2	1
SAM	Sample	2	0
SD	Shop Drawings	4	1
SCH	Schedule of Progress	4	0

1.05 REVIEW PROCEDURES

A. Priority submittals will be reviewed before other submittals for this project which have been received but not reviewed.

1.06 REQUIREMENTS

A. Certifications, Warranties and Service Agreements include documents as specified in the detailed specifications, as shown in the submittal schedule or as follows:

1. Certified Test Reports (CTR) - A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the specifications. (Refer to Section 01400, QUALITY CONTROL.)

2. Certification of Local Field Service (CLS) - A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300 mile radius of the project site. List names, addresses, and telephone numbers of approved service organizations on or attach to the certificate.

3. Extended Warranty (EW) - A guarantee of performance for the product or system beyond the normal one (1) year warranty described in the General Conditions. Issue the warranty certificate in the name of the Project Owner.

4. Extended Service Agreement (ESA) - A contract to provide maintenance beyond that required to fulfill requirements for warranty repairs, or to perform routine maintenance for a definite period of time beyond the warranty period. Issue the service agreement in the name of the Project Owner.

5. Certification of Adequacy of Design (CAD) - A certified letter from the manufacturer of the equipment stating that they have designed the equipment to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter shall state that mechanical and electrical equipment is adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.

6. Certification of Applicator/Subcontractor (CSQ) - A certified letter stating that the Applicator or Subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.

B. Submit record data to provide information to allow the Owner to adequately identify the products incorporated into the project and allow replacement or repair at some future date.

1. Provide record data for all products. Record data is not required for items for which shop drawings and/or operations and maintenance manuals are required.

2. Provide information only on the specified products. Submit a Contractor's Modification Request for approval of deviations or substitutions and obtain approval by Field Order or Change Order prior to submitting Record Data.

3. Record data will be received by the Engineer, logged, and provided to Owner for his/her record.

a. Record data may be reviewed to see that the information provided is adequate for the purpose intended. Inadequate drawings may be returned as unacceptable.

b. Record data is not reviewed for compliance with the Contract Documents. Comments may be returned if deviations from the Contract Documents are noted during the cursory review performed to see that the information is adequate.

1.07 REQUESTS FOR DEVIATION

A. Submit requests for deviation from the Contract Documents for any product that does not fully comply with the specifications.

B. Submit request by Contractor's Modification Request (CMR). Identify the deviations and the reason the change is requested.

C. Deviations that result in a reduction in cost shall also include the amount of the reduction to the Owner.

D. A Change Order or Field Order will be issued by the Engineer for deviations approved by the Owner. Deviations from the Contract Documents may only be approved by Change Order or Field Order.

1.08 SUBMITTALS FOR SUBSTITUTIONS

A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product.

B. If the Contractor desires to submit a manufacturer or product which is not specified, the Contractor must submit the following for consideration of approval of the substitution:

1. Contractor's Modification Request for deviation from the Contract Documents per Paragraph 1.07.

2. Prove that the product is acceptable as a substitute. It is not the Engineer's responsibility to prove the product is not acceptable as a substitute.

a. Indicate on a point by point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.

b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the submittal.

c. The decision of the Engineer regarding the acceptability of the proposed substituted product is final.

3. Provide a typewritten certification that, in making the substitution request, the Contractor:

a. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product.

b. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the Manufacturer of the specified product.

c. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the project and will waive all claims for additional work which may be necessary to incorporate the substituted product into the project which may subsequently become apparent.

d. Will maintain the same time schedule as for the specified product.

C. Engineering cost for review of substitutions will be paid by the Contractor.

1. Cost for additional review time will be billed to the Owner by the Engineer for the actual hours required for the review and marking of shop drawings by Engineer and in accordance with the following rates:

Principal-in-Charge	**$150.00**
Project Manager	**$125.00**
Design Engineer	**$ 90.00**
Engineering Technician	**$ 75.00**
Clerk	**$ 50.00**

2. Cost for the additional review shall be paid to the Owner by the Contractor on a monthly basis.

1.09 GUARANTEES

A. Warranties and guarantees shall be submitted as required by the Contract Documents and submitted with the shop drawings or record data.

1.10 RESUBMISSION REQUIREMENTS

A. Make all corrections or changes in the submittals required by the Engineer and resubmit until approved.

B. Need for more than one resubmission or any other delay of obtaining Engineer's review of submittals, will not entitle the Contractor to an extension of Contract Time. All costs associated with such delays shall be at the Contractor's expense.

1.11 ENGINEER'S DUTIES

A. Review the submittals and return with reasonable promptness.

B. Affix stamp, indicate approval, rejection, and the need for re-submittal.

C. Distribute documents.

SUBMITTAL SCHEDULE

Spec. No.	Description	SD	SAM	CTR	CLS	EW	ESA	CAD	CSQ	RD	OM	EIR	PPB
01568	Erosion and Sediment Control during Construction									X			
01600	Products							X				X	
01650	Starting Systems										X	X	
01700	Contract Closeout									X			
01730	Operations and Maintenance Manual										X		
02221	Excavating, Backfilling and Compacting for Utilities									X			
02300	Structural Earthwork									X			
02515	Wetwell and Manhole Structures									X			
02555	Water Lines									X			
02556	Force Mains									X			
02570	Sanitary Sewer									X			
02572	Combination Air Valves	X								X	X		
02590	Polyurthane Protective Coating									X			
02831	Chain Link Fence and Gates									X			
03300	Cast in Place Concrete									X			
07900	Joint Sealers									X			
11005	Equipment: General Requirements	X								X			
11060	Pumping Equipment: General Requirements	X								X			

Spec. No.	Description	SD	SAM	CTR	CLS	EW	ESA	CAD	CSQ	RD	OM	EIR	PPB
11322	Submersible Lift Station									X	X	X	
13443	Lift Station Controls	X		X						X	X	X	
15076	Tagging									X			
15100	Valves and Appurtenances									X	X		
16010	General Requirements	X								X			
16073	Hangers and Supports for Electrical Systems	X								X			
16100	Basic Electrical Materials and Methods									X			
16120	Conductors and Cables									X			
16130	Raceways and Boxes									X			
16140	Wiring Devices	X								X			
16401	Overhead Electrical Service	X								X			
16450	Grounding	X								X			
19000	Trench Protection									X			

SD - Shop Drawing
SAM - Sample
CTR - Certified Test Report
CLS - Certification of Local Field Service
EW - Extended Warranty
ESA - Extended Service Agreement
PPB - Process Performance Bond
CAD - Certificate of Adequacy of Design
CSQ - Certification of Applicator/ Subcontractor Qualifications
RD - Record Data
OM - Operation and Maintenance Manuals
EIR - Equipment Installation Report

END OF SECTION

SECTION 01310 – PROGRESS SCHEDULES

1.00 PART 1 - GENERAL

1.01 REQUIREMENTS

A. Prepare and submit a progress schedule for the work and update the schedule on a monthly basis for the duration of the project.

B. Provide schedule in adequate detail to allow Owner to monitor the work progress, to anticipate the time and amount of progress payments, and to relate submittal processing to sequential activities of the work.

C. Incorporate and specifically designate the dates of anticipated submission of submittals and the dates when submittals must be returned to the Contractor into the schedule.

D. Assume complete responsibility for maintaining the progress of the work per the schedule submitted.

E. Take into consideration when preparing schedule all requirements of Section 01030, SPECIAL PROCEDURES.

1.02 SCHEDULE REVISIONS

A. Revise the schedule if it appears that the schedule no longer represents the actual progress of the work.

1. Submit a written report if the schedule indicates that the project is more than thirty (30) days behind schedule. The report is to include:
   a. Number of days behind schedule
   b. Narrative description of the steps to be taken to bring the project back on schedule
   c. Anticipated time required to bring the project back on schedule

2. Submit a revised schedule indicating the action that the Contractor proposes to take to bring the project back on schedule.

B. Revise the schedule to indicate any adjustments in contract time approved by change order.

1. Revised schedule is to be included with Contract Modification Request and in response to Proposed Contract Modifications by the Owner and Engineer for which an extension of time is requested.

2. Failure to submit a revised schedule indicates that the modification shall have no impact on the ability of the Contractor to complete the project on time and that the cost associated with the change of additional plant or work force have been included in the cost proposed for the modification.

C. Updating the project schedule to reflect actual progress is not considered a revision to the project schedule.

D. Payment estimates may not be recommended for payment without a revised schedule and if required, the report indicating the Contractor's plan for bringing the project back on schedule.

END OF SECTION

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1.00 PART 1 - GENERAL

1.01 SUMMARY

A. General:
1. Section Addresses:
   a. Mechanics and administration of the submittal process for shop drawings, product data, samples and operation and maintenance manuals.
2. Related Sections include but are not necessarily limited to:
   a. Division 1 - General Requirements.
   b. Division 11 – Equipment.
   c. Division 13 – Special Construction.
   d. Division 15 - Mechanical.
   e. Division 16 – Electrical.

1.02 DEFINITIONS

A. Shop Drawings:
1. See General Provisions.
2. Product data and samples are Shop Drawing information.

B. Miscellaneous Submittals:
1. Submittals other than Shop Drawings:
2. Representative types of miscellaneous submittal items include but are not limited to:
   a) Construction schedule.
   b) Concrete, soil compaction, and pressure test reports.
   c) Installed equipment and systems performance test reports.
   d) Manufacturer's installation certification letters.
   e) Instrumentation and control commissioning reports.
   f) Warranties.
   g) Service agreements.
   h) Survey data.
   i) Cost breakdown (Schedule of Values).

1.03 TRANSMITTALS

A. Shop Drawings, Operation and Maintenance Manuals, Manufacturers and Installers Quality Control and Quality Assurance documentation:
1. Transmit 4 copies of all submittals to:

   Halff Associates, Inc.
   5000 W. Military Hwy, Suite 100
   McAllen, Texas 78503
   Attn: Jose Leal, P.E.
   Phone: (956) 664-0286
   Fax: (956) 664-0282

2. Utilize a copy of attached Exhibit "A" to transmit all shop drawings, product data and samples.
3. Utilize a copy of attached Exhibit "B" to transmit all Operation and Maintenance Manuals.
4. All transmittals must be from Contractor and bear his approval stamp. Transmittals will not be received from or returned to subcontractors.
5. Shop drawing transmittal stamp shall read “(Contractor's Name) represents that we have determined and verified all field dimensions and measurements, field

construction criteria, materials, catalog numbers, and similar data, and that we have verified the requirements of the work and the Contract Documents."

6. Operation and Maintenance Manual transmittal stamp may be Contractor's standard approval stamp.
7. Provide submittal information defining specific equipment or materials utilized on the project. Generalized product information not clearly defining specific equipment or materials to be provided will be rejected.
8. Calculations required in individual specification sections are required as For-Information Only-For-Future-Use submittals. Calculations and other submittals identified as For-Information-Only-For Future-Use submittals shall be transmitted directly to the Engineer at the following address:

Halff Associates, Inc.
5000 W. Military Hwy, Suite 100
McAllen, Texas 78503
Attn: Mr. Jose Leal, P.E.
Phone: (956) 664-0286
Fax: (956) 664-0282

B. Submittal schedule:
1. Schedule of shop drawings:
a. Submitted and approved within 20 days of receipt of Notice to Proceed.
2. Operation and Maintenance Manuals and Equipment Record Sheets:
a. Initial submittal within 60 days after date shop drawings are approved.

C. Miscellaneous Submittals:
1. Transmit under Contractor's standard letter of transmittal or letterhead.
2. Submit 4 copies of all submittals to:

Halff Associates, Inc.
5000 W. Military Hwy, Suite 100
McAllen, Texas 78503
Attn: Jose Leal, P.E.
Phone: (956) 664-0286
Fax: (956) 664-0282

1.04 PREPARATION OF SUBMITTALS

A. Shop Drawings:
1. Number transmittals consecutively beginning with 1.
2. Number transmittals of resubmitted items with the original root number and a suffix letter starting with "A" on a new transmittal form.
3. Restrict each letter of transmittal to only one Specification Section or portion thereof.
4. Provide breakout of each transmittal contents on transmittal form. Each component thus defined will receive specific action by the Engineer. Define manufacturer, item, Contract Document tag number, and Contract Drawing/Specification reference.
5. Do not change the scope of any resubmittal from the original transmittal scope. If some components of the original or previous resubmittal transmittal received "A" or "B" Action and others did not, list the "A" or "B" Action components in subsequent resubmittal packages and indicate "A" or "B" Action code previously received on the transmittal form.
6. Action items are defined on page 01340-6, Section 1.05A.
7. With prior approval of the Engineer, components of an original submittal or prior resubmittal that have not received an "A" or "B" Action may be withheld from a

resubmittal. Such components shall be listed on the resubmittal transmittal form and indicated as "Outstanding - To Be Resubmitted At a Later Date."

8. For 8-1/2 x 11 IN size sheets, provide four copies of each page for Engineer plus the number required by the Contractor.
9. The number of copies required by the Contractor will be defined at the Preconstruction Conference, but shall not exceed 10.
10. For items not covered in paragraph 1.04-A.6 submit one reproducible transparency and one print of each drawing until approval is obtained. Utilize mailing tube; do not fold.
11. he Engineer will mark and return the reproducible to the Contractor for his reproduction and distribution.
12. Provide clear space (3 IN SQ) for Engineer stamping of each component defined in 1.04-A.4.
13. Contractor shall not use red color for marks on transmittals.
14. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible. Outline Contractor marks on reproducible transparencies with a rectangular box.
15. Transmittal contents:
    a. Coordinate and identify shop drawing contents so that all items can be easily verified by the Engineer.
    b. Identify equipment or material use, tag number, drawing detail reference, weight, and other project specific information.
    c. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
    d. Submit items like equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 IN pages. Indicate exact item or model and all options proposed.
    e. Include legible scale details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout drawings, parts catalogs, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data. Arrange data and performance information in format similar to that provided in Contract Documents. Provide, at minimum, the detail provided in the Contract Documents.
    f. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.

B. Samples:
1. Identification:
    a. Identify sample referencing transmittal number, manufacturer, item, use, type, project designation, tag number, specification section or drawing detail reference, color, range, texture, finish and other pertinent data.
    b. If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.
2. Include application specific brochures, and installation instructions.
3. Provide Contractor's stamp of approval on samples or transmittal form as indication of Contractor's checking and verification of dimensions and coordination with interrelated work.
4. Resubmit samples of rejected items.

C. Operation and Maintenance Manuals:
1. Number transmittals for Operation and Maintenance Manual with original root number of the approved shop drawing for the item.

2. Submit one copy until approval is received.
3. Identify resubmittals with the original number plus a suffix letter starting with "A."
4. Submit Operation and Maintenance Manuals printed on 8-1/2 x 11 IN size heavy first quality paper with standard three-hole punching and bound in stiff metal hinged binder constructed as a three-ring style. Provide binders with titles on front and on spine of binder. Tab each section of manuals for easy reference with plastic-coated dividers. Provide index for each manual. Provide plastic sheet lifters prior to first page and following last page.
5. Reduce drawings or diagrams bound in manuals to an 8-1/2 x 11 IN or 11 x 17 IN size. However, where reduction is not practical to ensure readability, fold larger drawings separately and place in vinyl envelopes which are bound into the binder. Identify vinyl envelopes with drawing numbers.
6. Transmittal Content:
   a. Submission of Operation and Maintenance Manuals is applicable but not necessarily limited to: 1) Major equipment. 2) Equipment used with electrical motor loads of 1/6 HP nameplate or greater. 3) Specialized equipment including valves and instrumentation and control system components for process systems.
   b. Prepare Operation and Maintenance manuals to include, but not necessarily limited to, the following detailed information, as applicable:
      a) Equipment function, normal operating characteristics, and limiting operations.
      b) Assembly, disassembly, installation, alignment, adjustment, and checking instructions.
      c) Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.
      d) Lubrication and maintenance instructions.
      e) Guide to "troubleshooting."
      f) Parts list and predicted life of parts subject to wear.
      g) Outline, cross-section, and assembly drawings; engineering data; and electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, word description of wiring diagrams and interconnection diagrams.
      h) Test data and performance curves.
      i) A list of recommended spare parts with a price list and a list of spare parts provided under these specifications.
      j) Copies of installation instructions, parts lists or other documents packed with equipment when delivered.
      k) Instrumentation or tag numbers relating the equipment back to the Contract Documents.
      l) Include a filled-out copy of the Equipment Record Sheet, Exhibits C1 and C2 as the first page(s) of each Operation and Maintenance Manual. Complete maintenance requirements in detail. Simple reference to the Manual is not acceptable.
      m) For equipment items involving components or subunits, an Equipment Record Sheet for each operating component or subunit is required.

D. Project Schedule:
   1. Contractor shall submit detailed project work schedule and have same approved by Engineer prior to commencing work activities.
   2. Schedule shall describe each work element with corresponding completion time.

E. Manufacturer's Certificates:
   1. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting references date, affidavits, and certifications as appropriate.
3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.05 ENGINEER'S REVIEW ACTION

A. Shop Drawings and Samples:
1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
   a. A - FURNISH AS SUBMITTED.
   b. B - FURNISH AS NOTED (BY ENGINEER).
   c. C - REVISE AND RESUBMIT.
   d. D - REJECTED.
   e. E - ENGINEER'S REVIEW NOT REQUIRED.
2. Transmittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp. Drawings not stamped by the Contractor or stamped with a stamp containing language other than that specified in Paragraph 1.03.A.4.a. will not be reviewed for technical content and will be returned without any action.
3. Transmittals returned with Action "A" or "B" are considered ready for fabrication and installation. If for any reason a transmittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
4. Transmittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
   a. The portion of the transmittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference). One copy or the one transparency of the "C" or "D" drawings will be marked up and returned to the Contractor. Correct and resubmit items so marked.
   b. Items marked "A" or "B" will be fully distributed.
   c. If a portion of the items or system proposed are acceptable, however, the major part of the individual drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action. This is at the sole discretion of the Engineer. In this case, some drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package." Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
5. Failure to include any specific information specified under the submittal paragraphs of the specifications will result in the transmittal being returned to the Contractor with "C" or “D” Action.
6. In addition to calculations stamped and returned "E -Engineer's Review Not Required," other transmittals such as submittals which the Engineer considers as "Not Required,” submittal information which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior transmittal, will be returned with Action "E. Engineer's Review Not Required."
7. Samples may be retained for comparison purposes. Remove samples when directed. Include in bid all costs of furnishing and removing samples.
8. Approved samples submitted or constructed, constitute criteria for judging completed work. Finished work or items not equal to samples will be rejected.

B. Operation and Maintenance Manuals:

1. Engineer will review and indicate one of the following review actions:
   a. ACCEPTABLE.
   b. FURNISH AS NOTED.
   c. REVISE AND RESUBMIT.
   d. REJECTED.
2. Acceptable submittals will be retained with the transmittal form returned with a request for {four} additional copies.
3. Deficient submittals will be returned along with the transmittal form which will be marked to indicate deficient areas.

END OF SECTION

SECTION 01400 – QUALITY CONTROL

1.00 PART 1 - GENERAL

1.01 CONTRACTOR'S RESPONSIBILITIES

A. Control the quality of work produced and verify that the work performed meets the standards of quality established in the Contract Documents.

1. Inspect the work performed by the Contractor, subcontractors and suppliers. Correct defective work.

2. Inspect products to be incorporated into the project. Provide only those products that comply with the Contract Documents.

3. Verify conformance of the work and products with the Contract Documents before notifying the Owner of need for testing.

4. Provide consumable construction materials of adequate quality to provide a finished product that complies with the Contract Documents.

5. Provide and pay for the services of an approved professional materials testing laboratory to insure that products proposed for use fully comply with the Contract Documents.

6. Perform tests as indicated in this and other sections of the specifications. Schedule the time and sequence of testing with the Owner and Engineer. Testing is to be observed by the Owner, Engineer, or designated representative.

7. Provide labor, materials, tools, equipment, and related items for testing by the Owner and/or the City of Donna including, but not limited to temporary construction required for testing and operation of new and existing utilities.

B. Provide Certified Test Reports on products or constructed works to be incorporated into the project as required by Section 01300, SUBMITTALS. Reports are to indicate that products or constructed works are in compliance with the Contract Documents.

C. Assist the Engineer, the City of Donna, Owner, and Owner's testing organization to perform quality assurance activities.

1. Provide access to the work and to the Manufacturer's operations at all times work is in progress.

2. Cooperate fully in the performance of sampling, inspection, and testing.

3. Furnish labor and facilities to:
   a. Provide access to the work to be tested.
   b. Obtain and handle samples for testing at the project site or at the source of the product to be tested.
   c. Facilitate inspections and tests.
   d. Store and cure test samples.

4. Furnish copies of the tests performed on products.

5. Provide adequate quantities of representative product to be tested to the laboratory at the designated location.

6. Give the Owner adequate notice before proceeding with work that would interfere with testing.

7. Notify the Owner and the testing laboratory prior to the time that testing is required. Lead-time is to be adequate to allow arrangements to be made for testing.

8. Do not proceed with any work until testing services have been performed and results of tests indicate that the work is acceptable.

9. Provide complete access to the site and make Contract Documents available.

10. Provide personnel and equipment needed to perform sampling or to assist in making the field tests.

11. Testing performed by the Owner will be paid for by the Owner.

1.02 QUALITY ASSURANCE ACTIVITIES BY THE OWNER

A. Quality assurance activities of the Owner and Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the purpose of monitoring the results of the Contractor's work to see that it is in compliance with the requirements of the Contract Documents.

1. Quality assurance activities of the Owner and Engineer in no way relieves the Contractor of the obligation to perform work and furnish products and constructed work conforming to the Contract Documents.

2. Failure on the part of the Owner or Engineer to perform or test products or constructed works in no way relieves the Contractor of the obligation to perform work and furnish materials conforming to the Contract Documents.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, SUBMITTALS, and shall include:

1. The name of the proposed testing laboratory along with documentation of qualifications, a list of tests that can be performed, and a list of recent projects for which testing has been performed with references from those projects.

2. Test reports per Paragraph 1.07, TEST REPORTS of this specification.

1.04 STANDARDS

A. Provide a testing laboratory that complies with the ACIL (American Council of Independent Laboratories) "Recommended Requirements for Independent Laboratory Qualifications".

B. Perform testing per recognized test procedures as listed in the various sections of the specifications, standards of the State Department of Highways and Public Transportation, American Society of Testing Materials (ASTM), or other testing associations. Perform tests in accordance with published procedures for testing issued by these organizations.

1.05 DELIVERY AND STORAGE

A. Handle and protect test specimens of products and construction materials at the construction site in accordance with recognized test procedures.

1.06 VERIFICATION TESTING

A. Provide verification testing when tests performed by the Owner indicate that materials or the results of construction activities are not in conformance with Contract Documents.

B. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made.

C. Tests must comply with recognized methods or with methods recommended by the Owner's testing laboratory and approved by the Engineer.

1.07 TEST REPORTS

A. Test reports are to be prepared for all tests.

1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:
   a. Name of the Owner, project title and number, equipment installer and general contractor.
   b. Name of the laboratory, address, and telephone number.
   c. Name and signature of the laboratory personnel performing the test.
   d. Description of the product being sampled or tested.
   e. Date and time of sampling, inspection, and testing.
   f. Date the report was issued.
   g. Description of the test performed.
   h. Weather conditions and temperature at time of test or sampling.
   i. Location at the site or structure where the test was taken.
   j. Standard or test procedure used in making the test.
   k. A description of the results of the test.
   l. Statement of compliance or non-compliance with the Contract Documents.
   m. Interpretations of test results, if appropriate.

2. Submit reports on tests performed by Contractor or his suppliers or vendors.

B. Distribute copies of the test reports to:

	No. Of Copies
Owner	2
Resident Project Representative	2
Engineer	2
Contractor	2

1.08 NON-CONFORMING WORK

A. Immediately correct any work that is not in compliance with the Contract Documents or submit a written explanation of why the work is not to be corrected immediately and when the corrective work will be performed.

B. Payment for non-conforming work shall be withheld until work is brought into compliance with the Contract Documents.

1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

A. The testing laboratory representatives are limited to providing consultation on the test performed and in an advisory capacity.

B. The testing laboratory is not authorized to:

1. Alter the requirements of the contract documents.

2. Accept or reject any portion of the work.

3. Perform any of the duties of the Contractor.

4. Stop the work.

2.00 PART 2 - PRODUCTS

2.01 TESTING APPARATUS

A. Furnish testing apparatus and related accessories necessary to perform the tests.

3.00 PART 3 - EXECUTION

3.01 PROTECTIVE COATINGS [NOT USED]

3.02 LEAKAGE TESTS FOR STRUCTURES

A. Test structures that will contain water on a full time or intermittent basis for leaks. Perform tests prior to installing equipment or materials within the basins. In the event that the basins fail to pass the test, drain the basin, repair the leaks, re-fill, and re-test the basin. Repeat tests until the basin passes the test. The Owner may repeat the test at any time during the one (1) year guarantee period.

B. Test the basin for leakage using the following procedure:

1. Determine the evaporation allowance for loss of water.
   a. Use a standard circular pan procedure established by the U.S. Weather Bureau to measure evaporation rate.
   b. Calculate evaporation allowance by multiplying the evaporation rate in gallons per 24 hours per square foot of surface are by the open surface area of the water in the basin.

2. Calculate the allowable leakage for the basin. Allowable leakage is calculated as 0.03 gallons per square foot of concrete area in contact with the water per 24 hours.

3. Fill the basin to the overflow level with water at a rate not to exceed 2' per hour.

4. Allow the basins to set for three (3) days.

5. Observe the perimeter of the basins and identify all leaks.

6. Repair basin walls and floors where leaks have been identified.

7. Mark the water level at the basin wall. Measure the fall in water level over a 24-hour period to the nearest 1/8" at least twice a day to determine the quantity of water lost. Provide a stilling well for measurement if required to allow accurate measurement.

8. Calculate the amount of water lost during this time period.

9. Compare the amount of water lost to the allowable loss.

C. Drain the basin, determine the sources of leakage and repair if the amount of water lost exceeds the allowable leakage plus the evaporation allowance.

3.03 PIPING SYSTEMS

A. TEST REQUIREMENTS

1. Perform test on piping systems including piping installed between or connected to existing pipe.

2. Conduct tests on buried pipe to be hydrostatically tested after the trench is completely backfilled. If field conditions permit and if approved by the Engineer, partially backfill the trench and leave the joints open for inspection and conducting of the initial service leak test. Do not conduct the acceptance test until backfilling is complete.
3. Pneumatically test the buried piping and expose joints of the buried piping for the acceptance test.

4. Conduct the test on exposed piping after the piping is completely installed, including supports, hangers, and anchors, but prior to insulation.

5. Do not perform testing on pipe with concrete thrust blocking until the concrete has cured at least five (5) days.

6. Determine and remedy the cause of the excessive leakage for any pipe failing to meet the specified requirements for water or air tightness.

7. Tests must be successfully completed and reports filed before piping is accepted.

8. Submit the plan for testing to the Engineer for review at least 10 days before starting the test.

9. Remove and dispose of temporary blocking material and equipment after completion and acceptance of the piping test.

10. Repair any damage to the pipe coating.

11. Clean pipelines so they are totally free flowing prior to final acceptance.

12. Test piping independently from tests on structures.

13. Test method and test pressure depend upon the application of the piping.
    a. Pressure pipe is defined as piping that is part of a pumped or pressurized system. Perform test for pressure pipe per the procedures indicated in Paragraph B of this section.
    b. Gravity pipe is defined as piping that depends upon the force of gravity for flow through the pipe, with the exception of process piping described in paragraph d. Perform test for gravity pipe per the procedures indicated in Paragraph C, D, or E of this section.
    c. Chemical processing lines are to be tested as pressure pipe regardless of the operating conditions. The test pressure is to be 1.5 times the pressure rating of the pipe.
    d. Process piping between hydraulic structures is to be considered as pressure pipe. Perform the test for this pipe per Paragraph B of this section. The test pressure is to be the maximum hydrostatic head plus 10'. The maximum hydrostatic head is the difference in elevation of the pipe at it lowest point and the maximum top of the wall elevation of the hydraulic structure on the piping system.

B. PRESSURE AND LEAKAGE TESTS OF PRESSURE PIPING

1. See Specification -02556 – Water Transmission Lines and/or Pressure Sewer Lines.

C. HYDROSTATIC LEAK TEST

1. Perform hydrostatic leak tests after backfilling.

2. The length of the pipe to be tested shall be such that the head over the crown of the upstream end is not less than 2' or 2' above the ground water level whichever is higher and the head over the downstream crown is not more than 6'.

3. Plug the pipe by pneumatic bags or mechanical plugs so that the air can be released from the pipe while it is being filled with water.

4. Continue the test for one (1) hour and make provisions for measuring the amount of water required to maintain the water at a constant level during this period.

5. Remove the jointing material, and remake the joint if any joint shows any visible leakage or infiltration.
6. Remove and replace any defective or broken pipes.

7. Determine the maximum allowable leakage or infiltration by the following formula.

$$L = \frac{C\,DS}{126{,}720}$$

Where L = the allowable leakage in gallons per hour; S is the length of pipe tested in feet; D is the nominal diameter of the pipe in inches; C is infiltration/exfiltration rate. Use 50 for C outside of 25 year floodplain, and 10 for C within 25 year floodplain.

8. Determine the rates of infiltration by means of V-Notch weirs, pipe spigot, or plugs in the end of the pipe. Methods, times, and locations are subject to the Engineer's approval.

9. Pipe with visible leaks or infiltration or exceeds the maximum allowable leakage or infiltration is considered defective and must be corrected.

D. LOW PRESSURE AIR TEST

1. Use air test in lieu of the hydrostatic test if desired, or if pipeline grades do not allow filling the entire pipeline segment or manhole to the indicated depth.

2. Perform low-pressure air tests, using equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. Test is to conform to procedure described in ASTM C-828, ASTM C-924 except for testing times. The following test times are required:

Pipe Diameter (inches)	Minimum Time (seconds)	Length for Minimum Time (feet)	Time for Long Length (seconds)
6	340	398	0.855 (L)
8	454	298	1.520 (L)
10	567	239	2.374 (L)
12	680	199	3.419 (L)
15	850	159	5.342 (L)
18	1020	133	7.693 (L)
21	1190	114	10.471 (L)
24	1360	100	13.676 (L)
27	1530	88	17.309 (L)
30	1700	80	21.369 (L)
33	1870	72	25.856 (L)

a. Provide the equipment with an air regulator valve or air safety valve set to an internal air pressure in the pipeline that cannot exceed 6 psig.
b. Pass air through a single control panel.
c. Provide pneumatic plugs that have a sealing length equal to or greater than the circumference of the pipe to be tested.
d. Provide pneumatic plugs that resist internal test pressures without requiring external bracing or blocking.
e. Provide an air compressor of adequate capacity for charging the system.

3. Perform air test only on lines less than 36" diameter. Air tests for pipes larger than 36" may be air tested at each joint.

4. Check connections for leakage with a soap solution. If leaks are found, release the air pressure, repair the leak, and retest with soap solution until results are satisfactory, before resuming air test.

5. Determine the maximum allowable time for the pressure to drop from 3.5 pounds per square inch to 2.5 pounds per square inch.

   $T = 0.0850\ DK/Q$

   T is the time for the pressure to drop 1.0 pound per square inch gauge in seconds; K is 0.000419DL, but not less than 1.0; D is the average inside diameter in inches; L is the length of line of the same pipe size in feet; Q rate of loss, shall be 0.0015 cubic feet per minute per square foot of internal surface.

E. AIR TEST FOR INDIVIDUAL JOINTS

1. Lines 36" and larger may be tested at individual joints.

2. The maximum allowable time for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge is 10 seconds for all pipe sizes.

F. DEFLECTION TESTING FOR PIPE

1. Perform deflection tests on flexible and semi-rigid pipe in accordance with ASTM 3034.

a. The maximum allowable deflection of pipe measured as the reduction in vertical inside diameter is 5.0% unless specified otherwise.
b. Conduct test after the final backfill has been in place a minimum of 30 days.
c. Thoroughly clear the lines before testing.

2. Perform test by pulling a properly sized mandrill through the line.

3. Excavate and repair pipe with deflections in excess of the maximum allowable deflection.

G. MANHOLE TESTING

Test manholes for leakage separately and independently of the wastewater lines by hydrostatic exfiltration testing, vacuum testing or other approved methods acceptable to TCEQ. Make manhole watertight and re-test if the manhole fails the leakage test. The maximum leakage for hydrostatic testing is 0.025 gallons per foot diameter per foot of manhole depth per hour. Prepare for hydrostatic exfiltration testing by sealing all wastewater lines coming into the manhole with an internal pipe plug, then fill the manhole with water and maintain full for at least one hour. With concrete manholes a period of 24 hours prior to testing may be used in order to allow saturation of the concrete.

H. TESTS FOR PLUMBING DRAINAGE AND VENT SYSTEMS

1. Plug openings as necessary.

2. Test drainage and venting systems by filling piping with water to the level of the highest vent stack for 30 minutes.

3. Make the examination for leakage at joints and connections.

4. There shall be no drop in water level.

3.04 ELECTRICAL TESTING

A. As required by local and state codes.

END OF SECTION

SECTION 01420 – GEOTECHNICAL ENGINEERING STUDY

1.00 PART 1 - GENERAL

1.01 Raba Kistner Consultants, Inc. performed a Geotechnical Engineering Study for this project on December 19, 2014. This report, Raba Kistner Project No. AMA 14-047-00, will be included for Contractor's use as an amendment when report is finalized.

END OF SECTION

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RABA KISTNER CONSULTANTS

Raba Kistner Consultants, Inc.
800 E. Hackberry
McAllen, TX 78501
www.rkci.com

P 956 :: 682 :: 5332
F 956 :: 682 :: 5487
TBPE Firm F-3257

INTERIM DESIGN INFORMATION

TO: Mr. Pilar Rodriguez, P.E., Executive Director
Hidalgo County Regional Mobility Authority (HCRMA)
c/o Dannenbaum Engineering Corporation
Attn: Mr. Louis H. Jones, JR., P.E., HCRMA Program Manager
1109 Nolana Loop, Suite 208
McAllen, Texas 78504

FROM: Katrin M. Leonard, P.E.
Associate

STATE OF TEXAS
KATRIN M. LEONARD
95810
LICENSED
PROFESSIONAL ENGINEER
Oct. 31, 2014

DATE: October 31, 2014

RE: Geotechnical Engineering Study
Proposed Fiberglass Lift Station
Professional Services Agreement for Engineering/Design Services
International Bridge Trade Corridor (IBTC) Geotechnical/Segment 0010
Borings for Bridge, Pavements and Embankments, and
Overweight Pavement Design for IBTC Asphalt/Concrete, and
Overweight Concrete Design for SH365
Hidalgo County, Texas
RKCI Project No. AMA14-047-00

COPIES TO: Mr. Robert Saenz, P.E., Vice President with Halff Associates, Inc.

FIBERGLASS LIFT STATION (BORING C-3)

Design Parameters	Recommended Values	Comments
Estimated Potential Vertical Rise (PVR) value for existing conditions:	2-1/4 inches	• The PVR value was estimated using a surcharge load of 1 pound per square inch (psi) for the concrete slab and dry moisture conditions within the regional zone of seasonal moisture variation. • Estimated differential movements should be assumed to be about one-half of the estimated PVR.

O:\Active Projects\McAllen\2014\AMA14 - McAllen\AMA14-047-00 IBTC - Hidalgo RMA\Reporting\Lift Station Boring C-3\AMA14-047-00 Prelim for Lift Station.doc

INTERIM DESIGN INFORMATION - FIBERGLASS LIFT STATION (BORING C-3) (cont.)

Design Parameters	Recommended Values	Comments
Mat Foundation: Allowable Soil-Bearing Pressure: Minimum Depth from the Ground Surface Elevation Existing at the Time of our Study: Minimum Width:	4,000 psf (FS = 3) 31 ft 12 in.	• On the basis of the information received on the proposed lift station structure via electronic-mail transmittal from Mr. Jose Leal, P.E., with Halff Associates, Inc., the project civil engineering firm, on Tuesday, October 28, 2014, we understand that the proposed fiberglass lift station structure will be founded at a depth of about 31 ft below the ground surface elevation existing at the time of our study. • The recommended allowable soil-bearing pressure is based on the stratigraphic conditions encountered in Boring C-3, our field and laboratory testing, and our engineering analyses. • FS = Factor of Safety
Estimated Total Settlements:	1 inch	• Based on the above-recommended allowable soil-bearing pressures.

Note: Groundwater was encountered during our drilling operations in Boring C-3 conducted within the proposed lift station structure footprint area at a depth of about 14 ft below the ground surface elevation existing at the time of our study. It is possible for groundwater to exist beneath this site at a shallower depth on a transient basis following periods of precipitation. Fluctuations in groundwater levels occur due to variations in rainfall and surface water run-off. The construction process itself may also cause variations in the groundwater level.

THIS INTERIM DESIGN DATA IS BEING PROVIDED FOR USE IN PRELIMINARY PLANNING AND IS SUBJECT TO REVISION. IT IS NOT INTENDED FOR USE IN FINAL DESIGN. FINAL DESIGN RECOMMENDATIONS WILL BE PROVIDED IN THE REPORT OF OUR GEOTECHNICAL ENGINEERING STUDY.

DRILLING LOG

WinCore	County	Hidalgo	Hole	C-3	District	Pharr
Version 3.0	Highway	IBTC	Structure	Lift Station	Date	10/10/14
	CSJ	NP	Station	NP	Grnd. Elev.	100.00 ft
			Offset	NP	GW Elev.	86.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, fat, very stiff to soft, dry to moist, dark brown to brown to light brown, with shell fragments, gypsum crystals, and roots extending down to a depth of about 2 ft (CH)			22				
						22	55	35		
5		22 (6) 31 (6)				19				-200% = 92%
						17	62	39		
10		15 (6) 25 (6)				21	61	38		
15		3 (6) 10 (6)				19				- converted to mud rotary drilling method at a depth of about 15 ft
81.0			SAND, silty, compact to dense, wet, brown (SM)							
20		20 (6) 28 (6)				25				-200% = 18%
25		28 (6) 40 (6)				23				
30		32 (6) 44 (6)				21				-200% = 14%
35		50 (6) 34 (6)				21				
61.0										
40		45 (6) 30 (6)				18				

Remarks:
The ground surface elevation was assumed to be 100.0 ft.
Approx. GPS Coordinates: 26.169753° N 98.079529° W

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Southwest Drilling **Logger: A. Rodriguez** **Organization: Raba Kistner, Inc.**

DRILLING LOG

WinCore	County	Hidalgo	Hole	C-3	District	Pharr
Version 3.0	Highway	IBTC	Structure	Lift Station	Date	10/10/14
	CSJ	NP	Station	NP	Grnd. Elev.	100.00 ft
			Offset	NP	GW Elev.	86.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, fat, very stiff, wet, brown, with gray clay lenses (CH)							
57.0			SAND, silty, dense, wet, brown (SM)							
55.0		50 (6) 50 (6)				23				
45										
50										
55										
60										
65										
70										
75										
80										

Remarks:
The ground surface elevation was assumed to be 100.0 ft.
Approx. GPS Coordinates: 26.169753° N 98.079529° W

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Southwest Drilling **Logger: A. Rodriguez** **Organization: Raba Kistner, Inc.**

SECTION 01510 – TEMPORARY FACILITIES

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish temporary facilities, including field offices, storage sheds, and temporary utilities needed to complete the work.

B. Furnish, install, and maintain temporary project identification signs. Provide temporary on-site informational signs to identify key elements of the construction facilities. Do not allow other signs to be displayed.

2.00 PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Provide new or used, wood or metal, in sound condition for structure and framing. Materials are to be structurally adequate and suitable for the indicated finish.

B. Provide 3/4" exterior grade A/D face veneer plywood with medium density overlay for sign surface.

C. Bolts, brackets, fasteners, and other hardware are to be galvanized or stainless steel.

2.03 TEMPORARY STORAGE BUILDINGS

A. Furnish storage buildings of adequate size to store any materials or equipment delivered to the site that might be affected by weather.

2.04 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities at the job site from the commencement of the project to its conclusion. Maintain these facilities in a clean and sanitary condition at all times, and comply with the requirements of the local health authority.

B. Contractor's workmen shall use these sanitary facilities at all times. Rest rooms within existing or Owner-occupied buildings shall not be used.

2.06 TEMPORARY UTILITIES

A. Provide the temporary utilities needed by the trades during construction, including electrical power, water, and telephone.

1. Provide a source of temporary electrical power of adequate size for the construction procedures.
   a. Electrical pole and service shall comply with OSHA and other safety requirements and the requirements of the power company.
   b. Make the electrical power available to the trades as needed.
   c. Provide extensions to the various parts of the building as needed.
   d. Provide junction boxes in such an arrangement that distribution boxes are available within 75' of any part of the structure.

2. Provide temporary water. Extend water to the construction site and maintain source until such time that the permanent water supply can be extended to the site.

3. Provide telephone service to the site and install telephones inside the Contractor's and the Engineers office.

B. Make arrangements with the local utility company, comply with utility company's requirements and pay for the utility costs during construction.

C. Make utilities available to the trades during construction.

3.00 PART 3 - EXECUTION

3.01 LOCATION OF TEMPORARY FACILITIES

A. Locate all temporary facilities in an area that will not interfere with any work to be performed under this contract.

B. Construct and install signs at locations as required by applicable regulatory agencies or as selected by the Owner. Install informational signs at the height of optimum visibility, on ground-mounted poles, or attach to temporary structural surfaces.

C. Contractor to maintain all-weather access roads to all operational liftstations. Access road will be a minimum of ten (10) feet wide.

3.07 REMOVAL OF TEMPORARY FACILITIES

A. Remove temporary buildings, shed, and utilities at the conclusion of the project and restore the site to original condition or finished in accordance with the drawings.

B. Remove informational signs upon completion of construction.

C. Remove project identification signs, framing, supports, and foundations upon completion of the project.

END OF SECTION

SECTION 01563 – GROUNDWATER HANDLING

1.00 PART 1-GENERAL

1.01 SECTION INCLUDES

A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations, and foundation beds in a stable condition, and controlling ground water conditions for tunnel excavations.

B. Protecting work against surface runoff and rising flood waters.

C. Disposing of removed water.

1.02 REFERENCES

A. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

B. Federal Register 40 CFR (Vol. 53. No. 222) Part 122, EPA Administrator permit Programs (NPDES), Para 122.26 (b)(14) Storm Water Discharge.

1.03 DEFINITIONS

A. Ground water control includes both dewatering and depressurization of water-bearing soil layers using well points, for either vacuum or eductor systems, or deep wells. Use of sump pumps does not constitute ground water control.

1. Dewatering is lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations or into tunnels and shafts, and disposing of removed water.

2. Depressurization is reduction of piezometric pressure within a soil strata not controlled by dewatering alone.

B. Control of excavation drainage by sump pumping includes operating the sump pump and drainage facilities installed to collect water in the sump.

C. Control of surface drainage is diversion of surface water away from excavations.

1.04 PERFORMANCE REQUIREMENTS

A. Conduct subsurface investigations as needed to identify ground water conditions and to provide parameters for installation and operation of ground water control systems. Perform pump tests, if necessary, to determine drawdown characteristics of water bearing layers.

B. Develop a ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926, to produce the following results:

1. Reduce hydrostatic pressure affecting excavations to the following levels as determined by piezometer observations.

a. For structural excavations, reduce the piezometric level to at least 3 feet below the excavation bottom elevation or within 2 feet above the top of clay layers.

b. Where hydrostatic pressure in a confined water-bearing layer exist below the excavation, depressurize this zone to eliminate risk of uplift or other instability of the excavation or installed works.

2. Develop stable subgrade for subsequent construction operations.

3. Reduce hydrostatic pressure for tunnel excavations as necessary to maintain face stability, grade control, and to control seepage into tunnel.

C. Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials such as crushed stone and filter fabric, together with sump pumping.

D. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.

E. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells, if they affect potentially contaminated areas.

1.05 SUBMITTALS

1.06 ENVIRONMENTAL REQUIREMENTS

A. Comply with Texas Commission on Environmental Quality (TCEQ) regulations and Texas Water Well Driller Association for development, drilling, and abandonment of wells used in dewatering system.

B. Where potentially contaminated areas are indicated on the Drawings, monitor ground water discharge for contamination in accordance with the Project Engineer's instructions.

2.00 PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. Equipment and materials are at the option of Contractor as necessary to achieve desired results for ground water control. Ground water control systems may include single-stage or multiple-stage well point systems, educator and ejector-type systems, deep wells, or combinations of these equipment types. Excavation drainage and surface drainage may also include sump pumping subsidiary to bid item.

B. Maintain equipment in good repair and operating order.

C. Arrange for standby equipment and materials where required.

3.00 PART 3 - EXECUTION

3.01 GROUND WATER CONTROL

A. Install, operate and maintain the ground water control system in a manner compatible with construction methods and site conditions. Notify Project Engineer in writing of any changes made to accommodate field conditions and changes to the Work.

B. For above ground piping in ground water control system, include a length of clear transparent piping between every well point and discharge header so that discharge from each installation can be visually monitored.

C. Replace installations that produce noticeable amounts of sediments after development.

D. Provide additional ground water control installations, or change the methods, if the installations do not

achieve satisfactory results.

E. Do not allow piezometric pressure levels to rise until foundation concrete has achieved design strength.

F. During backfilling, dewatering may be reduced to maintain water level a minimum of 5 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place.

G. Remove ground water control installations.

1. Remove pumping system components and piping when ground water control is no longer required.

2. Remove monitoring wells when directed by the Project Engineer.

3. Grout abandoned well. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.

3.02 MAINTENANCE AND OBSERVATION

A. Conduct daily maintenance and observation of the ground water control systems.

B. Replace inoperable or damaged system components as necessary to maintain operation.

C. Keep monitoring system piping accessible for observation,

3.03 MONITORING AND RECORDING

A. Observe and record elevation of water level daily as long as ground water control system is in operation. Observe levels weekly thereafter until the Work is completed or piezometers or wells are removed. Initiate more frequent observation when the Project Engineer determines that more frequent monitoring and recording are required.

3.04 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations. This includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.

B. Drive surface water and seepage water into sumps and pump it into drainage channels, setting basins, or storm drains.

4.00 PART 4 – PAYMENT

4.01 Payment of the labor, equipment and personnel needed for the activities specified under this section are subsidiary to the other items of the bid.

END OF SECTION

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SECTION 01568 – EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to provide erosion and sediment control for the duration of the construction period including furnishing, installing and maintaining erosion and sediment control structures and procedures and the proper removal when no longer required.

B. The intent of this specification is to provide guidelines for the Contractor to adhere to all State, Federal, and Local environmental regulations. It is also the intent to provide preventive measures to keep sediment from entering any storm water system, including open channels. It is the Contractor's responsibility to adhere to all State, Federal and Local requirements. While the Owner may require the Contractor to install erosion control devices during construction, this will in no way relieve the Contractor of his responsibility.

1.02 QUALITY ASSURANCE

A. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Plans are not represented as being comprehensive, but rather to convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property.

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire length of construction. On-site areas which are subject to severe erosion and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation are to be identified and receive additional erosion control measures as directed by the Owner or the Engineer.

C. All land-disturbing activities shall be planned and conducted to minimize the size of the area to be exposed at any one time and to minimize the time of exposure.

D. Surface water runoff originating upgrade of exposed area shall be controlled to reduce erosion and sediment loss during the period of exposure.

E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving ditch or stream, the Contractor shall install measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream as directed by the Owner or the Engineer.

F. All land-disturbing activities shall be planned and conducted so as to minimize off-site sedimentation damage.

G. The Contractor shall be responsible for periodically cleaning out and disposing of all sediment once the storage capacity of the drainage feature or structure receiving the sediment is reduced by one-half. The Contractor shall also be responsible for cleaning out and disposing of all sediment at the time of completion of the Work.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, SUBMITTALS, and shall include:

1. Manufacturer’s Literature: Descriptive data of installation methods and procedures.

2. Certificates: Manufacturer’s certification that materials meet specification requirements.

1.04 STANDARDS [Not Used]

1.05 DELIVERY AND STORAGE [Not Used]

1.06 JOB CONDITIONS; CODES AND ORDINANCES

A. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional erosion and sediment control measures during construction, Contractor shall provide such measures.

1.07 OPTIONS [Not Used]

1.08 GUARANTEES [Not Used]

2.00 PART 2 - PRODUCTS

2.01 MATERIALS

A. STRAW BALES: Straw bales shall weigh a minimum of fifty (50) pounds and shall be at least 30" in length. Bales shall be composed entirely of vegetable matter and be free of seeds. Binding shall be either wire or nylon string, jute or cotton binding is unacceptable. Bales shall be used for not more than three months before being replaced. However, if weather conditions cause biological degradation of the straw bales, they shall be replaced sooner than the three month time period to prevent a loss of structural integrity of the dike.

B. SILT FENCE: Silt fence fabric shall be a nylon reinforced polypropylene fabric which has a built-in cord running the entire length of the top edge of the fabric. The fabric must meet the following minimum criteria:

Tensile Strength, ASTM D4632	90 lbs.,
Puncture Rating, ASTM D4833	60 lbs.,
Mullen Burst Rating, ASTM D3786	200 psi,
Apparent Opening Size, U.S. Sieve No.	40

Silt fence shall be "Enviro Fence" preassembled silt fence, AMXCO Silt Stop prefabricated silt fence, AMOCO Style 2155 preassembled silt fence or approved equal.

C. SILT FENCE POSTS: A minimum 2" x 2" (nominal) x 54" pressure treated wood posts of Number 2 Grade southern yellow pine or approved equal.

D. SAND BAG: Sand bag material shall be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight four (4) ounces per square yard, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70%. Length shall be 24 to 30 inches, width shall be 16 to 18 inches and thickness shall be six (6) to eight (8) inches and having an approximate weight of 40 pounds. Sand bags shall be filled with coarse grade sand, free from deleterious material. All sand shall pass through a No. 10 sieve.

E. P.V.C. PIPE: Pipe shall be SDR-35 polyvinyl chloride having a minimum nominal internal diameter of 4". Pipes shall be sized for anticipated flows.

F. SOIL RETENTION BLANKET: Soil retention blankets shall consist of a geocomposite of excelsior or fiber blanket with an extruded plastic net attached to the tope side. The plastic net shall be photodegradable and the excelsior or fiber blanket shall be made smolder resistant

without the use of chemicals. Soil retention blankets shall be high velocity type to resist severe runoff. The soil retention blanket shall be one (1) of the following classes and types:

1. Class 1. "Slope Protection"

    a. Type A. Slopes of 3:1 or flatter - Clay soils

    b. Type B. Slopes of 3:1 or flatter - Sandy soils

    c. Type C. Slopes steeper than 3:1 - Clay soils

    d. Type D. Slopes steeper than 3:1 - Sandy soils

2. Class 2. "Flexible Channel Liner"

    a. Type E. Short-term duration (Up to 2 Years)
    Shear Stress (t_D)< 1.0 lb./sq. ft.

    b. Type F. Short-term duration (Up to 2 Years)
    Shear Stress (t_d) 1.0 to 2.0 lb./sq. ft.

    c. Type G. Long-term duration (Longer than 2 Years)
    Shear Stress (t_d) > 2.0 to < 5.0 lb./sq. ft.

    d. Type H. Long-term duration (Longer than 2 Years)
    Shear Stress (t_d) greater than 0 Equal to 5.0 lb./sq. ft.

G. The Contractor has the option of selecting an approved soil retention blanket provided that selection conforms to the following list of approved soil retention blankets for slope protection applications:

1. CLASS I. SLOPE PROTECTION

    TYPE A: Slopes of 3:1 or Flatter-Clay Soils

    Airtrol® ANTI-WASH®/GEOJUTE® (Regular)
    Contech Standards®
    Contech Standards Plus®
    Green Triangle Regular®
    Green Triangle Superior®
    GREENSTREAK® PEC MAT
    Curlex®
    North American Green® S150
    North American Green® S75
    North American Green® SC150
    POLYJUTEÔ 407/GT
    SOIL SAVER®
    TerraJute®
    Verdyol® ERO-MAT®
    Xcel Regular®
    Xcel Superior®

    TYPE B: Slopes of 3:1 or Flatter-Sandy Soils

    Contech Standards®
    Contech Standards Plus®
    GEOCOIR®/DEKOWE® 700

Green Triangle Superior®
Green Triangle Regular®
North American Green® S75
North American Green® SC150
North American Green® S150
POLYJUTEÔ 407/GT
TerraJute®
Verdyol® ERO-MAT®
Xcel Superior®
Xcel Regular®

TYPE C: Slopes Steeper than 3:1-Clay Soils

Airtrol®
ANTI-WASH®/GEOJUTE® (Regular)
Contech Standards Plus®
Curlex®
Green Triangle Superior®
GREENSTREAK® PEC-MAT
North American Green® SC150
North American Green® S150
POLYJUTEÔ 407/GT
SOIL SAVER®
TerraJute®
Xcel Superior®

TYPE D: Slopes Steeper than 3:1-Sandy Soils

Contech Standards Plus®
GEOCOIR®/DEKOWE® 700
Green Triangle Superior®
North American Green® S150
North American Green® SC150
POLYJUTEÔ 407GT
TerraJute®
Xcel Superior®

2.02 MIXES [Not Used]

2.03 FABRICATIONS [Not Used]

2.04 MANUFACTURED PRODUCTS [Not Used]

3.00 PART 3 - EXECUTION

3.01 PREPARATION [Not Used]

3.02 INSTALLATION

A. COMPOST LOG
1. Compost log shall be placed along a trench as required to prevent erosion runoff. Use compost log as required for linear construction.
2. Compost log shall be tubular mesh and 10” diameter minimum.
3. Compost logs shall be secured using 30” x 2” x 2” wood post and spaced as required to keep compost log in place.

B. TEMPORARY STRAW BALE DIKE

1. Straw bales shall be embedded a minimum of 4" and securely anchored using 2" x 2" wood stakes driven through the bales into the ground a minimum of 6". Straw bales are to be placed directly adjacent to one another leaving no gap between them.

2. Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches, the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale. Additional bales shall be placed behind the first row where the bales abut each other. The additional bale is used to prevent unfiltered runoff from escaping between the bales.

3. The excavated soil shall be backfilled against the barrier. Backfill shall conform to ground level on the downhill side and shall be built up to 4" above ground level on the uphill side. Loose straw shall be scattered over the area immediately uphill from a straw barrier.

C. SILT FENCE

1. The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas to a limited extent. The Contractor shall excavate a 6" by 6" trench for site fence bedding along the lower perimeters of the site where necessary to prevent sediment from entering any drainage system.

2. The Contractor shall install the silt fence in accordance with the manufacturer's recommendations and instructions. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence shall remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way or where soil conditions prevent a minimum toe-in depth of 6" or installation of support post to depth of 12". Fabric shall overlap at abutting ends a minimum of 3' and shall be jointed such that no leakage or bypass occurs. If concentrated flow occurs after installation, corrective action must be taken such as placing rock berm in the areas of concentrated flow.

D. SAND BAG BERM

1. The purpose of a sandbag berm is to intercept sediment-laden water from disturbed areas such as construction in steam beds, create a retention pond, detain sediment and release water in sheet flow.

2. A temporary sand bag berm shall be installed across a channel or right of way in a developing or disturbed area and should be used when the contributing drainage area is greater than 5 acres. The berm shall be a minimum height of 18", measured from the top of the existing ground at the upslope toe to the top of the berm. The berm shall be sized to have a minimum width of 48" measured at the bottom of the berm and 18" measured at the top of the berm.

3. The sand bag berm shall be inspected after each rain. The sand bags shall be reshaped or replaced as needed during inspection. Additional inspections shall be made daily by the responsible party and when the silt reaches 6", the accumulated silt shall be removed and disposed of at an approved site in a manner that will not contribute to additional siltation. The sand bag berm shall be left in place until all upstream areas are stabilized and accumulated silt removed; removal must be done by hand.

E. SOIL RETENTION BLANKETS

1. A soil retention blanket (SRB) is a geotextile or biodegradable fabric placed over disturbed areas to limit the effects of erosion due to rainfall impact and runoff across barren soil. Soil retention blankets are manufactured by a wide variety of vendors addressing a wide variety of conditions such as vegetation establishment and high velocity flow. Blankets are used in areas which are difficult to stabilize such as steep slopes, drainage swales or high pedestrian traffic areas.

2. The soil retention blanket, whether installed as slope protection or as flexible channel liner, shall be placed within 24 hours after seeding or sodding operations have been completed, or as approved by the Engineer. Prior to placing the blanket, the area to be covered shall be relatively free of all rocks or clods over 1-1/2" in maximum dimension and all sticks or other foreign material which will prevent the close contact of the blanket with the soil. The area shall be smooth and free of ruts and other depressions. If as a result of rain, the prepared bed becomes crusted or eroded or if any eroded places, ruts or depressions exist for any reason, the Contractor shall be required to rework the soil until it is smooth and to reseed or resod the area at the Contractor's expense.

3. Installation and anchorage of the soil retention blanket shall be in accordance with the manufacturer's recommendations.

F. PROTECTION OF BARE AREAS

1. Apply seeding and soil retention blanket to bare areas including new embankment areas, fills, stripped areas, graded areas or otherwise disturbed areas, which have a grade greater than 5% or which will be exposed for more than 30 days.

2. Bare working areas on which it is not practical or desirable to install seeding and soil retention blankets, as determined by the Engineer, such as areas under proposed building slabs, shall be temporarily sloped to drain at a minimum of 0.2% and a maximum of 5% grade. These areas shall then be "trackwalked" with a crawler dozer traveling up and down the slope to form the effect of small "terraces" with the tracks of the dozer. Apply a minimum of three (3) coverages to each area with the dozer tracks.

3. Route runoff from the areas through the appropriate silt fence system.

4. Protect earth spoil areas by "trackwalking" and silt fences.

G. INTERCEPTOR SWALE

1. Interceptor swales may have a v-shape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. These are used to shorten the length of exposed slope by intercepting runoff and can also serve as perimeter swales preventing off-site runoff from entering the disturbed area or prevent sediment-laden runoff from leaving the construction site or disturbed area. The outflow from a swale must be directed to a stabilized outlet or sediment trapping device. The swales should remain in place until the disturbed area is permanently stabilized.

2. Stone Stabilization shall be used when grades exceed 2% or velocities exceed 6' per second and shall consist of a layer of crushed stone 3" thick, or flexible channel liner soil retention blankets. Stabilization shall extend across the bottom of the swale and up both sides of the channel to minimum height of 3" above the design water surface elevation based on a two year storm.

3. Interceptor swale shall be installed across exposed slopes during construction and should intercept no more than five (5) acres of runoff. Swales shall have a minimum bottom width of 2'-0" and a maximum depth of 1'-6" with side slopes of 3:1 or flatter. Swale must have positive drainage for its entire length to an outlet. When the slope exceeds 3%, or velocities exceed 4' per second (regardless of slope), stone stabilization is required. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary. Swales should be inspected on a weekly basis during wet weather and repairs should be made promptly to maintain a consistent cross section.

4. All trees, brush, stumps, obstructions and other material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

5. The swale shall be excavated or shaped to line, grade, and cross-section as required to meet criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.

6. All earth removed and not needed in construction shall be disposed of in an approved spoils site so that it will be conveyed to a sediment trapping device.

7. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device.

8. The on-site location may need to be adjusted to meet field conditions in order to utilized the most suitable outlet.

9. Minimum compaction for the swale shall be 90% standard proctor.

H. LOCATION OF EROSION AND SEDIMENT CONTROL STRUCTURES

1. Locate erosion and sediment control structures as required to prevent erosion and removal of sediment from the project site. Silt fences shall be required for disturbed areas and soil stockpiles/spoil areas. Each silt fence installation shall have a minimum net length (exclusive of embedments into diversion dikes or other ineffective areas) of 25'. The runoff from a maximum of one (1) acre of disturbed area or soil stockpile/ spoil area shall be routed through any individual silt fence installation.

2. Install diversion dikes to divert runoff to the silt fence installation.

3. Install silt traps at the inlet (upstream) end of the drainage structures, including open channels, through which runoff from disturbed areas or soil stockpiles/spoil areas may drain.

4. Provide an overall erosion and sediment control system which protects disturbed areas and soil stockpiles/spoil areas. The system shall be modified by the Contractor from time to time to effectively control erosion and sediment during construction.

3.03 MAINTENANCE

A. Maintain erosion and sediment control structures and procedures in full working order at all times during construction. This shall include any necessary repair or replacement of items which have become damaged or ineffective. Remove sediment on a regular basis which accumulates in sediment control devices and place the material in approved earth spoil areas or return the material to the area from which it eroded.

B. Upon completion of construction, properly remove the temporary erosion and sediment control structures and complete the area as indicated.

C. Soil retention blankets will not require removal if installed on a finished graded area specified to receive seeding.

3.04 FIELD QUALITY CONTROL

A. In the event of conflict between the requirements and storm water pollution control laws, rules or regulations or other Federal, State or Local agencies, the more restrictive laws, rules or regulations shall apply.

3.05 CLEAN AND ADJUST [Not Used]

END OF SECTION

SECTION 01600 – PRODUCTS

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide products for this project that comply with the requirements of this section. Specific requirements of the detailed equipment specification govern in the case of a conflict with the requirements of this Section.

B. Comply with applicable specifications and standards.

1.02 QUALITY ASSURANCE

A. DESIGN CRITERIA

1. Assume responsibility for the design of the products to include structural stability and operational capability.

2. Design members to withstand all loads imposed by installation, erection, and operation of the product without deformation, failure, or adversely affecting the operational requirements of the product. Size and strength of materials for structural members are specified as minimums only.

3. Design mechanical and electrical components for all loads, currents, stresses, and wear imposed by start-up and normal operations of the equipment without deformation, failure, or adversely affecting the operation of the unit. Mechanical and electrical components specified for equipment are specified as the minimum acceptable for the equipment.

B. COORDINATION

1. Provide coordination of the entire project, including verification that structures, piping, and equipment components to be furnished and installed by the Contractor or by others for this project are compatible.

2. Determine that the equipment furnished by Contractor or any Subcontractor or Supplier employed in this project is compatible with the Contract design requirements and with the equipment and materials furnished by the others.

C. ADAPTATION OF EQUIPMENT

1. Drawings and specifications are prepared for the specified products. Make modifications to incorporate the products into the project at no cost to the Owner, if a substitution for a product is requested and approved in accordance with Section 01640 – PRODUCT SUBSTITUTION.

2. Do not provide a product with a physical size that exceeds the available space. Consideration may be given to the acceptance of these products equipment if the Contractor assumes all costs necessary to incorporate the item and the Engineer approves such revisions.

3. Coordinate electrical requirements for the products to be installed in the project, including revisions in electrical equipment components wiring and other factors necessary to incorporate the component.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, SUBMITTALS, and shall include:

1. Certificates of Adequacy of Design, as described in SECTION 01300, SUBMITTALS;

2. Equipment Installation Reports per SECTION 01650, STARTING SYSTEM;

3. Other documentation as required by detailed equipment specifications.

1.04 STANDARDS

A. The applicable provisions of the following standard shall apply as if written here in its entirety:

1. ASTM A-48 "Standard Specification for Gray Iron Casting

B. Except where otherwise indicated, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction.

1.05 GUARANTEES

A. Guarantee products furnished by the Contractor under this contract against:

1. Faulty or inadequate design

2. Improper assembly or erection

3. Defective workmanship or materials

4. Leakage, breakage, or other failure

B. Guarantee the products installed under this contract, including products furnished by the Owner, against leakage, breakage, or other failure due to improper assembly or erection and against improper installation of the equipment. The guarantee period shall be as defined in the General Conditions.

2.00 PART 2 - PRODUCTS

2.01 MATERIALS

A. Design, fabricate, assemble, deliver and install according to normally accepted engineering and shop practices, except where a higher standard of quality is required by the Contract Documents.

B. Manufacture like parts of duplicate units to standard sizes and gages. Like parts are to be interchangeable.

C. Two (2) or more items of the same kind are to be identical and made by the same manufacturer.

D. Provide products suitable for the intended service.

E. Adhere to the equipment capacities, sizes, and dimensions indicated by the Contract Documents.

F. Do not use products for any purpose other than that for which it is designed.

G. Provide new products unless previously used products are specifically allowed in the Contract Documents.

H. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

I. Materials shall be suitable for service conditions.

J. Iron castings shall be tough, close-grained gray iron free from blowholes, flaws, or excessive shrinkage and shall conform to ASTM A-48.

K. Structural members shall be considered as subject to shock or vibratory loads.

L. Unless otherwise indicated, steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4" thick. All edges are to be chamfered to preclude any sharp exposed edges.

2.02 ELECTRIC MOTORS [NOT USED]

2.03 EQUIPMENT APPURTENANCES [NOT USED]

2.04 ANCHOR BOLTS

A. Provide suitable anchor bolts for each product.

B. Provide anchor bolts, with templates or setting drawings, sufficiently early to permit setting the anchor bolts when the structural concrete is placed.

C. Provide two (2) nuts for each bolt.

D. Provide anchor bolts for products mounted on baseplates that are long enough to permit 1-1/2" of grout beneath the baseplate and to provide adequate anchorage into structural concrete.

E. Provide stainless steel anchor bolts, nuts, and washers.

2.05 SPECIAL TOOLS AND ACCESSORIES

A. Furnish tools, instruments, lifting and handling devices, and accessories necessary for proper maintenance and adjustment that are available only from the Product Vendor or are not commonly available.

2.06 EQUIPMENT IDENTIFICATION PLAQUES [Not Used]

2.07 LUBRICATION SYSTEMS FOR EQUIPMENT

A. Provide equipment lubricated by systems which:

1. Require attention no more frequently than weekly during continuous operation.

2. Do not require attention during start-up or shutdown.

3. Do not waste lubricants.

B. Provide lubricants to fill lubricant reservoirs and to replace lubricant consumed during testing, start-up, and operation prior to acceptance of equipment by the Owner.

2.08 INSULATION OF PIPING

A. Insulate all piping on or related to equipment as required to prevent freezing under any condition. Insulate piping per the Manufacturer's written instruction.

3.00 PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment including equipment pre-selected or furnished by the Owner as part of this project as if this equipment had been selected and purchased by the Contractor. Assume responsibility for proper installation, start-up and making the necessary adjustments so that the equipment is placed in proper operating condition per SECTION 01650, STARTING SYSTEMS.

3.02 LUBRICATION

A. Lubricate all products provided or installed for this project, including products furnished by the Owner, per the Manufacturer's written recommendations until the product is accepted by the Owner.

END OF SECTION

SECTION 01601 – JOB CONDITIONS

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Job conditions for work to be performed.

B. Related Sections include but are not necessarily limited to:
   1. Bidding Requirements, Contract Forms, and Provisions of the Contract.
   2. Division 1 - General Requirements.
   3. Division 2 - Site Work.

1.02 PROJECT CONDITIONS

A. Overhead and underground utilities are located in and adjacent to the work area. The Contractor must confirm the location of underground utilities within and adjacent to the work site. The Contractor is responsible for locating, marking and preserving these utilities as well as any damage caused by the work.

B. The majority of the work under this project occurs within the right-of-way or in easements. Protection of benchmarks, permanent fencing, mailboxes, signs, driveways, poles and other facility appurtenances is the responsibility of the Contractor. Contractor will be held liable for any and all damage to facilities caused by the Contractor or his Subcontractors.

C. Contractor shall confine his operations to those areas shown on the construction drawings. Exceptions may be granted by the Engineer or the City of Donna.

D. A geotechnical engineering study with boring logs in provided in Section 01420 for Contractor's use.

1.03 SCHEDULE

A. Contractor shall comply with the requirements of Section 01310.

END OF SECTION

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SECTION 01640 – PRODUCT SUBSTITUTIONS

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. The procedure for requesting substitution approval for a product which is specified by descriptive or performance criteria or defined by reference to one or more of the following:
   a. Name of manufacturer.
   b. Name of vendor.
   c. Trade name.
   d. Catalog number.

B. Related Sections include but are not necessarily limited to:
1. Division 1 - General Requirements.
2. Division 9 – Coatings
3. Division 11 - Equipment
4. Division 16 - Electrical

C. Requests for Substitution - General:
1. Base all bids on materials, equipment, and procedures specified.
2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are capable of accomplishing the same tasks as the products specifically indicated.
3. Other types of equipment and kinds of material may be acceptable.

1.02 QUALITY ASSURANCE

A. In making request for substitution or in using an approved product, Contractor represents:
1. He has investigated proposed product, and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
2. He will provide same guarantee for substitute item for product specified by Engineer.
3. He will coordinate installation of accepted substitution into work, to include building modifications if necessary, making such changes as may be required for work to be complete in all respects.
4. He waives all claims for additional costs related to substitution which subsequently arise.

1.03 DEFINITIONS

A. Product: Manufactured material or equipment.

1.04 PROCEDURE FOR REQUESTING SUBSTITUTION

A. Considered after award of Contract.

B. Written requests through Contractor only.

C. Transmittal Mechanics:
1. Follow the transmittal mechanics prescribed for shop drawings in Section 01340. Product substitution will be treated in a manner similar to "deviations," as described in paragraph a) of Section 01340. List the letter describing the

deviation and justifications on the transmittal form in the space provided under the column with the heading "DESCRIPTION." Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in paragraph D below.

D. Transmittal Contents:
1. Product identification:
   a. Manufacturer's name.
   b. Telephone number and representative contact name.
   c. Specification section or drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.
2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
   a. Size.
   b. Composition or materials of construction.
   c. Weight.
   d. Electrical or mechanical requirements.
4. Product experience:
   a. Location of past projects utilizing product.
   b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
   c. Available field data and reports associated with proposed product.
5. Data relating to changes in construction schedule.
6. Data relating to changes in cost.
7. Samples:
   a. At request of Engineer.
   b. Full size if requested by Engineer.
   c. Held until substantial completion.
   d. Engineer not responsible for loss or damage to samples.

1.05 APPROVAL OR REJECTION

A. Written approval or rejection of substitution given by the Engineer.

B. Engineer reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.

C. In event substitution results in a change of Contract price or time, provisions in General Conditions will be applied for adjustment.

D. Substitutions will be rejected if:
1. Submittal is not through the Contractor with his stamp of approval.
2. Requests are not made in accordance with this Section.
3. In the Engineer's opinion, acceptance will require substantial revision of the original design.
4. In the Engineer's opinion, substitution is not equal to original product specified or will not perform adequately the function for which it was intended.

END OF SECTION

SECTION 01650 – STARTING SYSTEMS

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide step-by-step procedures for the starting of various systems, including equipment, pumps and processes.

B. Provide pre-start up inspections by equipment manufacturers.

C. Provide instruction and demonstration of operation, adjustment, and maintenance of each system and the component parts.

D. Place each system in service and operate the system to prove performance and provide for initial correction of defects in workmanship, calibration, and operation.

E. Provide for initial maintenance and operation.

1.02 SUBMITTALS

A. Submittals shall be in accordance with Section 01300, SUBMITTALS, and shall include:

1. A Plan of Action for testing, checking, and starting major equipment and process piping systems. Submit reports as required by this specification.

2. Equipment Installation Reports.

3. Operation and Maintenance Manuals per Section 01730, OPERATION AND MAINTENANCE MANUALS.

1.03 STANDARDS

A. Comply with any standards associated with the testing or start-up of equipment, as listed in the various sections of the specifications.

1.04 SPECIAL JOB CONDITIONS

A. Do not start or test any apparatus until the complete unit has been installed and thoroughly checked.

B. A representative of the Manufacturer shall be in attendance of tests and start-up procedures when required by these specifications.

C. Submit an Equipment Installation Report for the equipment installed on the project.

2.00 PART 2 - PRODUCTS

2.01 TESTING INSTRUMENTATION

A. Furnish any instrumentation or other testing devices needed to conduct tests.

3.00 PART 3 - EXECUTION

3.01 SERVICES OF MANUFACTURERS' REPRESENTATIVES

A. The Manufacturer's representative for inspection, supervision of installation, and training must be an experienced and competent technical (not sales) representative of the Manufacturer or Supplier.

B. Perform installation, adjustment, and testing of the equipment under the direct supervision of the Manufacturer's representative where specified.

C. The Manufacturer's representative is to instruct the Owner or his authorized personnel on operational procedures and maintenance requirements.

D. Include the cost of the services of the Manufacturer's representative as part of the equipment price.

3.02 INSPECTION AND START-UP

A. Inspect equipment prior to placing any equipment or system into operation. Make adjustments as necessary for proper operation.

1. Check for adequate and proper lubrication.

2. Determine that parts or components are free from undue stress from structural members, piping or anchorage.

3. Adjust equipment for proper balance and operations.

4. Determine that vibrations are within acceptable limits.

5. Determine that equipment operates properly under full load conditions.

6. Determine that the equipment is in true alignment.

B. Have the Manufacturer's representative present when the equipment is placed in operation.

1. The Representative is to be on site as often as necessary for proper and trouble free operation.

2. The cost for the services of the technical representative required for the proper start-up and operation of the equipment is to be included in the cost for the equipment.

3. Ensure that the proper procedure is employed in start up of systems.

C. Provide Equipment Installation Reports for Equipment.

1. Certify that the equipment and related appurtenances have been thoroughly examined and approved for start-up and operation.

2. The report is to indicate the date when Owner's personnel were instructed in the proper operation and maintenance of the equipment.

3.03 STARTING REQUIREMENTS

A. Refer to the individual sections of the specifications for specific start up procedures.

3.04 INITIAL OPERATION

A. Start, test, and place equipment and systems into operation for 30 days to allow the Owner and Engineer to observe the operation and overall performance of the equipment and to determine that controls function as intended.

B. Equipment which operates on a limited or part-time basis shall be operated in the presence of the Owner, the City, and Engineer to demonstrate that controls function as specified.

C. Perform acceptance test as specified in individual specification sections. Demonstrate that equipment and systems meet the specified performance criteria.

D. Equipment and systems shall not be accepted prior to this initial operation period.

3.05 OPERATOR TRAINING [NOT USED]

3.06 INITIAL MAINTENANCE

A. Maintain equipment until the Owner accepts the project. Contractor shall insure that mechanical equipment is properly greased, oiled, or otherwise cared for as recommended by the Manufacturer.

END OF SECTION

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SECTION 01700 – CONTRACT CLOSEOUT

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Construction Contract.

1.02 SUBMITTALS

A. Submit affidavits and releases.

1.03 SUBSTANTIAL COMPLETION

A. Submit written notification that the work or designated portion of the work is substantially complete to the Engineer when the work is considered to be substantially complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the project will be considered complete.

B. Engineer shall visit the project site to observe the work within a reasonable time after notification is received to determine the status of completion.

C. Engineer shall issue notification to the Contractor that the work is either substantially complete or that additional work must be performed before the project may be considered substantially complete.

1. Engineer shall notify the Contractor in writing of items that must be completed before the project can be considered substantially complete.

a. Correct the noted deficiencies in the work.

b. Issue a second written notice with a revised list of deficiencies when work has been completed.

c. Engineer shall revisit the site and the procedure shall begin again.

2. Engineer shall issue a tentative Certificate of Substantial Completion to the Project Owner when the project is considered substantially complete. Certificate shall include a tentative list of items to be corrected before final payment.

a. Owner will review and revise the list of items and notify the Engineer of any objections or other items that are to be included in the list.

b. Engineer shall prepare and send to the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be corrected or completed.

c. Review the list and notify the Engineer in writing of any objections within 10 days of receipt of Certificate of Substantial Completion.

1.04 FINAL INSPECTION

A. Submit written certification when the project is complete and:

1. Contract Documents have been reviewed.

2. Work has been completed in compliance with the Contract Documents.

3. Specified spare parts and special tools have been provided.

4. Work is complete and ready for final inspection.

B. Engineer shall make an inspection with the Owner and appropriate regulatory agencies to determine the status of completeness within a reasonable time after the receipt of the Certificate.

C. Engineer shall issue notice that the project is complete or notify the Contractor that work is not complete or is defective.

1. Submit the request for final payment with Closeout submittals described in Paragraph 1.07 if notified that the project is complete and the work is acceptable.

2. Upon receipt of notification from the Engineer that work is incomplete or defective, take immediate steps to remedy the stated deficiencies. Send a second certification to the Engineer when work has been completed or corrected.

3. Engineer shall re-visit the site and the procedure will begin again.

1.05 REINSPECTION FEES

A. Pay fees to the Owner to compensate the Engineer for reinspection of the work required by the failure of the work to comply with the claims of status of completion made by the Contractor.

B. Owner may withhold the amount of these fees from the Contractor's final payment.

C. Cost for additional inspections will be billed to the Owner by the Engineer for the actual hours required for the inspection and preparation of related reports in accordance with the following rates:

Principal in Charge	**$150.00**
Project Manager	**$125.00**
Design Engineer	**$ 90.00**
Engineering Technician	**$ 75.00**
Clerk	**$ 50.00**

1.06 CLOSEOUT SUBMITTALS TO THE ENGINEER

A. Record Drawings.

B. Keys and keying schedule.

C. Warranties and bonds.

D. Provide evidence of payment or release of liens as required by the General Conditions.

E. Consent from Surety to Final Payment.

F. Record data, and other submittals as required by the Contract Documents.

G. Specified spare parts and special tools.

H. Evidence of final, continuing insurance, and bond coverage as required by the Contract Documents.

1.07 FINAL PAYMENT REQUEST

A. Submit a preliminary final payment request. This request is to include adjustments to the Contract Amount for:

1. Approved Change Orders

2. Allowances not previously adjusted by Change Order

3. Unit prices

4. Deductions for defective work that has been accepted by the Owner

5. Penalties and bonuses

6. Deductions for liquidated damages

7. Deductions for reinspection payments per Paragraph 1.05

8. Other adjustments

B. Engineer shall prepare a final Change Order, reflecting the approved adjustments to the contract amount which have not been covered by previously approved Change Orders.

C. Submit the final application for payment per the General Conditions, including the final Change Order.

1.08 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

A. Provide warranties, bonds, and service agreements required by Section 01300, SUBMITTALS or by the individual sections of the specifications.

B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.

C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.

1. Each document is to be signed by the respective manufacturer, supplier, and subcontractor.

2. Each document is to include:

a. The product or work item description

b. The firm, with the name of the principal, address, and telephone number

c. Scope of warranty, bond or services agreement

d. Date, duration, and expiration date for each warranty bond and service agreement

e. Procedures to be followed in the event of a failure

f. Specific instances that might invalidate the warranty or bond

D. Submit two (2) copies of each document to the Engineer for review and transmittal to the Owner.

1. Submit duplicate sets.

2. Documents are to be submitted on 8-1/2" x 11" paper, punched for a standard three-ring binder.

3. Submit each set in a commercial quality three-ring binder with a durable and cleanable plastic cover. The title "Warranties, Bonds, and Services Agreements", the project name and the name of the Contractor are to be typed and affixed to the cover.

E. Submit warranties, bonds and services agreements:

1. At the time of final completion and before final payment.

2. Within 10 days after inspection and acceptance for equipment or components placed in service during the progress of construction.

1.9 CLAIMS AND DISPUTES

A. Claims and disputes must be resolved prior to recommendations of final payment. Acceptance and final payment by the Contractor will indicate that any outstanding claims or disputed issues have been resolved to the full satisfaction of the Contractor.

END OF SECTION

SECTION 01730 – OPERATION AND MAINTENANCE MANUALS

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Prepare a complete and detailed Operation and Maintenance Manual for each type and model of equipment or product furnished and installed under this contract.

B. Prepare the manuals in the form of an instruction manual for the Owner. The manual is to be suitable for use in providing operation and maintenance instruction as required by Section 01650, STARTING SYSTEMS.

C. Provide complete and detailed information specifically for the products or systems provided for this project. Include the information required to operate and maintain the product or system.

D. Manuals are to be in addition to any information packed with or attached to the product when delivered. This information is to be taken from the product and provided as an attachment to the manual.

1.02 SUBMITTALS

A. Submit manuals in accordance with Section 01300, SUBMITTALS.

1.03 GUARANTEES

A. Provide copies of the Manufacturer's warranties, guarantees, or service agreements in accordance with Section 01700, CONTRACT CLOSEOUT.

2.00 PART 2 - PRODUCTS

2.01 MATERIALS

A. Print manuals on heavy, first quality paper.

1. Paper shall be 8-1/2" X 11" paper.
   a. Reduce drawings and diagrams to 8-1/2" X 11" paper size.
   b. When reduction is not practical, fold drawings and place each separately in a clear, super heavy weight, top loading polypropylene sheet protector designed for ring binder use. Provide a typed identification label on each sheet protector.

2. Punch paper for standard three-ring binders.

B. Place manuals in Wilson Jones 385 Line D-Ring Dubllock Presentation Binders.

1. Binders are to have clear front, back, and spine covers.

2. Sheet lifters are to be provided.

3. Minimum size is 2" capacity. Maximum size is 3" capacity.

C. Provide tab indexes for each section of the manual.

1. Indexes are to be constructed of heavy-duty paper with a reinforced binding edge and punched with 9/32" holes to fit the binders.
2. Index is to have clear insertable tabs or may have clear tabs for a typed insert.

3.00 PART 3 - EXECUTION

3.01 MANUAL ORGANIZATION AND CONTENTS

A. Provide a Table of Contents listing each section of the manual for each product or system.

1. Identify each product or system using the nomenclature shown in the Contract Documents.

2. Assign a number and letter to each section in the manual.
   a. Assign a number to each product or system. The number is to correspond to the Owner's equipment numbering system or other system designated by the Engineer.
   b. A cross reference is to be provided for the Owner's numbering system and designations for equipment indicated in the Contract Documents.
   c. The letter assigned will represent the part of the manual, consistent with the manual contents as required by Paragraphs 3.02, 3.03, and 3.04.

3. Provide index tabs for each section in the manual.

4. The designation on each index tab is to correspond to the number and letter assigned in the Table of Contents.

B. Include only the information that pertains to the product described. Annotate each sheet to:

1. Clearly identify the specific product or component installed.

2. Clearly identify the data applicable to the installation.

3. Delete reference to inapplicable information.

C. Supplement manual information with drawings as necessary to clearly illustrate relations of component parts of equipment and systems, and control and flow diagrams.

D. Identify each manual by placing a printed cover sheet in the front cover of the binder and as the first page in the manual. The first page is to be placed in a clear polypropylene sheet protector. The information on first page and the cover page are to include:

1. Name of Owner
2. Project Name
3. Volume number
4. The Table of Contents for that volume

E. Insert the Table of Contents into the spine of each manual.

F. Manuals for several products or systems may be provided in the same binder.

1. Sections for each product or system must be included in the same binder.

2. Sections must be in numerical order from volume to volume.

G. Correlate the data into related groups when multiple binders are used.

H. Fill binders to only 3/4 of its indicated capacity to allow for addition of materials to each binder by the Owner.

3.02 EQUIPMENT AND SYSTEMS MANUAL CONTENT

Manual shall provide the following information:

A. A description of the unit and component parts.

B. Operating instructions for startup, normal operations, regulation, control, shutdown, emergency conditions, and limiting operating conditions.

C. Maintenance instructions including assembly, installation, alignment, adjustment, and checking instructions.

D. Lubrication schedule and lubrication procedures. Include a cross reference for recommended lubrication products.

E. Troubleshooting guide.

F. Schedule of routine maintenance requirements.

G. Description of sequence of operation by the Control Manufacturer.

H. Warnings for detrimental maintenance practices.

I. Parts lists including:

1. Part numbers for ordering new parts

2. Assembly illustrations showing an exploded view of the complex parts of the product

3. Predicted life of parts subject to wear

4. List of the Manufacturer's recommended spare parts, current prices with effective date and number of parts recommended for storage

5. Directory of a local source of supply for parts with company name, address, and telephone number

6. Complete nomenclature and list of commercial replacement parts

J. Outline, cross section and assembly drawings, engineering data, test data, and performance curves.

K. Control schematics and point to point wiring diagrams prepared for field installation, including circuit directories of panel boards and terminal strips.

L. List of identification nameplates installed on equipment and valve identification.

M. Other information as may be required by the individual sections of the specifications.

3.03 ELECTRICAL AND ELECTRONICS SYSTEMS MANUAL

A. As required in Section 01730, 3.02

3.04 ARCHITECTURAL PRODUCTS MANUAL [NOT USED]

3.05 LIST OF SERVICE ORGANIZATIONS

A. Provide a directory of authorized service organizations with company name, address, telephone number, and the contact person for warranty repair.

END OF SECTION

SECTION 01732 – DEMOLITION OF CIVIL SITE IMPROVEMENTS

1.00 PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This specification shall provide for the removal and disposal of old structures or portions of old structures including but not limited to pavement, curb and gutter sections, sidewalks, driveways, pipe lines, wet wells, manholes, etc., as noted on the plans, and shall include all excavation and backfilling necessary to complete the removal. The work shall be done in accordance with the provisions of these specifications. Remove all permanent structures to piping three (3) feet below finished grade.

2.00 PART 2 - PRODUCTS [NOT USED]

3.00 PART 3 - EXECUTION

3.01. METHOD OF REMOVAL

A. Pipelines: Pipe shall be removed by careful excavation of all dirt on top and the_sides in such manner that the pipe will not be damaged. Removal of sewer and/or waterline appurtenances shall be included for removal with the pipe. Those pipes which are deemed unsatisfactory for reuse by the Engineer may be removed in any manner the Contractor may select.

B. Concrete Structures: Concrete structures or concrete portions of structures shall be removed by saw-cutting and/or sledging the concrete into sizes not larger than one cubic foot. Portions of the old structure shall be removed to the lines and dimensions shown on the plans, and these materials shall be disposed of as shown on the plans or as directed by the Engineer. Any portion of the existing structure, outside of the limits designated for removal, damaged during the operations of the Contractor shall be restored to its original condition at his entire expense. Explosives shall not be used in the removal of portions of the existing structure. Reinforcement shall be cut off close to the concrete. All removed concrete shall not have exposed rebar protruding more than 2-inches. The city will be given the opportunity for use of concrete rubble.

C. Salvage:

1. All material such as pipe, timbers, railings, etc., which the Engineer deems as salvageable for reuse, and all structural steel shall be in the property of City unless otherwise specified and delivered to a designated storage area.

2. All mechanical and electrical lift station material, which the Engineer deems as salvageable for reuse, including pumps and control panels shall be in the property of the City unless otherwise specified and delivered to a designated storage area.

3. Materials which are not deemed salvable by the Engineer, shall become the property of the Contractor and shall be removed to suitable disposal sites off of the right-of-way arranged for by the Contractor, or otherwise disposed of in a manner satisfactory to the Engineer.

4. Where temporary structures are necessary for a detour adjacent to the present structure, the Contractor will be permitted to use the material in the old structure for the detour structure, but he shall dismantle and stack or dispose of the material as required above as soon as the new structure is opened for traffic.

D. Backfill:

1. All excavation made in connection with this specification and all openings below the natural ground line caused by the removal of old structures or portions thereof shall be backfilled to

the level of the original ground line, unless otherwise provided on the plans. All dirt and caliche needs to be graded to avoid ponding.

2. That portion of the backfill which will support any portion of the roadbed or embankment shall be placed in layers of the same depth as those required for placing embankment. Material in each layer shall be wetted uniformly, if required, and shall be compacted to the density required in the adjoining embankment. In places inaccessible to blading and rolling equipment, mechanical or hand tamps or rammers shall be used to obtain the required compaction.

3. That portion of the backfill which will not support any portion of the roadbed or embankment shall be placed as directed by the Engineer in such manner and to such state of compaction as will preclude objectionable amount of settlement.

END OF SECTION

SECTION 01900 – REFERENCES AND STANDARDS

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Certain abbreviations and acronyms have been used in the Contract Documents to identify organizations whose standards are specified by reference as the minimum requirements of these specifications, except as the specifications may modify or supersede, or establish stricter requirements.

B. The following organizations, trade associations, and societies are related to the building industry, and have been referred to in the specifications. Where such organizations have established standards for their particular trade, these standards shall be accepted by the Contractor as the minimum conditions for construction. Obtain copies of referenced standards from designated organizations when required. The latest publication in effect shall be used unless a specific publication date is specified.

1.02 ORGANIZATIONS

A. The following organizations are listed herein for Contractor's reference.

AA	Aluminum Association 818 Connecticut AVE, N.W. Washington, DC 20006
AAN	American Association of Nurserymen 1250 Eye ST, N.W., Ste. 500 Washington, DC 20005
ACI	American Concrete Institute 22400 W. Seven Mile RD Detroit, MI 48219
ACPI	American Concrete Pipe Institute P.O. Box 19150 Redford Station Detroit, MI 48219
AISI	American Iron and Steel Institute 1000 16th ST, NW Washington, DC 20036
AISC	American Institute of Steel Construction 4100 N. Michigan AVE Chicago, IL 60611
ANSI	American National Standard Institute, Inc. 1430 Broadway New York, NY 10018
APFA	American Pipe Fittings Association Old Keene Mill RD Springfield, VA 22152
ASTM	American Society for Testing and Materials Race ST Philadelphia, PA 19103
ASCC	American Society of Concrete Construction 426 S. Westgate

	Addison, IL 60101
ASME	American Society of Mechanical Engineers 345 East 47th ST New York, NY 10017
AWWA	American Water Works Association 6666 W. Quincy AVE Denver, CO 80235
AWS	American Welding Society, Inc. 550 NW LeJeune RD Miami, FL 33126
AI	Asphalt Institute Asphalt Institute BLDG College Park, MD 20740
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut AVE, NW #700 Washington, DC 20036
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove RD Scheumburg, IL 60195
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, BLDG 197 Washington, DC 20407
FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062
IES	Illuminating Engineering Society of North America 345 East 47th ST New York, NY 10017
IEEE	Institute of Electrical and Electronic Engineers 245 East 47th ST New York, NY 10017
MLFA	Metal Lath/Steel Framing Association 600 S. Federal ST, Ste. 400 Chicago, IL 60605
NAPA	National Asphalt Pavement Association 6811 Kenilworth AVE Riverdale, MD 20737
NBS	National Bureau of Standards Gaithersburg, MA 20899

NEMA	National Electrical Manufacturers Association 2101 L ST, N.W., Ste. 300 Washington, DC 20037
NEC	National Electrical Code
NFPA	National Fire Protection Agency 470 Atlantic AVE Boston, MA 02210
NLA	National Lime Association 3601 North Fairfax DR Arlington, VA 22201
NRMC	National Ready Mixed Concrete Association 900 Spring ST Silver Spring, MD 20910
PPI	Plastics Pipe Institute 355 Lexington AVE New York, NY 10017
RCRC	Reinforced Concrete Research Council 5420 Old Orchard RD Skokie, IL 60077
SJI	Steel Joist Institute 1205 48th AVE N., Ste. A Myrtle Beach, SC 29577
SSPC	Steel Structures Painting Council 4400 5th AVE Pittsburgh, PA 15213
UL	Underwriters' Laboratories, Inc. 333 Pfingston RD Northbrook, IL 60062
UBC	Uniform Building Code International Conference of Building Officials 5360 South Workman Mill RD Whittier, CA 90601
UFC	Uniform Fire Code International Conference of Building Officials 5360 South Workman Mill RD Whittier, CA 90601

END OF SECTION

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SECTION 02110 – SITE CLEARING AND GRUBBING

1.00 PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This technical specification covers the furnishing of all labor, materials, tools, and equipment necessary for clearing and grubbing of the project area in preparation for the construction activities described under this contract. Included in the work is the stripping, removal, and disposal of all trees, downed timber, snags, brush, vines, rubbish, stumps, logs, topsoil, existing sidewalks, concrete steps, curbing, driveways, pavement, fencing, guiderails, signs, yard drains, pipe, light fixtures, bases, old wire, and other incidentals that interfere with the planned construction. The work includes the resetting of walls, fence fabric, and poles, relocation and/or resetting of lawn sprinklers, signs, mail boxes, etc., including the installation of temporary and construction fencing, and relocation and trimming of shrubs, trees, or other plantings to remain.

B. Site preparation work also includes the construction, maintenance, and removal of construction site entrance pads, if shown on the plans or ordered by the Engineer.

1.02 SECTION INCLUDES:

A. Preparation for work.

B. Protection of existing features.

C. Clearing and grubbing.

D. Debris removal.

E. Mailbox Relocations.

1.03 RELATED SECTIONS:

A. Earthwork for Top Soil Requirements - Section 02200.

B. Excavating, Backfilling and Compacting for Utilities - Section 02221.

2.00 PART 2 - EXECUTION

2.01 GENERAL:

A. The scope of work shall be as listed in Section 1.01 Scope of Work.

2.02 PREPARATION FOR WORK:

A. Verify that existing plant life designated to remain, if any, is tagged or identified, and protected as described in the Specifications.

B. Verify and protect survey control.

2.03 PROTECTION OF EXISTING FEATURES:

A. Locate, identify, and protect from damage utilities to remain.

B. Protect trees, plant growth, and features designated to remain.

C. Protect bench marks and survey control from damage or displacement.

2.04 CLEARING AND GRUBBING:

A. The designated construction area shall be cleared of all trees, brush, shrubbery, and plants, not indicated on Drawings to be preserved. Trees and brush designated to be left in place shall be carefully trimmed as directed and shall be protected from scarring, barking or other injuries during construction operations. Pruned limbs over 2 inches in diameter shall be treated by painting the exposed ends with an approved asphaltic material.

B. Stumps In any case where the Engineer determines that the material encountered below the finished grade is unfit for a proper foundation, the material shall be removed.

C. All excess material, except topsoil, shall be the property of and disposed by the Contractor. Any topsoil to be used for the finished grading shall be stockpiled and preserved for future use in a location and manner approved by the Engineer. Any excess or unusable stripped topsoil under this item shall become the property of the City and shall be removed at the expense of the Contractor. Stumps, roots, and other objectionable material shall be removed from areas requiring fill or from borrow sites and/or materials sources to the complete extent necessary to prevent objectionable matter from becoming mixed with the material to be used in construction.

D. Unless otherwise provided, all merchantable timber removed as previously specified shall become the property of the Contractor. It is the intent of this specification to provide for the removal and disposal of all obstructions and objectionable materials not specifically provided for elsewhere by the Contract Documents.

E. In areas where certain trees and shrubs have been designated to be relocated, or to remain, or in areas adjacent to the construction activity, the Contractor shall protect this growth from damage or injury during construction. Trees shall be trimmed to provide a minimum of 8 feet of vertical clearance from the finished grade of any sidewalk constructed or repaired. In case of unavoidable damage to branches and limbs, the damaged portions shall be neatly trimmed and preserved as directed by the Engineer. Any trees or bushes that have been designated to be preserved and/or relocated and are damaged by the Contractor and are beyond recovery, shall be removed and replaced as directed by the Engineer, at the expense of the Contractor.

F. Remove existing concrete and asphalt paving, curb, gutter, walks and other items shown or described to be removed in the Contract Documents.

G. Remove trees, shrubs and other plant life within the site shown or described to be removed in the Contract Documents. Remove tree and shrub stumps and root system to a depth of 24 inches below existing grades. Remove grass and ground cover root system to a depth of 6 inches.

2.05 DEBRIS REMOVAL:

A. Removed material shall become the property of the Contractor. Contractor shall remove debris, rock, and extracted plant life from site and legally dispose.

C. Remove existing concrete and asphalt paving, curb, gutter, culverts, walks and other items, as needed for construction, or shown or described to be removed in the Contract Documents.

2.06 CLEARING AND GRUBBING:

A. Remove and relocate all existing sidewalks, concrete steps, curbing, driveways, pavement, fencing, guiderails, signs, yard drains, pipe, light fixtures, bases, and other incidentals that interfere with the planned construction. The work includes the resetting of walls, fence fabric, and poles, relocation and/or resetting of lawn sprinklers, signs, mail boxes, etc., including the installation of temporary and construction fencing, and relocation and trimming of shrubs, trees, or other plantings to remain.

2.07 CONSTRUCTION ENTRANCE:

A. Construction site entrance pads shall be constructed prior to any clearing and grubbing. They shall be maintained so as to prevent tracking of dirt onto the adjacent paved roadway. The local roadways shall be swept as necessary to remove any materials that have been tracked from the site.

3.00 PART 3 - MEASUREMENT AND PAYMENT

3.01 PAYMENT:

A. No separate payment shall be made to the Contractor for the work described in this Section. Such work shall be considered incidental to the project and the payments made under specific Pay Items shall be considered as full compensation for these requirements.

END OF SECTION

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SECTION 02200 – EARTHWORK FOR TOP SOIL REQUIREMENTS

1.00 PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Grading and earthwork which occurs in areas other than under structures, under paving, or trenching for utilities.

B. Earthwork consists of operations required for the excavation of materials on site; excavation of borrow material from designated areas; compaction of natural or improved sub-grades: finish grading; disposal of excess or unsuitable materials; and other required operations. Earthwork shall conform with dimensions and typical sections shown, and within lines and grades established on Drawings.

1.02 RELATED SECTIONS:

A. Trench Protection - Section 19000.

B. Excavating, backfilling and compacting for utilities - Section 02221.

1.03 REFERENCES:

A. ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 lbf/ft^3).

B. ASTM D4972 - pH of Soil.

C. ASTM G57 - Field Measurement of Soil Resistivity Using the Wenner Four Electrode Method.

D. ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.04 EXISTING UTILITIES:

A. Where pipes, ducts and structures are encountered in the excavation but are not shown on the Drawings, immediately notify the ENGINEER.

1.05 DEFINITIONS:

A. Borrow: Material taken from on-site designated areas or approved off-site sources to make up any deficit of excavated material. Obtain from area that is normally dry and well drained. Borrow does not include top soil.

B. Classification: Earthwork materials are classified in accordance with definitions in this Article.

C. Compaction: Compaction of soil materials shall be measured as a percent of Standard Proctor density as determined by the ASTM D698.

D. Excavation: Excavation of every description and of whatever substances encountered within the limits of the project to the lines and grades indicated on the Drawings.

E. Finish Grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

F. General Site Fill: Suitable, clean material excavated on-site or off-site may be used as fill material. Suitable material shall consist of clay soils classified as CH according to the unified

soil classification system. Clay soil used as fill shall have a liquid limit of less than 55 and a Plasticity Index comparable with on-site soils.

G. Select Fill: Select fill material, as required for construction, defined in the plans and Sections 02221, shall consist of inorganic silty or sandy clay.

H. Subgrade: Consists of that portion of the surface on which a compacted fill, backfill or topsoil is placed.

I. Topsoil: Top 6 inches of natural surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil includes roots and other vegetation.

2.00 PART 2 - PRODUCTS

2.01 SELECT FILL:

A. Source: Obtain select fill material from required excavation, or if excavated material is not adequate, from borrow areas approved by the ENGINEER. Material from source shall be tested for compliance with project requirements and approved by the Owner and Testing Laboratory.

B. Suitability: Use the best material available from excavation or borrow, suitability of select fill is subject to the ENGINEER'S approval.

C. Quality: Select fill material must be free of rock and clay lumps or excessive silts. Do not use soil containing brush, roots, sod or similar organic materials.

D. Characteristics: Select fill material shall consist of inorganic silty or sandy clay. Additional select fill requirements are described in Sections 02221.

2.02 FILL AND BACKFILL UNDER TOPSOIL:

A. Source: Obtain site fill from required excavation or, if excavated material is not sufficient, from borrow areas approved by the ENGINEER.

B. Suitability: Use the best material available from excavation or borrow. Suitability of fill material is subject to the Testing Laboratory\Engineer's approval.

C. Quality: Fill material shall be free of excessive silts. Do not use soil containing brush, roots, sod or similar organic materials.

D. Characteristics: Fill material shall have a plasticity index between 6 and 25, inclusive, and shall generally be of similar character to that of existing soil at the site.

3.00 PART 3 - EXECUTION

3.01 STRIP AND STOCKPILE:

A. Remove topsoil at all non-paved areas where excavation of topsoil is required or where fill material will be added for site grading. Remove top 6 inches of topsoil where necessary and stockpile on the property as directed by the Owner. Protect stockpiled topsoil from other

excavated materials, dumping of unwanted material, dumping by the public, and erosion. Upon completion of rough grading, replace topsoil in 4-inch minimum layer to finish grade elevations as shown on the grading plan.

B. Removal of topsoil in building areas and paving areas is further described under provisions of Section 02221.

3.02 EXCAVATION:

A. Objective: As shown on the Drawings, excavate to lines, grades and elevations required for subsequent construction. All excavation shall be made in such manner as to permit all surfaces to be brought to final line and grade within plus or minus 0.1 foot. Over excavation shall be restored by the Contractor at his own expense. Finished grades consistently high or low will not be acceptable and shall be corrected by the Contractor at his expense and no additional cost to the Owner.

B. Drainage: During excavation, maintain grades as required to provide positive drainage away from structures; or, as directed by the Engineer, install temporary drains or drainage ditches to intercept or divert surface water and prevent interference or delay of the work.

C. Stockpiling: If at time of excavation it is not possible to place material in the proper section of permanent construction, stockpile the material in Owner approved areas for later use.

D. Stone or Rock: Stone or rock fragments greater than 6" will not be allowed in fills or embankments. Stones or rock fragments larger than 2 inches in their greatest dimension will not be permitted in top 6 inches of subgrade.

E. Dressing: Uniformly dress cut and fill slopes to slope, cross section and alignment, as shown.

3.03 TREATMENT OF SUBGRADES:

A. All topsoil and vegetation shall be stripped from the ground surface and stockpiled, exposing sound undisturbed subgrade soils.

B. After stripping the topsoil in areas to receive fill or cut areas, the exposed ground surface shall be scarified to a depth of 6 inches, the moisture adjusted, and then recompact to a density of 95 to MIN. percent of the maximum density as obtained in the Standard Proctor Compaction Test (ASTM D698), at a moisture content between minus 1 to plus 3 percent of optimum. Any soft or compressible areas detected during the recompaction process shall be undercut such that sound subgrade soils are exposed and recompacted. Site excavated or select fill shall then be used to bring all areas to grade. Allow for placement of minimum 4-inch layer of top soil in areas not covered by building or pavement.

C. Finished subgrade shall be inspected by Testing Laboratory for determination that subgrade meets requirements of Contract Documents.

3.04 PLACING FILL AND BACKFILL:

A. Examination of Subgrade: Do not place fill on any part of the subgrade until the subgrade preparation has been accepted by the Engineer.

B. Removing Debris: During the dumping and spreading process, remove all roots, stones and debris that are uncovered in the fill material.

C. Spreading Fill and Backfill: After dumping, spread the material in horizontal layers over the entire fill area. The thickness of each layer before compaction shall not exceed 8 inches unless otherwise directed by the Engineer. Maintain positive drainage throughout construction. The combined excavation and fill placing operation shall be such that the material when compacted in the fill will be blended sufficiently to secure the best practicable degree of compaction. The suitability of the materials shall be subject to testing by the Testing Laboratory and approval of the Engineer. After each layer of fill has been spread to the proper depth, it shall be thoroughly manipulated with a disc plow or other suitable and approved equipment until the material is uniformly mixed, pulverized and brought to a uniform approved moisture content.

D. Attaining Proper Bond: If, in the opinion of the Testing Laboratory, the compacted surface of a layer is too smooth to bond with succeeding layers, loosen the surface by harrowing or other approved method before continuing the work.

E. Place materials to proper elevation allowing for depth of topsoil furnished under this Contract.

3.05 MOISTURE CONTROL:

A. Intent: Developing the maximum density obtainable with the natural moisture of the material is preferred. However, the moisture content shall not vary from the optimum, as determined by ASTM D698, by more than minus 1 to plus 3 percent of optimum.

B. Adjustment: If the moisture content is too high, adjust to within the specified limits by spreading the material and permitting it to dry. Assist the drying process by discing or harrowing if necessary. When the material is too dry, sprinkle each layer with water. Work the moisture into the soil by harrowing or other Engineer approved method.

3.06 COMPACTION:

A. Rough Grade: Compact each layer of fill material with suitable equipment as necessary to secure 95% to 98% Standard Proctor Density (ASTM D698) within the specified range of the moisture content.

B. Finish Grade: Place and lightly compact topsoil to achieve finish grades.

3.07 DISTRIBUTION OF TOPSOIL:

A. Perform rough grading and topsoil/finish grading work.

B. Preparation:

1. Prior to placing topsoil, scarify the subgrade to a depth of 2 inches to provide effective bonding of the topsoil with the subgrade.

2. Shape all areas designated for grading, including cut and fill areas, to receive a minimum of 4 inches of topsoil

C. Placement:

1. Do not haul or place wet topsoil. Also prohibited is placement of topsoil on a subgrade that is excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or proposed planting.

2. Distribute topsoil uniformly and spread evenly. Correct irregularities in the surface to prevent formation of depressions where water could stand.

3. Perform the spreading operation so that planting can proceed with little additional tillage or soil preparation. Leave the area smooth and suitable for lawn planting.

4. Lightly compact topsoil to obtain proper bond with previously placed or prepared material.

D. Maintenance: Where any portion of the surface becomes eroded or otherwise damaged, repair the affected area to establish the condition and grade prior to topsoil placement; then replace topsoil.

3.08 MATERIAL DISPOSAL:

A. Excess Excavation Material (soil material free of trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has been accepted by the Geotechnical Engineer): Remove excess excavated material from the construction site or place on the property as directed by the ENGINEER.

B. Waste Material (soil material including trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has not been accepted by the Geotechnical Engineer): Remove waste material from the project site before Final Inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

4.00 PART 4 - MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. No separate payment shall be made to the CONTRACTOR for the work described in this Section. Such work shall be considered incidental to the project and the payments made under specific Pay Items shall be considered as full compensation for these requirements.

END OF SECTION

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1.00 PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. Excavation, shoring, dewatering, pipe bedding, trench backfill, compaction, grading and cleanup of all pipeline trenching for the project.

B. All work must be done in accordance with these specifications and the safety requirements of the State and OSHA Standards.

1.02 JOB CONDITIONS

A. Site Acceptance
1. Accept site in condition existing during Contract time frame.
2. Ground water/surface water found during construction are conditions of the contract and responsibility of Contractor.

B. Adverse Weather
1. Place no backfill that is excessively wet or frozen.
2. Place no backfill in excessively wet or frozen trenches.

1.03 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

2.00 PART 2 - PRODUCT

2.01 MATERIAL CLASSIFICATIONS FOR PIPE BEDDING AND BACKFILL

Materials for bedding and backfill shall be classified for the purpose of quality control in accordance with the Unified Soil Classification Symbols as defined in ASTM D2487 and with ASTM D2321. Material use and application is defined by class in accordance with ASTM D2321, or by product descriptions, as described below. Determination of source of materials for bedding and backfill to meet the stated conditions shall be responsibility of Contractor, but use of such materials shall be subject to approval of Engineer. Contractor shall submit characterization/sieve analysis of proposed pipe embedment material for approval prior to commencement of construction.

A. Class Designations Based on Laboratory Testing (ASTM D2321):
1. Class IA and IB: Manufactured aggregates, open or dense graded, clean.
   a. Plasticity Index: Non-plastic.
   b. Gradation: 100% passing 1½” sieve, ≤ 50% passing No. 4 sieve, and < 5% passing No. 200 sieve.
2. Class II: Well and poorly graded gravels and sands, clean or with little to moderate fines (GW, GP, SW, SP, and combinations of the preceding with GM, GC, SM, and SC)
   a. Plasticity Index: Non-plastic
   b. Gravel (GW, GP) Gradation: 100% passing 1½” sieve, < 5% passing No. 200 sieve (i.e. <5% fines), and < 50% of the non-fines passing a No. 4 sieve. For pipes 15” diameter and smaller, bedding material shall be 3/4-inch maximum (i.e. 100% passing 3/4-inch sieve).

c. Sand (SW, SP) Gradation: 100% passing 1½" sieve, < 5% passing No. 200 sieve (i.e. <5% fines), and > 50% of the non-fines passing a No. 4 sieve.
d. Gravel, Sand W/ Fines Gradation: 100% passing 1½" sieve, and 5% to 12% passing No. 200 sieve (i.e. 5% to 12% fines).

3. Class III: Silty/clayey gravels and sands, gravel-sand-silt/clay mixtures (GM, GC, SM, SC)
   a. Plasticity Index: (Refer to ASTM D2321)
   b. Gradation: 100% passing 1½" sieve, 12% to 50% passing No. 200 sieve.

B. Designations Based on Product Descriptions:
1. Excavated Material Backfill: Excavated material may be used in the trench backfill, provided that all hard rock and stones having any dimensions greater than 6" and frozen earth, debris and roots larger than 2" are removed for the initial backfill. Plasticity Index shall be less than 30. Excavated backfill material must be approved by Engineer for bedding material.
2. Select Backfill: Select Backfill shall be gravel, fine rock cuttings, sand, sandy loam or loam free from excessive clay. Rock cuttings shall have no dimensions greater than 2 inches. Plasticity Index shall be between 7 and 22. Select backfill must be approved by Engineer.
3. Sand Backfill: Sand backfill shall be clean, hard, durable, uncoated grains, free from lumps and organic material. All materials must pass a No. 8 sieve with less than 5% passing a No. 200 sieve.
4. Granular Backfill: Granular backfill shall be free flowing, such as sand or hydraulically graded stone fines, or mixed sand and gravel, or sandy loam. The material shall be free from lumps, stones over 2 inches in diameter, clay and organic matter.
5. Controlled Density Fill: Use high slump mixture of portland cement, fly ash and fine aggregate formulated, licensed and marketed as K-Krete or equal. Provide mixture with minimum 28-day compressive strength of 70 psi with no measurable shrinkage or surface settlement.

2.02 CRADLING ROCK

A. Use crushed rock or stone with 70-100% passing 1½ inch sieve and no more than 50% passing 1 inch sieve.

2.03 SHEETING, SHORING AND BRACING

A. Use sound timber or structural steel.

B. Use shapes and sizes as required.

3.00 PART 3 - EXECUTION

3.01 GENERAL

A. Dewatering
1. Execute work "dry". No pipe or conduits shall be laid or concrete poured on wet soil.
2. Prevent surface water from flowing into excavation.
3. Provide equipment for handling water encountered as required. Obtain approval of proposed method of dewatering.
4. No Sanitary sewer shall be used for disposal of trench water.

B. Protection of Existing Utilities:

1. Notify all utilities of location and schedule of work.
2. Locations and elevations of utilities shown on plans are to be considered approximate only. Notify utility and Engineer of conflicts between existing and proposed facilities.
3. Repair, relay or replace existing utilities damaged, destroyed or disrupted during work. Unless specified otherwise, replacement will be at the Contractors expense.

C. Protection of Existing Facilties:
1. Mailboxes, driveways, fences, etc., existing near excavation shall be protected from damage. If needed, facilities shall be removed during construction and replaced to before construction condition or better.
2. Mail delivery service shall not be interrupted.
3. Driveway access shall be maintained.

D. Sheeting, Shoring and Bracing
1. All sheeting, shoring, and bracing shall be in accordance with the Excavation Safety System Plan, these specifications and the safety requirements of the State and OSHA Standards.
2. Provide as necessary, to hold walls of excavation, prevent damage to adjacent structures, and to protect workmen and property.
3. Leave Sheeting and shoring in place where removal might cause damage to work or otherwise indicated on drawings.
4. When movable trench shield is used below spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

E. Changes in Grade
1. Grades may be adjusted 1.5 feet (plus or minus) from plan grades to suit unforeseen construction conflicts or conditions with prior approval of Engineer.
2. No additional compensation will be made for such changes.

3.02 EXCAVATION AND TRENCHING

A. General
1. Method of excavation at Contractor's option.
2. Allow no more than 300 feet of trench to be open at one time.
3. Excavate by hand under tree roots 3 inches and larger, and under and around structures and utilities.
4. Stockpile and replace topsoil to a minimum of 8-inches for surface restoration in grassed or agricultural areas.

B. Trench Characteristics
1. Depth
   a. As indicated for pipe installation to lines and grades required with proper allowance for thickness of pipe and type of bedding specified or indicated.
2. Width
   a. Minimum trench width shall be pipe O.D. plus 16 inches or pipe O.D. × 1.25 + 12 inches, whichever is greater.
   b. Maximum width as follows:

Pipe Size Inches	Maximum Trench Width
4	2-feet 0-inches
6	2-feet 0-inches
8	2-feet 4-inches
10	2-feet 4-inches

12	2-feet 6-inches
15	2-feet 9-inches
18	3-feet 0-inches
Over 18	Pipe O.D. × 2

3. Trench walls must be vertical below top of pipe and may be vertical or sloped above pipe to conform to excavating codes.
4. Provide bell holes for each pipe joint where pipe bears on undisturbed earth.
5. Trench bottom shall be free of large stones and other foreign material.

3.03 SOFT, SPONGY OR UNSTABLE MATERIALS (e.g. peat, muck, and highly expansive soils)

A. Stop work and notify Engineer.

B. Perform remedial work as directed.

C. If material is judged unsuitable and removal is authorized, remove and replace with trench stabilizing material as directed by Engineer.

3.04 ROCK EXCAVATION

A. Excavate any rock to maintain minimum 6-inch clearance around pipe.

B. Dispose of rock material not suitable for backfill as directed by Engineer.

C. Use of explosives not permitted without prior written authorization from owner and Engineer.

D. Provide Special Hazard Insurance covering liability for blasting operations.

3.05 PIPE EMBEDMENT

A. Bedding
1. Place after bottom of trench has been excavated to proper depth and grade.
2. Place, compact and shape bedding material to conform to barrel of pipe and bell to insure continuous firm bedding for full length of pipe.
3. Provide bedding as described in following table unless indicated otherwise on Plans or in Special Conditions.

	Pipe Material	Minimum Bedding Class
1.	Non-reinforced Concrete Pipe	Class C*
3.	Reinforced Concrete Pipe	Class D*
4.	Ductile Iron Pipe	Class D*
5.	Steel Cylinder	Class C*
6.	Flexible (PVC) or Composite Pipe	Class I, II, and III*

*Refer to ASTM D2321 and standard pipe bedding details in the Drawings.

B. Haunching (bottom of pipe to springline)
1. Haunching shall be same material used for bedding.
2. Place after pipe has been bedded and checked for alignment, grade and internal obstructions.
3. Do not backfill until concrete or mortar has sufficiently cured.
4. Record location of connections and appurtenances before backfilling.
5. Work bedding under pipe haunches and compact by hand to springline of pipe in 6-inch maximum lifts.

C. Initial Backfill
1. Initial backfill shall be same material used for bedding.
2. From springline to not less than 6-inches above top of pipe, place backfill and compact in 6-inch layers using vibratory compactors.
3. Backfill simultaneously on both sides of pipe to prevent displacement.

3.06 TRENCH BACKFILL

A. Final Backfill
1. Place backfill into trench at an angle so that impact on installed pipe is minimized.
2. Compaction of all backfill material shall be performed in a manner that shall not crack, crush, and/or cause the installed pipe to be moved from the established grade and/or alignment.
3. Place cushion of 4-foot compacted backfill above pipe envelope before using heavy compacting equipment.
4. Use excavated material for final backfill subject to the requirements stated for Select Backfill unless otherwise specified.
5. Areas under or within 5 feet of pavement, and under or within 2 feet of utilities, buildings, or walks shall be backfilled with sand and mechanically compacted to the top of the subgrade in 8 inch lifts to a minimum of 95% Standard Proctor Density.
6. Areas not subject to vehicular traffic shall be backfilled in layers not more than 12-inches.
7. Structural and non structural backfill shall be mechanically compacted. Compaction method is at discretion of Contractor with following exceptions:
   a. If in Owner's opinion compaction method presents potential damage to pipe, it will not be allowed.
   b. Flooding or water jetting may be permitted only if a geotechnical report justifying the use of water jetting/puddling is submitted to the Engineer by a qualified laboratory and the Engineer approves.
8. Mound excavated materials no greater than 6-inches in open areas only.
9. Fill upper portion of trench with topsoil as specified hereinbefore.

B. Controlled Density Fill
1. Use where shown on plans.
2. Provide suitable forms to limit volume of control density fill material.
3. Prevent flow of material into existing drain lines.
4. Protect exposed utility lines during placement.
5. Place material in accordance with suppliers' written recommendations unless directed otherwise by Engineer.

3.07 EXCESS MATERIAL

A. Waste of excess excavated material shall be the responsibility of the Contractor.

3.08 TESTING

A. Unless specified elsewhere, testing will be responsibility of Owner.

B. Standard Proctor Density
1. ASTM D698.
2. One (1) required for each type of material encountered.

C. In Place Density
1. ASTM D1556 (Sand Cone)
2. ASTM D2167 (Balloon)
3. ASTM D3017 (Nuclear)

D. One (1) test per 250 linear feet of trench on alternating lifts, with a minimum of three tests per visit, for non-structural areas. One (1) test per 100 linear feet of trench on alternating lifts, with a minimum of three tests per visit, for structural areas.

E. Contractor will be responsible for any costs associated with testing performed as a result of failed tests

4.00 PART 4 - MEASUREMENT AND PAYMENT

4.01 TRENCH EXCAVATION

A. Trench excavation shall be considered incidental to pipeline installation.

B. Payment shall be made at the contract unit price per cubic yard only if a bid item is established in the contract.

4.02 BACKFILL

A. Payment for backfill shall be made at the contract unit price per cubic yard only if a separate bid item is established in the contract, otherwise it shall be considered incidental to the pipeline installation.

B. No allowance for waste shall be made.

C. If Engineer orders an initial backfill material other than that specified in contract, it shall be paid for as an extra in price per cubic yard as compacted in place, EXCEPT if a higher class embedment is ordered by Engineer because the Contractor has over-excavated the trench width.

D. If the Engineer orders the excavated material to be removed and disposed of and replaced with another material and a separate bid item is not established as a bid item, the material shall be paid as an extra.

E. If the Contractor fails to compact the backfill to the density requirements, the Engineer may order the material removed and replaced at no cost to the Owner.

F. The disposal of rejected material shall be at no cost to the Owner.

END OF SECTION

SECTION 02300 – STRUCTURAL EARTHWORK

1.00 PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Preparing subgrades for slabs-on-grade.
   2. Excavating and backfilling for buildings and structures.

B. Related Sections include the following:
   1. Division 1 Section "Temporary Facilities" for temporary controls, utilities, and support facilities.
   2. Division 2 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
   3. Division 2 Section "Groundwater Handling" for lowering and disposing of ground water during construction.
   4. Division 2 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
   5. Divisions 2, 15, and 16 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.03 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

B. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

C. Fill: Soil materials used to raise existing grades.

D. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

E. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

F. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.04 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

   1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.
   3. If required, submission of product data and mix design for controlled low-strength material.

B. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.05 QUALITY ASSURANCE

A. Provide Material Test Reports from a qualified testing agency indicating and interpreting test results for compliance of the requirements of this section.

1.06 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
   1. Notify Engineer not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Engineer's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

2.00 PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

E. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

F. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.02 CONTROLLED LOW-STRENGTH MATERIAL

A. Flowable Fill: Low-density, self-compacting, flowable concrete material as follows:
   1. Portland Cement: ASTM C 150, Type [I] [II] [or] [III].
   2. Fly Ash: ASTM C 618, Class C or F.
   3. Normal-Weight Aggregate: ASTM C 33, [3/4-inch (19-mm)] [3/8-inch (10-mm)] <Insert dimension> nominal maximum aggregate size.
   4. Retain first subparagraph below if low-density, controlled low-strength material is required.
   5. Foaming Agent: ASTM C 869.
   6. Water: ASTM C 94/C 94M.

7. Delete subparagraph below for low-density, controlled low-strength material using foaming agent.
8. Air-Entraining Admixture: ASTM C 260.

B. Produce low-density, controlled low-strength material with the following physical properties:
1. As-Cast Unit Weight: 30 to 36 lb/cu. ft. (480 to 576 kg/cu. m) at point of placement, when tested according to ASTM C 138/C 138M.
2. Compressive Strength: 80 psi (550 kPa), when tested according to ASTM C 495.

3.00 PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.03 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.04 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.05 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.06 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
1. Surveying locations of underground utilities for Record Documents.
2. Testing and inspecting underground utilities.
3. Removing concrete formwork.
4. Removing trash and debris.
5. Removing temporary shoring and bracing, and sheeting.
6. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.07 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations under slabs and foundations using engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.08 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.09 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures and slabs, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Grading inside structure lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
   1. Paved and Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 500 sq. ft. or less of paved area or slab, but in no case fewer than 3 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.12 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PAYMENT:

A. Compensation for work included under this specification shall be subsidiary to the cost for the installation of the pipe or structure.

B. Compensation will be for furnishing all materials, labor, equipment, tools and incidental work required by this specification and in accordance with the plans.

C. If the compaction tests fail, the trouble spot is to be corrected all as incidental to the construction of the line or structure.

END OF SECTION

SECTION 03200 – CONCRETE REINFORCEMENT

1.00 PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. ACI 315, Details and Detailing of Concrete Reinforcement.
2. ASTM A615, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
3. ASTM A185, Specifications for Steel Welded Wire Reinforcement, Plain, for Concrete.
4. Concrete Reinforcing Steel Institute, Manual of Standard Practice.

B. Allowable Tolerances:

1. Fabricating: (per ACI 117-90)
   a. Saw cut length to: Plus or minus 1". (Remove all burrs).
   b. Stirrups and ties: Plus or minus 1/2".
   c. All other bends: Plus or minus 1".
2. Placing:
   a. Concrete cover to formed surfaces: Plus or minus 1/4".
   b. Minimum spacing between bars: Plus or minus 1/4".
   c. Top bars in slabs and beams:
      1) Members 8" deep or less: Plus or minus 1/4".
      2) Members more than 8" but not over 2'-0" deep: Plus or minus 1/2".
      3) Members more than 2'-0" deep: Plus or minus 1".
      4) Crosswise of members: Space evenly within 2" of stated separation.
      5) Lengthwise of members: Plus or minus 2".
3. Maximum bar relocation to avoid interference with other reinforcing steel, conduits, or other embedded item: 1 bar diameter.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver reinforcement to project site in bundles marked with tags indicating bar size, length and mark.

B. Unload reinforcing carefully to prevent damage. Store above ground in dry, well drained area; protect from mud, dirt and corrosion.

2.00 PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing Bars: ASTM A615, deformed billet steel bars, domestic manufacture, Grades 40 and/or 60 as indicated on structural drawings.

B. Welded Wire Fabric Reinforcing: ASTM A185, steel wire spot welded at intersections and of size indicated.

C. Metal Accessories: Include spacers, chairs, bolsters, ties and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place, conforming to requirements to CRSI "Manual of Standard practice for Detailing Reinforced Concrete Structures." Metal accessories shall be galvanized or plastic coated where legs will be exposed in finished concrete surfaces.

D. Tie Wire: FS QQ-W-461, black annealed steel, 16 ga. min.

2.02 FABRICATION:

A. In accordance with CRSI "Manual of Standard Practice."

3.00 PART 3 - EXECUTION

3.01 PREPARATION

A. Cleaning: Before placing in work, thoroughly clean reinforcement of loose rust, mill, scale, dirt, oil, and other coating which might tend to reduce bonding. Reinspect reinforcing left protruding for future bonding, or following delay in work, and reclean if necessary.

3.02 INSTALLATION

A. Bar Placement: In accordance with CRSI "Recommended Practice for Placing Reinforcing Bars" and "Recommended Practice for Placing Bar Supports."

1. Bending: Bend bars cold; do not heat reinforcing or bend by make-shift methods. Discard bent, kinked or otherwise damaged bars.

2. Splices: In accordance with ACI 315.

3. Placing: Accurately position reinforcement; securely saddle tie at intersections.

4. Supports: In accordance with ACI 315 for number, type, spacing and placing.

END OF SECTION

SECTION 02500 – FLEXIBLE BASE

1.00 PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.

B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, or crushed slag.

C. Flexible base shall be constructed as specified herein in one or more courses in conformance with details, lines and grades shown on the plans, and as established by the ENGINEER.

2.00 PART 2 -PRODUCTS

2.01 MATERIALS:

A. Materials for flexible base shall be crushed or uncrushed as necessary to comply with the requirements hereinafter specified.

B. Materials shall consist of durable course aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with TxDOT Item 260.

2.03 TYPES:

A. Type A - Crushed or broken aggregate (excluding gravel aggregate).

B. Type B - Gravel Aggregate

C. Type C - Iron Ore Topsoil

D. Type D - Shell Aggregate with Sand Admixture

E. Type E - Shell Aggregate with Sand and Caliche Admixture

F. Type F – Caliche

G. Type G - Crushed Slag

H. Unless otherwise noted on the plans, the CONTRACTOR may use any one type of these types provided the material used meet the requirements set forth in the specification test limits herein.

2.04 GRADES:

A. Base courses or subbase materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02500-1.

B. All grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02500-1.

C. Testing of flexible base materials shall be in accordance with the following test procedures:

TEST	TESTING PROCEDURE
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Limit	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Test	TEX-117-E (Part I or II)

D. Unless otherwise specified on the plans, samples for testing the material for Soil constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.

E. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.

TABLE 02500-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

GRADES				
TYPES	Grade 1: Triaxial Class 1) minimum compressive strength, psi: 45 at 0 psi lateral pressure and 175 at 15 psi lateral pressure	Grade 2: Triaxial Class 1 to 2.3) Min. compressive strength, psi: 35 at 0 psi lateral pressure and 175 at 15 psi lateral pressure	Grade 3: (Unspecified Triaxial Class)	Grade 4:
TYPE A Crushed or Broken Aggregate (excluding gravel aggregate)	Retained on % Sq. Sieve 1-3/4 ..... 0 7/8" ..... 10-35 3/8" ..... 30-50 No. 4 ..... 45-65 No. 40 ..... 70-85 Max LL ..... 35 Max PI ..... 10 Wet Ball Mill Max Amt ..... 40 Max Increase in Passing No. 40 20	Retained on % Sq. Sieve 1-3/4" .....0-10 No. 4 ..... 45-75 No. 40 ..... 60-85 Max LL .....40 Max PI.....12 Wet Ball Mill Max. Amt .....50 Max Increase in passing No. 40 20	Retained on % Sq. Sieve 1-3/4" ..... 0-10 No. 40 ..... 60-85 Max LL ..... 45 Max PI ..... 15 Wet Ball Mill Max. Amt ..... 55 Max Increase in passing No. 40 20	As Shown on Plans
TYPE B Gravel Aggregate		Retained on % Sq. Sieve 1-3/4" .....0-10 No. 4 ..... 30-75 No. 40 ..... 70-85 Max LL .....35 Max PI.....12	Retained on % Sq. Sieve 1-3/4" ..... 0-5 No. 4 ..... 30-75 No. 40 ..... 65-85 Max LL ..... 35 Max PI 12	As Shown on Plans
TYPE C Iron Ore Topsoil		Retained on % Sq. Sieve 2-1/2" .....0 No. 40 ..... 50-85 Max LL .....35 Max PI.....12	Retained on % Sq. Sieve 2-3/4" ..... 0 No. 40 ..... 45-85 Max LL ..... 35 Max PI 12	As Shown on Plans

TABLE 02500- (CONT'D)

TYPE D Sand-Shell		Retained on % Sq. Sieve 1-3/4.....0-10 No. 4 ..... 45-65 No. 40 ..... 50-70 Max LL.....35 Max PI.....10	Retained on % Sq. Sieve 1-3/4".....0-10 No. 40.....45-65 Max LL..... 35 Max PI 12	As Shown on Plans
TYPE E Shell with Sand and Caliche		Retained on % Sq. Sieve 1-3/4" .....0-10 No. 40 ..... 45-65 Max LL.....35 Max PI.....12	Retained on % Sq. Sieve 1-3/4"..... 0 No. 40.....45-65 Max LL..... 35 Max PI 12	As Shown on Plans
TYPE F Caliche		Retained on % Sq. Sieve 1-3/4" .....0 No. 4 ..... 45-75 No. 40 ..... 50-85 Max LL.....40 Max PI.....12	Retained on % Sq. Sieve 1-3/4"..... 0 No. 40.....50-85 Max LL..... 40 Max PI 12	As Shown on Plans
TYPE G Crushed Blast Furnace Slag				As Shown on Plans

F. The limits establishing reasonable close conformity with the specified gradation and plasticity index are defined by the following:

1. The ENGINEER may accept the material, providing not more than 2 of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.

2. The ENGINEER may accept the material providing not more than 2 of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:

A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.

B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stock- pile for delivery to the road.

C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.

D. If the CONTRACTOR elects to produce the Type A material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the course aggregate stockpiles will be

retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.

E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the CONTRACTOR will be required to secure other materials which will meet specifications requirements.

F. The central mixing plant shall be either the batch or continuous flow type, and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.

G. Mixing shall continue until a uniform mixture is obtained.

3.00 PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

A. The roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.

B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.

C. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material.

D. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans, and any deviation in excess of 1/2 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

E. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.

F. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed on as directed, and any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as directed by the Engineer.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE C, TYPE F, AND TYPE G MATERIAL:

A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.

B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered in each 100- foot station.

C. Material deposited upon the subgrade shall be spread and shaped the same day.

D. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24-hour period, the materials shall be scarified and spread as directed by the Engineer.

E. The material shall be sprinkled, if directed, and shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

F. All areas and "nests" of segregated coarse or fine material shall be corrected to removed and replaced with well graded material, as directed by the ENGINEER.

G. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplies in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.

H. The course shall be compacted by method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:

    a. The course shall be sprinkled as required and rolled ad directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading and the surface upon completion shall be smooth and in conformity with the typical sections shown on plans and to the established lines and grades.

    b. In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

    c. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.

2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:

    a. The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".

    b. In addition to the requirement specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.

    c. After each section of flexible base is completed, tests as necessary will be made by the ENGINEER. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

    d. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to established lined and grades.

    e. In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be

corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

f. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.

I. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete; it shall be recompacted and refinished at the sole expense of the CONTRACTOR.

J. Where Type C material is used, the material shall be scarified, thoroughly wetted, mixed, manipulated, and bladed so as to secure a uniformly wetted material, and pulled in over the subgrade in courses and set under the action of blading and rolling. The work of mixing, blading, rolling, shaping, and subsequent maintenance shall be performed by the continuous use of sufficient number of satisfactory rollers and power maintainers with adequate scarifier attachments.

3.03 PLACEMENT OF FIRST COURSE - TYPE D MATERIAL:

A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section, and corrections made if necessary.

B. All materials shall be delivered in approved vehicles of a uniform capacity.

C. The required amount of shell shall be uniformly spread across the section and allowed to dry sufficiently to insure proper slaking and mixing of the binder material. Immediately upon completion of the drying period, as determined by the ENGINEER, the specified amount of sand admixture as required to produce a combined material meeting the requirements hereinbefore specified shall be spread uniformly across the shell.

D. The material shall then be sprinkled as required and thoroughly mixed by blading and harrowing, or other approved methods.

E. Failure to proceed with the placing of sand admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

F. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

G. The course shall be compacted by the method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the plans indicate that the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a. After mixing, all material shall be windrowed, and then spread over the section in layers.

b. The layer shall not exceed 2 inches in loose depth.

c. If necessary to prevent segregation, the material shall be wetted in the window prior to spreading.

d. After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction as directed by the ENGINEER. Succeeding layers shall then be placed similarly until the course is completed.

e. All areas and "nest of segregated coarse or fine material shall be corrected or removed and replaced with well graded material, as directed by the ENGINEER.

f. The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured.

g. Throughout this entire operation, the shape of the course shall be maintained by blading; and the surface, upon completion, shall be smooth and in conformity with the typical sections shown on plans, and to the established lines and grades.

h. In that area on which pavement is to be place, any deviation in excess of 1/4 inch in cross section in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

i. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.

2. When the plans indicate that the "Density Control" method of compaction is to be used, the compaction method shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

H. When indicated on the plans or permitted by the ENGINEER, Type D material may be mixed in a central mixing plant and delivered to the road as a combined mixture. When this method is used, the combined mixture shall meet the requirements for type D material as hereinbefore specified and the placing and compaction requirement shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

3.04 PLACEMENT OF FIRST COURSE - TYPE E MATERIAL:

A. The construction methods for placing the first course of Type E material shall be the same as prescribed for Type D material except that after the shell and sand have been placed, the prescribed amount of caliche shall then be spread across the sand and shell.

B. The composite mixture shall then be sprinkled as required and thoroughly mixed by blading and harrowing or other approved methods.

C. Compaction of the first course of Type E material shall be the same as prescribed above for Type D material.

D. Failure to proceed with placing the sand and caliche admixture or mixing and placing operations will be grounds for the suspension of placing of shell.

E. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

3.05 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

A. Construction methods shall be the same as prescribed for the first course.

B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.06 DENSITY CONTROL:

A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.

B. The testing will be as outlined in Test Method Tex-114-E.

C. It is the intent of this specification to provide in that part of the base included in the top 8 inches immediately below the finished surface of the roadway not less than 100 percent of the density as determined by the compaction ratio method.

D. Field density determination shall be made in accordance with Test Method Tex-115-E.

3.07 TOLERANCES:

A. Flexible base will be measured by the square yard of surface area of completed and accepted work based on the width of flexible base as shown on the plans.

1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

4.00 PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Flexible base will be measure by the square yard of surface area of completed and accepted work or by the cubic yard delivered and spread for manipulation.

1. The flexible base shall be measured for depth by the units of 2000 square yards, with one measurement taken at a location selected by the ENGINEER.

2. In that unit where flexible base is deficient by more than 1/2 inch in thickness, the deficiency shall be corrected by scarifying, adding material as required, reshaping and recompacting by sprinkling and rolling.

3. No additional payment over the contract unit price will be made for any flexible base of a thickness exceeding that required by plans.

B. The CONTRACTOR shall schedule his operations in such a manner as to facilitate the measurement of the pay item.

C. The ENGINEER may accept the work provided no more than 2 out of 10 depth tests performed are deficient by not more 1/2 inch and where no two consecutive tests on continuous work are outside the specified depth.

4.02 PAYMENT:

A. The accepted quantities of flexible base of the type, grade, and compaction method specified will be paid at the contract unit bid price, complete in place.

B. Regardless of the type of compaction or Density Control specified, all sprinkling, rolling, and manipulation required will not be paid for directly, but will be incidental.

C. The unit prices bid shall each be full compensation for shaping and fine grading the roadbed; for securing and furnishing all materials, including all royalty and freight involved; for furnishing scales and labor involved in weighing the material when required; for loosening, blasting, excavating, screening, crushing and temporary stockpiling when required; for loading all materials for all hauling and delivering. on the road; for spreading, mixing, blading, dragging, shaping and finishing and for all manipulation, labor, tools and incidentals necessary to complete the work.

END OF SECTION

SECTION 02515 – WETWELL AND MANHOLE STRUCTURES

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sanitary sewer wetwells, manholes and appurtenances.

2. Valve vaults.

B. Related Sections include but are not necessarily limited to:

1. Forms of Contract, Bond and Proposal.

2. General Specifications.

3. Section 02221 – Excavating, Backfilling, and Compacting for Utilities.

4. Section 02300 – Structural Earthwork

5. Section 02556 – Force Main

6. Section 02570 – Sanitary Sewer.

7. Section 11322 – Submersible Lift Station.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. M198, Standard Specification for Asbestos-Cement Underdrain Pipe.
   b. H20, Axial Loading.

2. American Society for Testing and Materials (ASTM):
   a. A48, Gray Iron Castings (Class 35 Minimum).
   b. C478, Precast Reinforced Concrete Manhole Sections.
   c. C581, Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass-Fiber Reinforced Structures Intended for Liquid Service.
   d. C582, Plastic Laminate.
   e. C923, Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.
   f. C950, Glass-Fiber Reinforced Thermosetting Resin Pressure Pipe.
   g. D695, Test Method for Compressive Properties of Rigid Plastics.
   h. D790, Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
   i. D2412, Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading.
   j. D2583, Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impresser.
   k. D2584, Test Method for Ignition Loss of Cured Reinforced Resins.
   l. D3753, Standard Specification for Glass-Fiber Reinforced Polyester Manholes.

3. Occupational, Health and Safety Administration (OSHA).

1.03 SUBMITTALS

A. Refer to Section 01300.

B. Product technical data including:

1. Acknowledgment that products submitted meet requirements of standards referenced.

2. Manufacturer's installation instructions.

3. Operation and maintenance manuals.

C. Fabrication and/or layout drawings:

1. Include detailed diagrams of wetwells/manholes and valve vaults showing typical components and dimensions.

2. Itemize, on separate schedule, sectional breakdown of each wetwell/manhole or valve vault structure with all components and refer to drawing identification number or notation.

3. Indicate knockout elevations for all piping entering each wetwell/manhole.

D. Certifications.

E. Design calculations.

F. Concrete pad foundation design and drawings.

G. Test reports.

H. Warranty information.

2.00 PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:

1. Wetwell/manhole rings, covers and frames:
   a. Halliday.
   b. Bilco.
   c. Bass & Hays Foundry.
   d. Neenah Foundry.
   e. Deeter Foundry.

2. Black mastic joint compound:
   a. Kalktite 340.
   b. Tufflex.
   c. Plastico.

3. Premolded joint compound:
   a. Ram Nec.
   b. Kent Seal.

4. Fibered asphalt compound:
   a. Sonneborn Hydrocide 700B Semi-Mastic.

5. Fiberglass Wetwells/Manholes:
   a. Containment Solutions, Inc.
   b. Flowtite Products.
   c. Bellco.

6. Precast Concrete Wetwells/Manholes:
   a. Hanson.
   b. Oldcastle Precast.
   c. American.
   d. Park Engineering.

7. Interior Protective Epoxy Coating for Concrete Wetwells/Manholes:
   a. Refer to Section 09900.

B. Submit request for substitutions in accordance with Specification Section 01640.

2.02 SANITARY SEWER WETWELL

A. Wetwell/Manhole Interior Dimensions:

1. Diameter: 96 inches (wetwell). 60 inches (receiving manhole).

2. Depth: See plans.

3. The dimensions provided herein are approximate. The Contractor shall refer to the Drawings for exact dimensions.

B. Physical Requirements:

1. Fiberglass Wetwell/Manhole:
   a. The complete wetwell/manhole shall have a minimum dynamic-load rating of 16,000 ft-lbs when tested in accordance with the requirements of this specification. To establish this rating, the complete wetwell/manhole shall not leak, crack or suffer other damage when load tested to 40,000 ft-lbs and shall not deflect vertically downward more than ¼ inch at the point of load application when loaded to 24,000 lbs.
   b. The wetwell/manhole cylinder shall meet the minimum pipe-stiffness values specified below:

Length (ft)	Stiffness Requirements (F/AY-psi)
10 to 20	2.01
21 to 30	3.02
31 to 40	5.24

   c. Physical properties:

Physical Property	Hoop Direction	Axial Direction
Tensile strength (psi)	18,000	5,000
Tensile modulus (psi)	800,000	700,000
Flexural strength (psi)	26,000	4,500
Flexural modulus (psi) No ribs – 48”, 60” or 72”	1,400,000	700,000

With ribs – 96” or 144”	700,000	700,000

d. Tests shall be performed as specified in ASTM D3757.
e. The Contractor shall furnish all materials, labor and equipment for the installation of a one-piece, prefabricated fiberglass reinforced polyester (FRP) wetwell/manhole and accessories including concrete sections as shown on the Drawings and as specified herein.
f. FRP wetwell/manhole shall be built to meet the requirements of ANSI/ASTM D3753 at a minimum and shall be manufactured from commercial grade polyester resin or vinyl ester resin with fiberglass reinforcements. The resin system shall be suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with wastewater collection systems.
g. Pipe connections shall be installed by the manufacturer.

h. FPR wetwells/manholes shall be marked by the manufacture in letters no less than one (1) inch in height with the following information:
   i. ASTM Designation.
   ii. Manhole Length.
   iii. Manufacturer’s Identification.
   iv. Manufacturer’s Serial Number.

i. Provide the following components for each wetwell/manhole structure:
   i. Level reinforced concrete base pad (cast-in-place).
   ii. Circular penetrations as required.
   iii. Barrel section(s).
   iv. Adjuster ring(s).

j. Contractor shall coordinate size, type, and location of all penetrations with all other trades and equipment.
k. FRP wetwells/manholes shall be suitable for use in sanitary sewer environment.

l. Cylinders shall be designed and fabricated to provide sufficient strength for the following conditions:
   i. Resistant to buckling when empty and when the groundwater elevation is at grade.
   ii. The anchoring wall structure at the embankment within the reinforced concrete base zone shall be designed to resist external hydrostatic water forces of an empty or full cylinder with the groundwater at grade elevation.
   iii. Load bearing capacity: Properly installed wetwell/manhole shall be capable of withstanding H-20 dynamic loading (24,000 lbs) applied vertically.

m. FRP wetwells shall be manufactured to the diameters and heights as shown on the Drawings and as specified herein.
n. FRP wetwells shall be designed to perform as underground structures at the depths required and to withstand the necessary lateral hydrostatic pressures with a minimum safety factor of 2.5. FRP structures shall be capable of supporting the top slab covers, frames, soil overburdens plus a live load equivalent to AASHTO H-20 Loading.
o. All cutouts shown in the plans and details for each FRP wetwell/manhole shall be capable of maintaining the unit’s structural integrity.

C. Wetwell and Valve Vault Access Doors and Frames:

1. Furnish and install double-hinged doors constructed of aluminum.

2. Furnish size shown on Drawings.

3. Equip with nonsparking upper guide rail support, cable brackets, and flush locking mechanism, and safety grating.

4. Doors shall be spring-assisted and shall remain in open position while work is being performed with safety handles.
5. Securely place frame above pump(s).

6. Provide doors of skidproof design.

7. Provide doors with snap locks and removable handle.

8. Provide door hardware including latching mechanism and hinges of stainless steel materials.

9. Access doors shall be sized and designed to withstand H-10 loads and shall allow for the easy removal of pumps and valves from the wetwell or valve vault.

10. Aluminum access doors shall be of a non-watertight design.

D. Nonpressure Type Frames and Manhole Covers:

1. Cast or ductile iron frame and covers: ASTM A48, Class 30, with asphalt varnish coating applied at the foundry.

2. Use only cast or ductile iron of best quality, free from imperfections and blowholes.

3. Machine all horizontal surfaces.

4. Unless dimensioned or specifically noted on Drawings, manhole frame and cover shall be 24-inch diameter standard cast iron and shall weigh approximately 400 LB.

5. Furnish unit with solid nonventilated lid with concealed pickholes. Letter covers "SEWER" for all collection system manholes.

6. Ensure minimum clear opening of 30-inch diameter.

E. Special Coatings and Joint Treatment:

1. Joints for precast sections: Resilient O-ring gaskets manufactured from natural or synthetic materials complying with ASTM C923, of suitable cross section and size to meet specified infiltration or exfiltration requirements.

2. All interior surfaces of concrete wetwells/manholes shall be epoxy-coated to protect from sulfide corrosion. Contractor shall propose coating materials and methods for Owner approval prior to ordering materials. The interior coating shall be in place prior to setting of wetwell/manhole section. Refer to Section 09900 for interior concrete coating specification.

2.03 MATERIALS

A. FRP Wetwell/Manhole

1. Resin:
   a. Unsaturated isophthalic polyester resins shall be used and they must meet the requirements listed below:

Property	Test Method	Requirement
Acid number	ASTM D465-59	Maximum = 15
Hydroxyl number		Maximum = 30
Solids content	ASTM D1259-61	Maximum = 50%

   b. The following requirements are determined when testing the resin without any reinforcing material included:

Property	Test Method	Requirement
Flexural strength	ASTM D790-70	Minimum = 10,000 psi
Flexural E-modulus	ASTM D790-70	Minimum = 400,000 psi
Elongation at rupture	ASTM D790-70	Minimum = 2 ½ %
Heat distortion temperature	ASTM D648-61	Minimum = 167ºF
Weight change after 28 days storing in distilled water	ASTM D570-63	Maximum = 150 mg/sample
Surface hardness (Barcol)	ASTM D2583-67	Minimum = 80% of resin's normal value

   c. All resin shall be supplied by same supplier. Mixed lots or "odd lots" of resin from different vendors shall not be used.

2. Reinforcement:
   a. Reinforcement shall be fiberglass mat, continuous roving, chopped roving, roving fabric or a combination of the above.
   b. The fiberglass shall be type "E" and have a finish compatible with the resin used.
   c. The interior surface shall be reinforced layer 10 to 20 mils.
   d. Reinforcement materials shall be chemically resistant surface mat or organic surfacing veil.
   e. Reinforcements shall have a coupling agent which will provide a suitable bond between the reinforcement and the resin.
   f. If reinforcing material is used on the surface exposed to the contained substance, it shall be a commercial grade chemical-resistant glass that will provide a suitable bond with the resin and leave a resin-rich surface.

3. Fillers, when used, must not degrade the resin chemical resistant properties as defined in this specification.

4. Additives, such as thixotropic agents, catalysts and promoters may be added as required by the specific manufacturing process used to meet this standard. However, calcium carbonate mixed by the manufacturer shall not be permitted. The resulting reinforced plastic material must meet the requirements of this specification.

5. Laminate: (Cured composite including glass fiber reinforcement) Cured laminate must meet the following conditions:

Property	Test Method	Requirement
Glass content (% by wt.)	ASTM D2584-68	20 to 70%
Compressive strength	ASTM D695-69	Minimum = 12,000 psi
Flexural strength	ASTM D790-70	Minimum = 12,000 psi
Flexural E-modulus	ASTM D790-70	Minimum = 700,000 psi
Surface hardness (Barcol)	ASTM D2583-67	Minimum = 90% of resin's normal value

6. UV inhibitors/stabilizers shall be added directly to resins system to prevent photodegradation of laminate or wetwell/manhole shall have exterior gray gel-coat for UV inhibitor.

B. Wetwell/manhole concrete shall meet the requirements of ASTM C478.

2.04 FABRICATION

A. FRP Wetwell/Manhole:

1. The exterior surface shall be relatively smooth with no sharp projections. Handwork finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than ½ inch diameter, delamination and fiber show.

2. Interior surface shall be resin-rich with no exposed fibers. The surface shall be free of grazing, delamination, blisters larger than ½ inch diameter, and wrinkles of 1/8 inch or greater in depth. Surface pits shall be permitted up to six (6) square feet if they are less than ¾ inch in diameter and less than 1/16 inch deep.

3. The bottom shall be fabricated using fiberglass material and shall meet all physical requirements as specified herein. The bottom shall be attached to the wetwell/manhole with fiberglass lay up to comply with ASTM D3299.

4. The FRP wetwell/manhole top shall be fabricated using fiberglass material and shall meet all physical requirements as specified herein. The top shall be attached to the wetwell/manhole with fiberglass lay up to comply with ASTM D3299.

5. When reinforcement is necessary for strength, the reinforcement shall be completely enclosed with a fiberglass lay up per ASTM D3299.

6. The FRP receiving manhole shall be fabricated to allow the installation of a slide gate and appurtenances as shown on the plans. The slide gate shall be factory installed by the FRP manhole manufacturer.

2.05 QUALITY ASSURANCE/QUALITY CONTROL

A. FRP Wetwell/Manhole:

1. Examination: Each FRP cylinder component part shall be examined for dimensional requirements, hardness and workmanship.

2. Composition control: Controls on glass and resin content shall be maintained for all manufacturing processes and for each portion of the FRP cylinder fabrication. Records

shall be maintained for these control checks. Proper glass content may be shown by glass usage checks, by glass and resin application rate checks, in accordance with the material composition test in ASTM D3753, Section 8.8.1.

3. All required ASTM D3753 testing shall be completed and records of all testing shall be kept and copies of test results shall be presented to Owner/Engineer upon written request within a reasonable time period.

4. When requested by the Owner/Engineer, a certification shall be made the basis of acceptance. This shall consist of a copy of the manufacturer's test report or a statement by the supplier, accompanied by a copy of the test results, that the FRP cylinders have been sampled, tested and inspected in accordance with the provisions of ASTM D3753 and the requirements of this specification. Each certification so furnished shall be signed by an authorized agent of the supplier and manufacturer.

5. Rejection of FRP Wetwells/Manholes: FRP wetwells/manholes are subject to rejection on account of any of the following visual defects:
   a. Fuzz: Glass fibers loosely adhering to wetwell/manhole which are not wet out with resin.
   b. Protruding fibers: Glass fibers sticking out from pipe surface that are not wet out with resin.
   c. Resin runs: Runs of resin and sand on surface of wetwell/manhole.
   d. Dry areas: Areas in laminate with glass to wet out with resin.
   e. Delamination: Separation in the laminate.
   f. Blisters: Light (straw) colored areas resulting from too hot a cure.
   g. Craze: Crack usually star shaped; caused by sharp impact.
   h. Surface pits or voids: small air pockets on the surface or directly beneath the surface mat.
   i. Wrinkles: Smooth irregularities on the surface.
   j. Torn edges, end delamination and end gauges: tears and rips in the edge of cuts.
   k. Ground area: Areas around lay-up which have been abraded and not covered by lay-up.
   l. Hand lay-up ragged edges: Areas at the edge of hand lay-up that are not rolled down properly and that are rough.
   m. Painting or gel-coating of exterior or interior laminate.

2.06 HANDLING AND STORAGE REQUIREMENTS

A. FRP Wetwell/Manhole:

1. FRP wetwells/manholes may be stored upright or horizontally; however, the wetwell/manhole vertical deflection shall not exceed 4% of the diameter. The wetwell/manhole shall not be dropped or impacted. If stored horizontally, the wetwell/manhole shall be chocked.

2. If wetwells/manholes must be moved by rolling, the ground traversed shall be smooth and free of rocks, debris, etc.

3. Additional handling instructions shall be in accordance with the FRP wetwell/manhole manufacturer's instructions.

4. Each FRP section manufactured in accordance with this specification and the Drawings shall be clearly marked to indicate the intended pump station installation location. The contractor shall be responsible for the installation of the correct FRP sections in their designated pump station locations.

B. Handle and store precast concrete wetwell/manhole sections in accordance with manufacturer recommendations.

3.00 PART 3 - EXECUTION

3.01 MANHOLE CONSTRUCTION

A. General:

1. Construct cast-in-place concrete base slabs as shown on the Drawings.

2. Make inverts with a semi-circular bottom conforming to the inside contour of the adjacent sewer sections.

3. Shape inverts accurately and steel trowel finish. For changes in direction of the sewer and entering branches into the wetwell/manhole, make a circular curve in the wetwell/manhole invert using as large a radius as wetwell/manhole inside diameter will permit. Place base slab integral with bottom barrel section.

B. Build each wetwell/manhole to dimensions indicated on Drawings and at such elevation that pipe sections built into wall of wetwell/manhole will be true extensions of line of pipe.

C. For all horizontal mating surfaces between concrete to concrete and concrete to metal, install resilient O-ring type gaskets.

D. For horizontal joints which fall below established high groundwater elevation, install a resilient O-ring type gasket in addition to (pre-molded) mastic compound.

E. Seal all pipe penetrations in wetwell/manhole. Form pipe openings smooth and well shaped. After installation, seal cracks with, non-shrink grout. After grout cures, wire brush smooth and apply two coats emulsified fibered asphalt compound to minimum wet thickness of 1/8 inch to ensure complete seal.

F. Set and adjust frame and cover final 6 inches (minimum) to 18 inches (maximum) to match finished pavement or finished grade elevation using precast adjuster rings.

G. FRP Wetwells/Manholes:

1. Install fiberglass wetwells/manholes as per manufactures installation instructions.

2. FRP wetwells/manholes shall be lifted by the installation of lifting lugs as specified by the manufacturer on the outside surface near the top or by a sling or choker connection around center. Use of chains or cables in contact with the wetwell/manhole surface is prohibited. Wetwells/manholes may be lifted horizontally using one support point.

3. Each excavation and backfill are to be done as part of the work under this section, including any necessary sheeting and/or bracing.

4. Excavation: The limit of the excavation shall be such to allow for placing and removing forms, installing sheeting, shoring, bracing, etc. The Contractor shall pile excavated material in a manner that will not endanger the work and will avoid obstructing sidewalks, driveways, power poles, etc. Drainage shall be kept clear.

5. The Contractor shall keep the excavation free from water by use of cofferdams, bailing, pumping, well pointing, or any combination as the particular situation may warrant. All dewatering devices shall be installed in such a manner as to provide clearance for

construction, removal of forms, and inspection of exterior form work. It is the intent of these specifications that the foundation be placed on a firm dry bed. The foundation bed shall be kept in a dewatered condition a sufficient period of time to insure the safety of the structure. All dewatering methods and procedures are subject to the approval of the Owner. The excavation shall be protected from excessive rainfall, drainage and drying.

6. The excavation shall be inspected and approved by the Owner before work on the structure is started. It is the intent of these specifications that the Contractor provide a relatively smooth, firm foundation bed for footings and slab that bear directly on the undisturbed earth without additional cost to the owner, regardless of the soil conditions encountered. The Owner will be the sole judge as to whether these conditions have been met.

7. When necessary to protect existing or proposed structures or other improvements, the Contractor shall maintain vertical sides of the excavation. The limit shall not exceed three feet outside the footing on a vertical plane parallel to the footing except where specifically approved otherwise by the Owner. The Contractor shall provide and install any sheeting, shoring and bracing as necessary to provide a safe work area as required to protect workmen, structures, equipment, power poles, etc. The Contractor shall be responsible for the design and adequacy of all sheeting, shoring and bracing. The sheeting, shoring and bracing shall be removed as the excavation is backfilled in such a manner as to prevent injurious caving.

8. Where sufficient space is available, the Contractor shall be allowed to back slope the sides of the excavation. The back slope shall be such that the excavation shall be safe from caving. The type of material being excavated shall govern the back slope used, but in any case the back slope shall be no steeper than one foot horizontal to one foot vertical.

9. Excavation for slabs, footings, etc. that bear on the earth shall not be carried below the elevation shown on the Drawings. In the event that the excavation is carried on below the indicated elevation, the Contractor shall bring the slab, footing, etc. to the required grade by filling with concrete having a minimum compressive strength of at least 3,000 psi at 28 days.

10. The bottom of the excavation shall be compacted to 95% Standard Proctor Density. The Contractor shall pour reinforced concrete base one foot deep and at least two feet larger than the FRP wetwell/manhole outside diameter. As soon as the concrete has set-up enough to support the FRP wetwell/manhole, the wetwell/manhole shall be lowered into place. A minimum of one foot of reinforced concrete shall be poured on the inside of the wetwell/manhole. Reinforced concrete shall be poured one foot deep and two feet from the wetwell/manhole wall on the outside of the wetwell/manhole. A ram neck type sealant shall be inset on the outside of the FRP wetwell/manhole around the bottom where the fiberglass and concrete come together.

11. A minimum of 12 inches of bedding shall be placed as a foundation for the wetwell/manhole base slab.

12. Do not backfill until the concrete base has hardened sufficiently to provide rigid support for both the wetwell/manhole and backfill. Unless otherwise shown on the Drawings, sand shall be used for backfill around the wetwell/manhole for a distance of two feet from the external surface of the fiberglass wetwell/manhole and extending from the bottom of the excavation to the bottom of the top slab.

13. Contractor shall use extreme caution when backfilling and compacting around the perimeter of the FRP wetwell/manhole so as not to crack or damage the wetwell/manhole.

14. Suitable material chosen from the excavation may be used for the remainder of the backfill. The material shall be free of large lumps or clods, which will not readily break down under compaction. This material shall be subject to approval by the Owner.

15. Backfill material shall be free of vegetation or other extraneous material. Excavated materials which are to be used for fill or backfill may be stockpiled on the site. Location of stockpiles shall be approved by the Owner. Top soil shall be stockpiled separately and used for finish grading around the structure.

16. Backfill shall be placed in layers of not more than 12 loose measure inches and mechanically tamped to at least 95% Standard Proctor Density. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the structure.

17. One foot outside of the FRP wetwell/manhole and a minimum of six (6) inches thick.

18. Pre-cast concrete bases are permitted with Owner pre-approval for installation with the wetwell/manhole. If such bases are used and are to be set with the wetwell/manhole, all lifting shall be done on the base itself with Owner approved lifting eyes or loops and not the wetwell/manhole structure.

19. Wetwell/manhole manufacturer shall provide a competent representative, knowledgeable in the installation of fiberglass wetwells/manholes, to inspect the concrete base and provide Owner with a letter certifying that the base has been inspected and is suitable for installation of the wetwell/manhole.

20. Wetwell/manhole cutouts may be made in the FRP wetwell/manhole using a circular saw, saber saw, hole saw or similar equipment with a masonry type blade. Axes, hammers, chisels, or similar impact type tools shall not be used.

21. Fiberglass wetwell and manhole structures to have fabricated stubouts and connections. (unless otherwise stated.)

22. Stubouts and connections:
    a. Type I: Make the cutout in the wetwell/manhole wall equivalent to the outside diameter of the pipe plus ½ inch maximum. Slip the pipe into position and apply industrial grade silicone around the pipe next to the wetwell/manhole wall cutout on the inside and the outside. Cover the outside silicone area with epoxy grout and backfill.
    b. Type 2: Make the cutout in the wetwell/manhole wall equivalent to the outside diameter of the pipe plus ½ inch maximum. Grind the outside surface of the pipe and both the inside and the outside surfaces of the cutout in the wetwell/manhole wall. Apply a priming agent to any PVC pipe that might be used before fiberglass lay-up. Insert the pipe through the cutout in the wall of the wetwell/manhole and apply fiberglass putty to the inside and outside of the wetwell/manhole wall cutout, filling openings between the pipe and cutout. Make a good radius for the fiberglass lay-up. After the putty has set-up, fiberglass the pipe into place. Use one layer of woven roving sandwiched between two layers of fiberglass mat. Allow the fiberglass to completely set before backfilling. Fiberglass lay-up method shall comply with ASTM D3299.
    c. Type 3: Install Insert-A-Tee type fittings per manufacturer's instructions (Fowler Manufacturing Company or approved equal).
    d. The fiberglass top may have stubouts installed or may have a raised fiberglass collar around the hatch opening. The fiberglass top has been designated to withstand the weight of a concrete reinforced slab to be installed over it.

H. Debris must be removed from the wetwell/manhole by the Contractor before the wetwell/manhole will be accepted.

I. Build each wetwell/manhole to dimensions indicated on Drawings and at such elevation that pipe sections built into wall of wetwell/manhole will be true extensions of line of pipe.

J. For all horizontal mating surfaces between concrete to concrete and concrete to metal, install resilient O-ring type gaskets.

K. For horizontal joints which fall below established high groundwater elevation, install a resilient O-ring type gasket in addition to (pre-molded) mastic compound.

L. Seal all pipe penetrations in wetwell/manhole. After installation, seal cracks with, non-shrink grout. After grout cures, wire brush smooth and apply two coats emulsified fibered asphalt compound to minimum wet thickness of 1/8 inch to ensure complete seal.

M. Set and adjust wetwell/manhole frame and cover final six (6) inches (minimum) to 18 inches (maximum) to match finished pavement or finished grade elevation using adjuster rings.

3.02 FIELD TESTING

A. All wetwells/manholes shall be field tested to verify watertightness:

1. Hydrostatic Exfiltration Test:
   a. All wastewater lines coming into the wetwell/manhole shall be sealed with an internal pipe plug.
   b. Fill the wetwell/manhole with water and maintained full for at least one hour
   c. For concrete wetwells/manholes a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete.
   d. The maximum leakage of hydrostatic testing shall be 0.025 gallons per foot diameter per foot of wetwell/manhole depth per hour.

2. Vacuum Test
   a. All wastewater lines coming into the wetwell/manhole shall be sealed with a plug braced adequately to prevent them from being drawn into the wetwell/manhole.
   b. Plugs shall be installed beyond drop connections or stub-outs.
   c. The test head shall be placed inside the frame at the top of the wetwell/manhole and inflated in accordance with the manufacturer's recommendations.
   d. A vacuum of 10-inches of mercury shall be drawn, and the vacuum pump will be turned off.
   e. With the valve closed the level of vacuum shall be read after the required test time as shown in the table below.
   f. If the drop in vacuum level is less than one-inch of mercury at the end of the required test time the wetwell/manhole will have passed the vacuum test.

Minimum Time Required for Vacuum Drop of 1" Mercury

Manhole Depth (Ft.)	4-Foot Diameter	5-Foot Diameter	6-Foot Diameter
0 – 20'	0 m 50 sec	1 m 05 sec	1 m 20 sec
20' – 24'	1 m 00 sec	1 m 18 sec	1 m 36 sec
Over 24' *	0 m 05 sec	0 m 6.5 sec	0 m 08 sec

* Add these items to that required for wetwells/manholes 20 to 24 feet deep for every two (2) feet of depth greater than 24 feet.

B. Structures failing watertight testing shall be rejected. Contractor shall either fix and retest the failing structure or replace the structure at no additional cost to the Owner.

3.03 INSPECTION

A. FRP Wetwell/Manhole:

1. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other designated representative of the Owner. Such inspections shall be made at the place of manufacture or at the site of delivery. The sections shall be subject to rejection on account of failure to meet any of the specification requirements as specified herein. Sections rejected after delivery to the job site shall be marked for identification and shall be removed from the job at once. All sections which have been damaged after delivery will be rejected, and if already installed shall be acceptable if repaired or removed and replaced at the Contractor's expense.

2. At the time of inspection the material shall be examined for compliance with the requirements of this specification and the approved drawings.

END OF SECTION

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SECTION 02556 - WATER TRANSMISSION LINES AND/OR PRESSURE SEWER LINES

1.00 PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Trenching, Backfilling and Compacting: Section 02221.

B. Valves and Appurtenances: Section 15100.

1.02 SUBMITTALS

A. Conform to requirements of Section 01300 - Submittals.

B. Manufacturer's Literature: Manufacturer's descriptive literature and recommended method of installation.

C. Certificates: Manufacturer's certification that products meet specification requirements.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials on manufacturer's original skids or in original unopened protective packaging. OWNER reserves the right to reject surplus material from a different project/jobsite.

B. Protect materials during transportation, storage, and installation to avoid physical damage.

1.04 GENERAL DESCRIPTION OF WORK COVERED

A. Furnish and install all pipe, fittings, structures and accessories required for water transmission line and/or pressure sewer lines.

1.05 QUALITY ASSURANCE

A. Comply with the latest published edition of American Water Works Association (AWWA) Standards:
   1. AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.
   2. AWWA C105 - Polyethylene Encasement for Ductile Iron Pipe Systems
   3. AWWA C110 & C110a - Gray Iron and Ductile-Iron Fittings, 2-inch through 48-inch for Water and Other Liquids.
   4. AWWA C111 - Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings.
   5. AWWA C115 - Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
   6. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
   7. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
   8. AWWA C153 - Ductile-Iron Compact Fittings, 3-inch through 24-inch, and 54-inch through 64-inch for Water and Other Liquids.
   9. AWWA C 600 - Standard for Installation of Ductile Iron Water Mains and Their Appurtenances.
   10. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe 4-inch through 12-inch for water.
   11. AWWA C907 - Polyvinyl Chloride (PVC) Pressure Fittings for Water, 4-inch through 8-inch.
   12. AWWA C909 - Polyvinyl Chloride (PVC) Pressure Pipe 6-inch through 12-inch for water.
   13. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe 14-inch through 36-inch for water.
   14. AWWA C301-99 – Pre-stressed Concrete Pressure Pipe - Steel Cylinder Type, for water and other liquids.

B. Comply with the latest published editions of the American Society for Testing and Materials (ASTM) Standards:
   1. D 1248 - Polyethylene Plastics Molding and Extrusion Materials.
   2. D 2241 - Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).
   3. D 3139 - Joints for PVC Pressure Pipes using Flexible Elastomeric Seals.
   4. G 62 - Test Methods for Holiday Detection in Pipeline Coatings.

C. Comply with the latest published editions of Plastics Pipe Institute (PPI) Standards:
   1. TR2 - PPI PVC Range Composition, Listing of Qualified Ingredients.

D. Comply with the latest published editions of Canadian Standards Association (CSA) Standards:
   1. CSA B137.3 - Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.

E. Comply with the latest published editions the Steel Structures Painting Council (SSPC) Standards, for Commercial Blast Cleaning.

2.00 PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Water Pipe: Pipe furnished shall be Polyvinyl Chloride (PVC). Ductile Iron (DI) pipe shall be provided only where specifically identified on the Drawings or in the Specifications.

B. Wastewater Pipe: Pipe shall be Polyvinyl Chloride (PVC) for buried service, and flanged Ductile Iron (DI) for non-buried service unless shown otherwise on the Drawings or Specifications.

C. All pipe and fittings shall be marked in accordance with the applicable standard specification under which the pipe is manufactured unless otherwise specified.

D. The quality of materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the ENGINEER at the pipe manufacturing plant and at the project site prior to and during installation. All water distribution pipe and fittings shall be listed in the Fire Protection Equipment Directory published by the Underwriter's Laboratories, Inc. or shall be Factory Mutual approved for fire service.

2.02 POLYVINYL CHLORIDE PIPE (PVC)

A. Water Pipelines:
   1. Pipe shall be blue in color.
   2. Water lines 12-inch and smaller may be constructed of PVC water pipe, Pressure Class 150, in accordance with AWWA C900 (DR18) or AWWA C909 unless otherwise noted on drawings.
   3. Water lines 14-inch through 24-inch may be constructed of PVC water pipe in accordance with AWWA C905 (DR 18) unless otherwise noted on drawings.
   4. Water lines 30-inch and larger shall not be constructed of PVC.

B. Wastewater Pipelines:
   1. Pipe shall be green in color.
   2. Forcemains 12-inch and smaller may be constructed of PVC pipe in accordance with AWWA C900 (Pressure Class 150, DR18), AWWA C909 (Class 150), or ASTM 2241 (Pressure Rated 160 psi, SDR 26).
   3. Forcemains 14-inch through 24-inch may be constructed of PVC pipe in accordance with AWWA C905 (Pressure Rated 165 psi, DR 25) or ASTM 2241 (Pressure Rated 160 psi, SDR 26).
   4. Forcemains 30-inch and larger may be constructed of PVC pressure pipe in accordance with AWWA C905 (Pressure Rated 165 psi, DR25).

C. Where PVC pipeline is installed using non-encased, trenchless methods, the pipe shall conform to all preceding requirements for PVC pipe and may be one of the following:
   1. Jointless PVC conforming also to the requirements of PPI TR2. The pipe shall be extruded with plain ends square to the pipe and free of any bevel or chamfer. Pipe shall be Fusible C900™ or Fusible C905™ as manufactured by Underground Solutions, Sarver, PA.
   2. Restrained joint PVC having non-metallic couplings incorporating high-strength, flexible

thermoplastic splines which shall be inserted in to mating, precision-machined grooves in the pipe and coupling to provide full 360º restraint with evenly distributed loading. Couplings shall be designed for use at or above the pressure class/rating of the pipe on which they are installed, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F 477. Pipe shall be C900/RJ™ or C905/RJ™ as manufactured by CertainTeed Corporation, Valley Forge, PA.

D. Provide push-on joints with bell integrally cast into pipe or with coupling of same material as pipe.

E. Use elastomeric gaskets, as provided in AWWA C900 or ASTM D3139.

F. On PVC pipelines, provide compatible fittings meeting or exceeding all requirements and ratings for the pipe on which they are installed. Use long radius fittings where possible.
   1. For water lines, provide either AWWA C907 PVC or ductile iron fittings as shown on the Drawings.
   2. For wastewater forcemains, fittings shall be one of the following:
      a. AWWA C907 PVC or 200 psi Pressure Rated PVC for 8-inch and smaller sizes.
      b. Fabricated PVC for 10-inch through 24-inch sizes. Fittings shall be made from segments of AWWA C900, C905, or ASTM 2241 PVC pipe bonded together and over-wrapped with fiberglass-reinforced polyester.
      c. Ductile iron on 14-inch and larger lines conforming to AWWA C905. Ductile iron fittings for wastewater service shall be coated as specified for Ductile Iron Pipe.

G. Provide sleeve type or restraint follower glands where indicated or required to join pipe or provide restraint to offset internal or hydrostatic test pressures.

H. All pipe shall be designed and installed with a minimum of four foot cover.

I. PVC pipe shall be marked to indicate the following:
   1. Nominal Pipe Size.
   2. Material Code Designation.
   3. Standard Dimension Ratio.
   4. Pressure Rating.
   5. Manufacturer's name or trademark.
   6. National Sanitation Foundation Seal.
   7. Appropriate AWWA or ASTM designation number.

2.03 DUCTILE IRON PIPE (DIP)

A. Ductile iron push-on and mechanical joint pipe for buried service shall meet all requirements of standard AWWA C151, Class 350. Provide push-on joints unless otherwise indicated on the Drawings.

B. Ductile iron flanged pipe for non-buried service shall meet all requirements AWWA C115. Flanges shall be fabricated and attached to the pipe barrels by U.S. fabricators using flanges and pipe barrels of U.S. manufacture. If fabrication is to be by other than the pipe barrel manufacturer, a complete product submittal and approval by the Utility will be required. Additionally, such fabricator shall furnish certification that each fabricated joint has been satisfactorily tested hydrostatically at a minimum pressure of 250 psi

C. Joints shall meet all requirements of AWWA C111 for push-on, mechanical, and flanged pipe. Threaded- or grooved-type joints which reduce pipe wall thickness below minimum required are not acceptable.

D. Provide manufacturer's certifications that all ductile iron pipe and fittings meet provisions of this Section and have been hydrostatically tested at the factory.

E. Joint Materials:

1. Gaskets for ductile iron pipe shall conform to AWWA C111.
2. Joining of slipjoint iron pipe shall be accomplished with the natural or synthetic rubber gaskets of the manufacturer of that particular pipe being used. Pipe to be installed in areas potentially contaminated by petroleum shall have nitrile rubber gaskets. Where other contaminants are present, gaskets shall be as recommended by the pipe manufacturer.
3. Gaskets for flanged joints shall be continuous full face gaskets, of 1/8 inch minimum thickness of natural or synthetic rubber, cloth reinforced rubber or neoprene material, preferably of deformed cross section deign and shall meet all applicable requirements of AWWA C111 for gaskets. Flange gaskets shall be manufactured by, or satisfy all recommendations of, the manufacturer of the pipe/fittings being used.
4. Tee-head bolts, nuts, and washers for mechanical joints shall be high strength, low alloy, corrosion resistant steel stock equal to "COR-TEN A" having UNC Class 2 rolled threads or alloyed ductile-iron conforming to ASTM A 536; either shall be fabricated in accordance with ASTM B18.2 with UNC Class 2 rolled threads.
5. Hex-head bolts and nuts shall satisfy the chemical and mechanical requirements of ASTM A449 SAE Grade 5 plain, and shall be fabricated in accordance with ASTM B 18.2 with UNC Class 2 rolled threads.
6. Bolts, washers and nuts on flanged fittings shall be Grade B, ASTM A-307, 304 stainless steel. In corrosive environments such as wastewater lift station wetwells, bolts, nuts, and washers shall be 316 stainless steel and shall be coated after assembly in the same manner specified above for piping.
7. All threaded fasteners shall be marked with a readily visible symbol cast, forged or stamped on each nut and bolt, which will identify the fastener material and grade. The producer and the supplier shall provide adequate literature to facilitate such identification; painted markings are not acceptable.

F. Polyethylene Film Wrap:
1. All iron pipe, fittings, and accessories including polyurethane coated pipe shall be wrapped with standard 8-mil (minimum) low density polyethylene film or r-fill (minimum) cross laminated high-density polyethylene conforming to AWWA C105, with all edges overlapped and taped securely with duct tape to provide a continuous wrap to prevent contact between the piping and the surrounding backfill. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective wrap before backfilling.
2. For flanged joints in buried service, provide petrolatum wrapping system, Denso, or equal, for the complete joint and alloy steel fasteners. Alternatively, provide bolts made of Type 304 stainless steel.

G. Markings: Each ductile iron pipe joint and fitting shall be marked as required by the applicable AWWA specification including the following:
1. Manufacturer's identification.
2. Country where cast.
3. Year of casting.
4. "DUCTILE" or "DI".
5. Barrels of flanged pipe shall show thickness class; others shall show pressure class.
6. The flanges of pipe sections shall be stamped with the fabricators identification.
7. Fittings shall show pressure rating and the nominal diameter of openings and the number of degrees for bends.
8. Painted markings are not acceptable.

H. Linings and Coatings:
1. Interior:
   a. Pipe and fittings for water pipelines shall be cement-mortar lined and seal coated as required by AWWA C104. The type and brand of interior lining shall be clearly marked on the outside of the pipe and fittings. Except as authorized by the ENGINEER, only one type and brand of pipe lining shall be used on a given project.
   b. Pipe and fittings for wastewater pipelines shall be coated to a minimum 40 mils dry film thickness with an amine cured novalac epoxy containing at least 20% by volume of

ceramic quartz pigment. Coating shall be “Protecto 401” ceramic epoxy, as manufactured by Induron Protective Coatings or equal.

2. Exterior:
   a. Buried ductile iron piping and fittings shall have a prime coat and outside asphaltic coating conforming to the applicable AWWA standard for the pipe or fitting being installed. Pipe to be installed in potentially contaminated areas shall have coatings and linings recommended by the manufacturer and approved by the ENGINEER as resistant to the contaminants identified.
   b. Above-ground ductile iron piping shall have a shop prime with one coat of Koppers No. 621 Rust Inhibitive Primer or equal, and a finish coat of Tnemec 75 Endura-Shield or equal.
   c. Ductile iron piping and fittings in non-buried, corrosive environments such as wastewater lift station wetwells shall be coated as follows:
      1) Minimum 25 mils DFT with “Ceramawrap” ceramic epoxy as manufactured by Induron Protective Coatings.
      2) Minimum 40 mils DFT with “Corropipe II TX-15 (AM)” as manufactured by Madison Chemical.
      3) Or equal.
   d. Non-buried pipe with specified coating shall be provided with touch-up kit for field repair of damaged coating.
   e. Pipe and fittings to receive external coating shall be shop primed or delivered to the coating applicator bear as recommended by the manufacturer of the finish coat. Pipe and fittings for non-buried service receiving asphaltic coating at any point prior to application of the specified coating are not acceptable.

2.04 DUCTILE IRON PIPE FITTINGS

A. Fittings shall be flanged for above-ground service or mechanical joint for buried service unless otherwise indicated or approved, and shall meet all requirements of the following standards:
   1. AWWA C110 or AWWA C153 (buried service only).
   2. AWWA C111.

B. Use fittings of same size as pipe. Reducers are not permitted to facilitate an off-size fitting. Reducing bushings are also prohibited. Make reductions in piping size by reducing fittings.

C. Where long radius bends are indicated, fittings shall have center-to-face and radius dimensions according to the ANSI B16.1 Class 125 standard for long radius bends, and shall conform to all other applicable requirements of AWWA C110 including pressure rating.

D. Shall be compatible with joint type of adjacent pipe.

E. Provide all specials, taps, plugs, flanges and wall fittings as required.

F. Linings and coatings for ductile iron fittings shall be as specified for ductile iron pipe.

2.05 VALVES, HYDRANTS, METERS AND APPURTENANCES

A. For valve requirements refer to Section 15100.

B. Valve Boxes:
   1. Provide for all buried valves.
   2. Use nominal 6 inch cast-iron sliding type pipe shaft with cover and base casting.
   3. Set box top at finished grade.
   4. Furnish drop cover appropriately marked "WATER".

C. Corporation Stops:
   1. Conform to AWWA C800.
   2. Use 3/4 inch unless indicated otherwise.

D. Hydrants:
   1. Design: latest edition of AWWA C502, traffic model with break flange.
      a. Mueller Centrurion - A423
      b. American-Darling - B-84-B
      c. Kennedy Guardian - K-81A
      d. U.S. Pipe – Metropolitan
      e. Others as approved by OWNER in writing
   2. Provide 6 inch inlet, 2 - 2> inch hose nozzles, 1 - 4> inch pumper.
   3. Provide compression type main valve, minimum size 5< inches.
   4. Pentagon operating nut.
   5. Design to open counterclockwise.
   6. Provide mechanical joint bell on footpiece.
   7. Furnish depth as noted on plans.
   8. Furnish National (American) Standard Fire Hose Coupling Screw Thread (NH).

E. Polyethylene Wrapping:
   1. Material: AWWA C105.
   2. Thickness: 8 mils.

F. Polyethylene Plastic Pipe (PE):
   1. Material: ASTM D2737.
   2. Fittings: ASTM D2683.
   3. Size: 3/4 inch unless shown otherwise on plans.

G. Copper Pipe (CU):
   1. Material: seamless, Type K, ATM B88.
   2. Fittings: wrought copper solder joint or flared.
   3. Size: 3/4 inch unless shown otherwise on plans.

3.00 PART 3 - EXECUTION

3.01 GENERAL

A. Provide all labor, equipment and materials, and install all pipe fittings, specials and appurtenances as indicated or specified.

3.02 PIPE INSTALLATION

A. Handling:
   1. Handle in a manner to insure installation in sound and undamaged condition.
      a. Do not drop or bump.
      b. Use slings, lifting lugs, hooks and other devices designed to protect pipe, joint elements, and coatings.
   2. Ship, move and store with provisions to prevent movement or shock contact with adjacent units.
   3. Handle with equipment capable of work with adequate factor of safety against overturning or other unsafe procedures.

B. Installation:
   1. Utilize equipment, methods, and materials insuring installation to lines and grades as indicated.
   2. Do not lay piping on blocks unless pipe is to receive total concrete encasement.
   3. Accomplish horizontal and vertical alignment adjustments with fittings or deflection of joints.
      a. Limit joint deflection:
         1) Conform to AWWA C600 for ductile iron pipe.
         2) Not more than 80% of pipe manufacturer's recommended maximum for PVC pipe.

b. Use short specials preceding curves as required.
c. Obtain approval of ENGINEER of method proposed or transfer of line and grade from control to the work.

4. Install pipe of size, material, strength class, and joint type with embedment as shown on the Drawings or specified herein.
5. Clean interior of all pipe, fittings, and joints prior to installation. Exclude entrance of foreign matter during discontinuance of installation.
   a. Close open ends of pipe with snug fitting closures.
   b. Do not let water fill trench. Prevent flotation of pipe where potential for trench flooding is present.
   c. Remove water, sand, mud and undesirable materials from trench before removal of end cap.
6. Inspect pipe prior to installation to determine if any pipe defects are present.
7. Brace or anchor as required to prevent displacement after establishing final position.
8. Perform only when weather and trench conditions are suitable. Do not lay pipe in water.
9. Observe extra precaution when hazardous atmospheres might be encountered.
10. Sanitary sewer separation distance from water lines:
    a. Conform to all TCEQ requirements for separation.
    b. Maintain 9-foot horizontal separation whenever possible.
    c. When conditions prevent a lateral separation of 9 feet, water line may be installed closer to a sewer subject to the following conditions:
       1) Crossings: Sewer shall be constructed of PVC pipe meeting the requirements specified above for pressure sewer lines and have a minimum working pressure rating of 150 psi or greater for pipe and fittings. The water line may be placed no closer than 6 inches from the sewer. The separation distance shall be measured between the nearest outside pipe diameters. The water line shall be located at a higher elevation than the sewer line whenever possible and one length of the sewer pipe must be centered on the water line;
       2) Parallel Alignment: the water line shall be separated by a minimum vertical distance of 2-feet (water above sewer) and a minimum horizontal distance of 4-feet, measured between the nearest outside diameters of the pipes.
11. Separation of water lines from sewer manholes:
    a. No water pipe shall pass through or come in contract with any part of a sewer manhole.
    b. A minimum horizontal separation of 9 feet shall be maintained.
12. Construct service lines where shown on plans in accordance with Standard Detail Drawing. Use pipe material specified on plans or in contract documents.
13. Wrap ferrous pipe, fittings and tie rods with polyethylene where shown on plans in accordance with AWWA C105.

D. Jointing:
1. General requirements:
   a. Locate joint to provide for differential movement at changes in type of pipe embedment, at changes from rock to soil trench bottom, and within 18 inches of structure walls.
   b. Perform in accordance with manufacturer's recommendations.
   c. Clean and lubricate all joint and gasket surfaces with lubricant recommended.
   d. Utilize methods and equipment capable of fully homing or making up joints without damage.
   e. Check joint opening and deflection for specification limits.
2. Special provisions for jointing ductile iron pipe:
   a. Conform to AWWA C600.
   b. Visually examine while suspended and before lowering into trench.
      1) Paint bell, spigot, or other suspected portions with turpentine and dust with cement to check for cracks invisible to the eye.
      2) Remove turpentine and cement by washing when test is satisfactorily completed.
      3) Reject all defective pipe.
3. Special provisions for jointing and laying PVC pipe:
   a. Conform to AWWA C600 and ASTM D2321.
   b. Allow pipe to reach trench soil temperature prior to installation in ditch.

E. Cutting:
   1. Cut in neat workmanlike manner without damage to pipe.
   2. Cut cast-iron with Carborumdum saw or other approved method.
      a. Smooth cut by power grinding to remove burrs and sharp edges.
      b. Repair lining as required and approved by Engineer.

F. Closure Pieces:
   1. Connect two segments of pipelines or a pipeline segment and existing structure with short sections of pipe fabricated for the purpose.
   2. Observe specifications regarding location of joints, type of joints and pipe materials and strength classifications.
   3. May be accomplished with sleeve coupling of rating equal to or greater than that of pipe:
      a. Of length such that gaskets are not less than 3 inches from pipe ends.
      b. Include spacer ring identical to pipe end such that clear space does not exceed 1/4 inch.

G. Temporary Plugs:
   1. Install whenever installed pipe is left unattended.
   2. Use water-tight plug rated for 150 psi or greater.

H. Joint Restraint:
   1. Thrust Blocks:
      a. Provide for all horizontal or vertical bends.
      b. Use on all dead-ends, tee fittings, and changes in pipe diameter.
      c. Install as indicated on Standard Detail Drawing.
      d. Construct to undisturbed edge of trench for bearing.
      e. Mechanical joints shall be protected by felt roofing paper prior to placing concrete. Concrete shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Wooden side forms or sand bags shall be provided for thrust blocks.
      f. Provide minimum bearing area in square feet. based on 150 psi test pressure and 2000 psf soil bearing capacity and as shown on construction drawings.
      g. Adjust thrust block areas accordingly if pressures and/or soil bearing capacity varies
   3. Restraint follower glands for use with mechanical joint fittings shall be used in addition to thrust blocks where indicated on the Drawings. Restraint gland shall have torque limiting twist-off nuts and shall meet the requirements of ASTM 1674-96 for use with PVC pipe and be equal to “MEGALUG®” as manufactured by EBAA Iron, Eastland, TX.

I. After installation, non-buried pipe shall be visually inspected for damage to protective coating and repaired using coating manufacturer’s repair kit.

3.03 VALVE AND APPURTENANCE INSTALLATION

A. Valves:
   1. Install with stems vertical when installation is horizontal.
   2. Set valves on concrete thrust block having four (4) square feet of bearing area on undisturbed earth.

B. Valve Boxes:
   1. Center on valves.
   2. Carefully tamp earth around each valve box to a distance of 4 feet on all sides of box or to undisturbed trench face, if less than 4 feet.

C. Hydrants:
   1. Set hydrants where shown on plans in accordance with Standard Detail Drawing.
   2. Install gravel, blocks and anchors in accordance with Standard Detail Drawing.
   3. Set reference elevation 3 inches above existing grade or to elevation established by ENGINEER (not to exceed 6 inches).
   4. Break-a-way flange to be either ground level where applicable or between 3 inches and 6

inches above curb as established by Engineer.

3.04 ACCEPTANCE TESTS FOR PRESSURE MAINS

A. Perform hydrostatic pressure and leakage test.
   1. Conform to AWWA C600 procedures.
      a. As modified herein.
      b. Shall apply to all pipe materials specified.
   2. Perform after backfilling.

B. Test separately in segments between sectionalizing valves, between a sectionalizing valve and a test plug, or between test plugs.
   1. Contractor to furnish and install test plugs, including all anchors, braces and other temporary or permanent devices to withstand hydrostatic pressure on plugs, at no additional cost to the Owner.
   2. Contractor responsible for any damage to public or private property caused by failure of plugs.

C. Limit fill rate of line to available venting capacity. Fill rate shall be regulated to limit velocity in lines when flowing full to not more than 1 fps.

D. OWNER will make water for testing available to contractor at nearest source. **Valves of existing water system will at all times be operated by City personnel only**.

E. Pressure test:
   1. Conduct at pressure at least 1.5 times the normal working pressure (not less than 150 psi test pressure).
   2. Maintain pressure for a minimum of two (2) hours.
   3. Test pressure shall not vary by more than +5 psi

F. Leakage Test:
   1. Conduct concurrently with the pressure test.
   2. Maintain pressure for a minimum of two (2) hours.
   3. Acceptable when leakage does not exceed that determined by the following formula:

$$L = \frac{N \cdot D \cdot P^{0.5}}{7400}$$

L = Maximum permissible leakage in gallons per hour.
N = Number of pipe joints in segment under test.
D = Nominal internal diameter of pipe being tested in inches.
P = Average actual leakage test pressure, psig.

   4. Repeat leakage test as necessary:
      a. After location of leaks and repair or replacement of defective joints, pipe or fittings.
      b. Until satisfactory performance of test.
      c. At no increase in cost to the OWNER.

G. Refit and replace all pipe not meeting the leakage or pressure requirements. Repair clamp is not permitted.

H. Repair all visible leaks regardless of the amount of leakage.

I. OWNER or ENGINEER will observe all tests.

3.05 DISINFECTION OF PIPELINES FOR CONVEYING POTABLE WATER

A. CONTRACTOR to provide all equipment and materials and perform in accordance with AWWA C601.
   1. As modified herein.
   2. Include chlorination and final flushing.

B. Add chlorine to attain an initial concentration of 50 mg/l chlorine with 10 mg/l remaining after 24 hours.

C. Flush main until concentration is 2 mg/l or less prior to placing main in service.

D. Obtain approval of materials and methods proposed for use.

E. May be conducted in conjunction with acceptance tests.

F. Dispose of flushing water without damage to public or private property.

G. Repeat disinfection procedure should initial treatment fail to yield satisfactory results.
   1. At no additional cost to the OWNER.
   2. OWNER will provide water under terms specified for acceptance tests.

H. Do not exceed 500 gpm rate in flushing.

I. Provide safe bacterial sample results before placing main into service.

4.00 PART 4 - MEASUREMENT AND PAYMENT

4.01 PRESSURE LINES

A. Line shall be measured along the center of the pipe without considering fittings or other pipe connections. The line will be paid at the contract bid price per linear foot.

B. Compensation will be for furnishing all materials, labor, equipment, tools and incidental work required by the construction of the pressure line, all in accordance with the plans and these specifications.

C. If pressure line fails any test procedure, trouble spot is to be corrected all as incidental to the construction of the pressure line.

END OF SECTION

SECTION 02570 – SANITARY SEWER

1.00 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Trenching, Backfilling and Compacting for Utilities: Section 02221

B. Force Mains: Section 02556

C. Wetwells and Manhole Structures: Section 02515

1.02 SUBMITTALS

A. Conform to requirements of Section 01300 - Submittals.

B. Manufacturer's Literature: Manufacturer's descriptive literature and recommended method of installation.

C. Certificates: Manufacturer's certification that products meet specification requirements.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials on manufacturer's original skids or in original unopened protective packaging. OWNER reserves the right to reject surplus material from a different project/jobsite.

B. Protect materials during transportation, storage, and installation to avoid physical damage.

1.04 GENERAL DESCRIPTION OF WORK COVERED

A. Furnish and install all sewer pipe, fittings and structures, and accessories required for sanitary sewer construction as indicated.

1.05 QUALITY ASSURANCE

A. Comply with latest published editions of American Society of Testing and Materials (ASTM) Standards:
   1. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
   2. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   3. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   4. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   5. ASTM F679 - Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings (SDR35).
   6. ANSI A21.11 - Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.
   7. ASTM D3753 - Standard Specification for Glass Fiber Reinforced Polyester Manholes.
   8. ASTM C-923 - Standard Specification for Resilient Manhole Connectors.
   9. ASTM C-1244 - Specification for Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
   10. ASTM D-1784 - Rigid Poly (Vinyl Chloride) (PVC) Compounds, and Chlorinated Poly (Vinyl Chloride) (CPVC) Compound.
   11. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe 4-inch through 12-inch for water distribution.
   12. AWWA C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameter 14-inch through 36-inch.
   13. ASTM 2241 - Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR PR Series).

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide PVC pipe and fittings as standard material unless specifically identified otherwise on the Drawings. PVC fittings shall have rating/thickness equal to or greater than that for the pipe on which they are installed. Ductile iron fittings are not acceptable and will be rejected unless specifically indicated on the Drawings and approved beforehand by the Engineer.

B. All pipe shall be marked in accordance with applicable standard specification under which pipe is manufactured unless otherwise specified.

2.02 POLYVINYL CHLORIDE PLASTIC PIPE (PVC)

A. Unless otherwise required for trenchless installation or for water line crossings, provide pipe and fittings complying with ASTM D3034 or ASTM F679, manufactured using material conforming to ASTM D1784, and having wall thickness equivalent to SDR 26. Joints shall be single elastomeric gasket push-on type complying with ASTM F477 and D3212.

B. Where PVC gravity sewers cross water lines and where indicated on the plans, sewer shall conform to the following standards and have a minimum pressure rating of 150 psi for pipe, joints, and fittings:
   1. AWWA C900 (DR 18)
   2. AWWA C905 (DR 25)
   3. ASTM 2241 (SDR 26)

C. Where PVC gravity sewer is installed using non-encased, trenchless methods, pipe may be one of the following having minimum wall thickness corresponding to SDR 18:
   1. Jointless PVC conforming also to the requirements of PPI TR2. The pipe shall be extruded with plain ends square to the pipe and free of any bevel or chamfer. Pipe shall be Fusible C900™ or Fusible C905™ as manufactured by Underground Solutions, Sarver, PA.
   2. Restrained joint PVC having non-metallic couplings incorporating high-strength, flexible thermoplastic splines which shall be inserted in to mating, precision-machined grooves in the pipe and coupling to provide full 360º restraint with evenly distributed loading. Couplings shall be designed for use at or above the pressure class/rating of the pipe with which they are installed, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F 477. Joints shall be designed to meet the zero leakage test requirements of ASTM D3139. Pipe shall be C900/RJ™ or C905/RJ™ as manufactured by CertainTeed Corporation, Valley Forge, PA.

D. All PVC pipe for sewer service shall be green in color.

E. Lubricant for jointed pipe to be in accordance with the requirements of ASTM D3212. Lubricant to be suitable for lubricating the parts of the joints in the assembly. The lubricant shall not have any deteriorating effects on the gasket and pipe materials.

F. Service laterals shall be Schedule 40 PVC in accordance with ASTM D1785 and D2665.

G. Mark all pipe and fittings.

2.03 DUCTILE IRON PIPE AND FITTINGS

A. Ductile iron pipe and fittings for sanitary sewer service shall be provided only where specifically indicated on the Drawings.

B. Comply with the latest published edition of American Water Works Association (AWWA) Standards:
   1. AWWA C110 & C110a - Gray Iron and Ductile-Iron Fittings, 2-inch through 48-inch for water

and other liquids.
2. AWWA C111 - Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings.
3. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
4. AWWA C151 - Ductile-Iron Pipe, centrifugally cast in metal mold or sand lined molds, for water or other liquids.
5. AWWA C153 - Ductile Iron Compact Fittings, 3-inch through 12-inch for water and other liquids.
6. Polyethylene encasement for the protection of ductile and cast iron pipes, fittings valves, and appurtenances shall be furnished and installed in accordance with the requirements of AWWA C105.

C. Linings and Coatings
1. Interior Lining: Ductile iron pipes, fittings, valves, and appurtenances for sanitary sewer service shall be furnished with corrosion resistant interior lining furnished by the manufacturer:
   a. Ceramic-Epoxy "Protecto 401" as manufactured by Induron Protective Coatings and applied by certified applicator.
   d. Engineer Approved Equal
2. Exterior Coating: Buried ductile iron pipe and fittings shall have a prime coat and outside asphaltic coating conforming to the applicable AWWA standard for the pipe or fitting being installed. Pipe to be installed in potentially contaminated areas shall have coatings and linings recommended by the manufacturer and approved by the Engineer as resistant to the contaminants identified. Refer to Section 02556 for requirements relating to above-ground or exposed ductile iron piping.

2.04 MANHOLES, STRUCTURES AND PIPE ACCESSORIES

A. Fittings
1. Fittings allowed only on manhole/wetwell drop connections.
2. Fittings shall equal or exceed quality and rating of pipe.
3. Fittings shall be heavy wall PVC conforming to ASTM D3034 (SDR 26) and F1336.
4. Joints shall be single elastomeric gasket push-on type complying with ASTM F477 and D3212. Gaskets shall meet the same performance requirements of the sewer pipe to be installed.

B. Fiberglass Manholes
1. Fiberglass manholes shall be in accordance with ASTM D3753. Refer to Section 02515 FIBERGLASS MANHOLES AND WETWELLS for manhole structure requirements.
2. The inside diameter of the manhole barrel shall be either 48-inches or 1.5 times the nominal pipe diameter of the largest pipe, which ever is larger, or as indicated on the Drawings. A concentric reducer over the barrel of the manhole shall have an inside diameter of 30 inches.
3. Pipe Connections: Connections to manholes shall be via pipe stubouts of length not greater than the pipe diameter. Attachment of pipe to stubouts shall be by means of gasketed flexible joints such as bell-and-spigot or size-on-size sleeve coupling that allow for differential settlement.
   a. 15-inch pipe and smaller: Attachment of stubout to manhole shall be by means of gasketed watertight compression connection (e.g. “Inserta Tee” or equal) or by fiberglass layup in accordance with the manufacturer’s recommendations.
   b. 16-inch pipe and larger: stubout shall be factory-installed.

D. Manhole Accessories
1. Manhole frame and cover:
   a. Gray cast iron, with minimum clear opening of 24 inches.
   b. Use Western Iron Works A770R or approved equal with vent holes.
   c. Provide anchor bolt holes for exposed manhole tops.
2. Manhole Grade Adjustment Rings:
   a. Provide minimum of three grade rings but not more than 12 inches total between cone and manhole lid and cover. Adjustment rings shall be High Density Polyethylene grade

rings as manufactured by LadTech® or approved equal.
b. Each ring face shall be sealed to adjacent rings, manhole cone, and frame-and-cover using 1/2-inch minimum butyl rope sealant (ASTM C990) in strict accordance with manufacturer's instructions to provide an airtight seal.

3. Coating: All internal concrete, masonry, grout, and metallic surfaces shall be coated with minimum 20 mils coal tar epoxy as manufactured by Inertol Company unless otherwise indicated. Materials shall be installed and applied in accordance with the manufacturer's instructions and as approved by Engineer.
4. Infiltration Inserts: Provide infiltration insert to fit the manhole frame rim upon which the manhole cover rests.
   a. Insert body shall be made of high density polyethylene copolymer material that meets ASTM D 1248, Class A, Category 5, Type III. Minimum thickness 1/8-inch.
   b. Gasket shall be of closed cell neoprene and have pressure sensitive adhesive on one side and be placed under the weight-bearing surface of the insert by the manufacturer.
   c. Lift strap of 1-inch woven polyethylene (seared on all cut ends to prevent unraveling. Strap shall be attached to the rising edge of the bowl off the insert by means of stainless steel rivet and washer.
   d. Vent shall have 1/8-inch hole located on the side wall of the insert 3/4-inch below the lip.
   e. Load capacity insert shall have certified test data verifying minimum collapse load of 1500 lbs. minimum applied to a 5.50-inch square area in the center of the insert.

PART 3 - EXECUTION

3.01 GENERAL

A. Provide all labor, equipment and materials and install all pipe, fittings, specials and appurtenances as indicated or specified.

3.02 PIPE INSTALLATION

A. Handling
   1. Handle in a manner to insure installation in sound and undamaged condition.
      a. Do not drop or bump.
      b. Use slings, lifting lugs, hooks and other devices designed to protect pipe, joint elements, and coatings.
   2. Ship, move and store with provisions to prevent movement or shock contact with adjacent units.
   3. Handle with equipment capable of work with adequate factor of safety against overturning or other unsafe procedures.

B. Installation
   1. Installation, jointing and testing of pipe, fittings, and accessories shall be in accordance with the provisions of the applicable reference standard and in accordance with the requirements of this specification and related specifications referenced or contained in the contract documents for pressure or gravity sewers.
   2. Lay pipe to slope gradient noted on the drawings.
   3. Utilize equipment, methods, and materials insuring installation to lines and grades as indicated.
      a. Do not lay on blocks unless pipe is to receive total concrete encasement.
      b. Use laser or minimum of 3 batter boards for control of line and grade.
      c. Obtain approval from Engineer for method proposed for transfer of line and grade from control to the work.
   4. Install pipe of size, material, strength class, and joint type with embedment shown for plan location.
   5. Insofar as possible, commence laying of pipe at downstream end of line, and, install pipe with bell ends in direction of pipe laying. Sewer pipe shall have spigot ends in direction of flow. Obtain approval of Engineer for deviations therefrom.
   6. Clean interior of all pipe, fittings and joints prior to installation. Exclude entrance of foreign

matter during discontinuance of installation.
   a. Close open ends of pipe with snug fitting closures.
   b. Do not let water fill trench. Prevent flotation of pipe where potential for trench flooding is present.
   c. Remove water, sand, mud and other undesirable materials from trench before removal of end cap.
7. Inspect pipe prior to installation to determine if any pipe defects are present.
8. Brace or anchor as required to prevent displacement after establishing final position.
9. Perform only when weather and trench conditions are suitable. Do not lay pipe in water.
10. Observe extra precaution when hazardous atmospheres might be encountered.
11. Sanitary sewer separation distance from water mains:
   a. Maintain 9-foot horizontal separation whenever possible.
   b. When conditions prevent a lateral separation of 9 feet, sewer may be installed closer to a water main subject to the following:
      (1) Crossings: sewer shall be constructed of PVC pipe meeting the requirements of AWWA C900/C905 or ASTM 2241 and have a minimum working pressure rating of 150 psi or greater for pipe and fittings. The sewer may be placed no closer than 6 inches from the water line. The separation distance shall be measured between the nearest outside pipe diameters. The sewer line shall be located at a lower elevation than the water line whenever possible and one length of the sewer pipe must be centered on the water line;
      (2) Parallel Alignment: the sewer line and water main shall be separated by a minimum vertical distance of 2-feet (water line above sewer) and a minimum horizontal distance of 4-feet, measured between the nearest outside diameters of the pipes.
12. Separation of water lines from sewer manholes:
   a. No water pipe shall pass through or come in contract with any part of a sewer manhole.
   b. A minimum horizontal separation of 9 feet shall be maintained.
13. Auger or jack casing pipe in place where shown on plans.

C. Jointing
1. General requirements:
   a. Locate joint to provide for differential movement at changes in type of pipe embedment, at changes from rock to soil trench bottom, and within 18 inches of structure walls or manholes.
   b. Perform in accordance with manufacturer's recommendations.
   c. Clean and lubricate all joint and gasket surfaces with lubricant recommended.
   d. Utilize methods and equipment capable of fully homing or making up joints without damage.
   e. Check joint opening and deflection for specification limits.

D. Closure Pieces
1. Connect two segments of pipelines or a pipeline segment and existing structure with short sections of pipe fabricated for the purpose.
2. Observe specifications regarding location of joints, type of joints and pipe materials and strength classifications.
3. May be accomplished with sleeve coupling of rating equal to or greater than that of pipe:
   a. Of length such that gaskets are not less than 3 inches from pipe ends.
   b. Include spacer ring identical to pipe end such that clear space does not exceed ¼ inch.

E. Temporary Plugs
1. Furnish and install temporary plugs at each end of work for removal by others where indicated.
2. Remove plug on existing line to perform tie-in indicated in coordination with Utility operations staff.
3. Plugs:
   a. Use test plugs as manufactured by pipe supplier, or
   b. Fabricate by Contractor of substantial construction.
   c. Must be watertight against heads up to 20 feet of water.

d. Secure in place in a manner to facilitate removal when required to connect pipe.

3.03 MANHOLE INSTALLATION

A. Install fiberglass manholes and appurtenances in strict accordance with manufacturer's recommendations. Refer to Section 02515 for additional installation requirements.

B. Foundations shall be poured in place with channel inverts integrally formed with the foundation. See standard details shown on the plans.

C. Heat materials for casting in place in freezing weather and protect work from cold; maintain temperature of work at 40° F. for at least 24 hours after placing.

D. Invert Channels
1. The bottom of the manhole shall be provided with a "U" shaped channel that is a smooth continuation of the inlet and outlet pipes. Channel dimensions shall be as follows based on outlet pipe diameter:
   a. 12-inch and smaller: channel depth shall be at least 1/2 the outlet diameter.
   b. 15 to 24-inch: channel depth shall be at least 3/4 the outlet diameter.
   c. 24-inch and greater: channel depth shall be at least equal to the outlet diameter.
2. In manholes with pipes of different sizes, the crown of the pipes shall be placed at the same elevation and flow channels in the invert shall be evenly sloped from pipe to pipe.
3. The bench provided above the channel shall be sloped at a minimum of 1-inch per foot.

E. Drop Manholes: A drop manhole as shown on the Drawings shall be provided for a sewer entering a manhole more than 24-inches above the invert.
1. Drop pipe shall be of the same material and size as sewer pipe.
2. Drop shall be constructed on the outside of the manhole using compatible PVC fittings to provide a smooth drop and a clean out leg as shown on the details.
3. The drop pipe shall be encased with concrete unless otherwise directed by the Engineer. Concrete shall extend from the bottom of the manhole base up to the bottom of the inlet sewer pipe or as shown otherwise on the Drawings. Concrete shall also extend from the outside wall of the manhole beyond the drop tee with a minimum of six inches (6") on each side.
4. Internal drops are not allowed unless type, design, materials, and manhole size are approved by the Engineer in writing beforehand.

G. Pipe Connections
1. Make airtight. All connections to be subject to manhole vacuum testing.
2. Field installation of stubouts 15-inch and smaller: Cutting of the manhole wall for installation of stubouts via compression connection (e.g. "Inserta Tee") shall be by means of a hole saw only. Openings for stubout attachment by fiberglass layup shall be no greater than 1/2-inch larger than the pipe diameter and shall be cut using masonry power saw. All other methods are not allowed unless approved in writing by the Engineer.
3. Field installation of stubouts 16-inch and larger is not allowed.
4. Doghouse connections at new manholes installed over existing pipe shall be sealed tight by working the foundation concrete over the top of pipe to a minimum depth of 6 inches. Install a 1-inch thick strip of butyl sealant rope (ASTM C990) around the pipe circumference outside the manhole wall prior to placement of concrete to provide a continuous waterstop between pipe and concrete.

H. Exterior Pipe Support (Rigid Pipe)
1. Provide pipe joint within 18 inches of manhole wall or support vitrified clay pipe on reinforced concrete cradle integral with manhole foundation to first joint on each side of manhole as indicated.

I. Castings, frames, and fittings
   1. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed.
   2. The unit shall be protected until mortar or concrete is set.

J. Coatings if required in the specifications or on the drawings shall be applied after Engineer's approval of structure.

3.04 ACCEPTANCE TESTS FOR SEWER PIPELINES

A. General
   1. Lines shall be leak tested. A low pressure air test shall be used for leak testing unless a hydrostatic leak test is specifically permitted by the Engineer in writing.
   2. Acceptance of air test or exfiltration results will not preclude rejection of work if infiltration is measured and exceeds test limitation.
   3. After backfilling and removing debris from each section of sewer line, conduct a line acceptance test under observation of the Engineer. Copies of all test results shall be made available to the Engineer upon request.
   4. Perform test on piping systems including piping installed between or connected to existing pipe.
   5. Conduct tests on buried pipe after the trench is completely backfilled. If field conditions permit and if approved by the Engineer, partially backfill the trench and leave the joints open for inspection and for conducting the initial service leak test. Do not conduct the acceptance test until backfilling is complete.
   6. On exposed, non-buried piping, conduct the test after the piping is completely installed, including supports, hangers, and anchors, but prior to insulation.
   7. Do not perform testing on pipe with concrete thrust blocking until the concrete has cured at least five (5) days.
   8. Determine and remedy the cause of the excessive leakage for any pipe failing to meet the specified requirement for water or air tightness, and retest until the installation is proven satisfactory.
   9. Tests must be successfully completed and reports filed before piping is accepted. Provide copies of test reports to owner.
   10. Submit the plan for testing to the Engineer for review at least 10 days before starting the test.
   11. Remove and dispose of temporary blocking material and equipment after completion and acceptance of the piping test.
   12. Repair any damage to the pipe coating.
   13. Clean pipelines so they are completely free of debris, mud, or soil prior to final acceptance.
   14. Test piping independently from tests on structures.

B. Low Pressure Air Test
   1. Perform low-pressure air tests, using equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. Test is to conform to procedure described in ASTM F 1417.
      a. Provide the equipment with an air regulator valve or air safety valve set to an internal air pressure in the pipeline that cannot exceed 6 psig. Monitoring pressure gauge shall have minimum divisions of 0.10 psi with an accuracy of ±0.04 psi.
      b. Pass air through a single control panel.
      c. Provide pneumatic plugs that have a sealing length equal to or greater than the circumference of the pipe to be tested.
      d. Provide pneumatic plugs that resist internal test pressures without requiring external bracing or blocking.
      e. Provide an air compressor of adequate capacity for charging the system.
      f. Introduce low pressure air until internal air pressure is 4.0 psi greater than the average back pressure of ground water above the pipe. Unless demonstrated otherwise in a test pit, ground water shall be assumed at the natural ground surface.
      g. Allow two minutes for air pressure to stabilize.

h. The minimum allowable time for the pressure to drop from 3.5 psig to 2.5 psig greater than average back pressure of any ground water above the pipe shall be determined as follows:

$$T = \frac{0.085 \cdot D \cdot K}{Q}$$

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Where K = 0.000419·D·L or 1.0, whichever is greater
T = time in seconds for the pressure to drop 1.0 psi
D = average inside diameter in inches
L = length of line of the same pipe size in feet
Q = 0.0015 cubic feet per minute per square foot of internal surface.

i. Alternately, the following table may be used to calculate allowable times based on the preceding formula:

Pipe Diameter (inches)	Minimum Time *(i.e. K = 1.0)* (seconds)	Length for Minimum Time *(i.e. K = 1.0)* (feet)	Time for Long Length *(i.e. K > 1.0)* (seconds)
6	340	398	0.854 (L)
8	454	298	1.520 (L)
10	567	239	2.374 (L)
12	680	199	3.418 (L)
15	850	159	5.342 (L)
18	1020	133	7.692 (L)
21	1190	114	10.470 (L)
24	1360	100	13.674 (L)
27	1530	88	17.306 (L)
30	1700	80	21.366 (L)
36	2040	66	30.768 (L)

3. Perform air test only on lines 36-inch diameter and smaller.
4. Check connections for leakage with a soap solution. If leaks are found, release the air pressure, repair the leak, and retest with soap solution until results are satisfactory, before resuming air test.

C. Air Test for Individual Joints
1. Lines 36 inches and larger may be tested at individual joints.
2. The maximum allowable time for the pressure to drop from 3.5 psig to 2.5 psig is 10 seconds per joint for all pipe sizes.

D. Hydrostatic Leak Test (by Engineer's approval only)
1. Perform hydrostatic leak tests only if agreed upon or directed by the Engineer in writing. The test is to conform to the procedure described in ASTM C 1091.
2. The length of the pipe to be tested shall be such that the head over the crown of the upstream end is not less than 2 feet or 2 feet above the ground water level, whichever is higher, and the head over the downstream crown is not more than 6 feet.
3. Plug the pipe by pneumatic bags or mechanical plugs so that the air can be released from the pipe while it is being filled with water.
4. Continue the test for one (1) hour and make provisions for measuring the amount of water required to maintain the water at a constant level during this period.
5. Remove the jointing material, and remake the joint if any joint shows any visible leakage or infiltration.

6. Remove and replace any defective or broken pipes.
7. Maximum Allowable Leakage Rates:
   a. Total exfiltration or infiltration shall not exceed 25 gallons per inch diameter, per mile of pipe, per 24 hours at a minimum test head of two feet above the crown of the pipe at the upstream manhole.
   b. For construction within the 25 year flood plain, total exfiltration or infiltration shall not exceed 10 gallons per inch diameter, per mile of pipe, per 24 hours at a minimum test head of two feet above the crown of the pipe at the upstream manhole.
   c. When pipes are installed below the groundwater level, an infiltration test shall be used in lieu of the exfiltration test provided groundwater is at least two feet above the top of pipe throughout the length of the pipe section to be tested.
9. Determine the rates of infiltration by means of V-Notch weirs, pipe spigot, or plugs in the end of the pipe. Methods, times, and locations are subject to the Engineer's approval.
10. Pipe with visible leaks or infiltration exceeding the maximum allowable leakage or infiltration is considered defective and must be corrected.

E. Deflection Testing for Pipe
1. Perform deflection tests on flexible and semi-rigid pipe in accordance with ASTM D3034.
   a. Perform test by pulling a properly sized mandrel through the line to test for a maximum 5% allowable deflection of pipe measured as the reduction in vertical inside diameter unless specified otherwise.
   b. Mandrel shall be sized at 95% of the manufacturer's stated ID for the pipe and be constructed as shown on the Drawing detail.
   c. Conduct test after the final backfill has been in place a minimum of 30 days.
   d. Thoroughly clean the lines before testing.
   e. Use no mechanical pulling devices.
   f. Uncover all irregularity or pipe deformation exceeding 5%. Replace all damaged pipe, re-round non-damaged pipe, and tamp the embedment and initial backfill.
   g. Any pipe removed shall be replaced by use of gasketed repair couplings having a rating equal to or exceeding the pipe being joined/repaired.
   h. Conduct deflection test in the presence of the Owner's or Engineer's representative.

3.04 ACCEPTANCE TESTS FOR SEWER MANHOLES

A. Manhole Testing: Successful passage of a vacuum test shall be required for acceptance of sanitary sewer manholes and sanitary sewer structures, whether fiberglass or concrete. If a manhole fails a leakage test or visible leaks are observed, the manhole must be made watertight and retested.
1. Vacuum testing shall be performed in accordance with the requirements of ASTM C-1244, Specification for Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
   a. Perform test after installation with all connections in place. Final acceptance in accordance with the requirements of this specification will consist of a vacuum test of the completed and backfilled manhole including manhole, adjustment rings, and manhole frame and cover.
   b. Materials: Vacuum testing apparatus shall consist of a minimum of the following: Engine, Vacuum Pump, Hose, Test Head device capable of sealing opening in manhole frame as required, and Pneumatic Test Plugs having a sealing length equal to or greater than the diameter of the connecting pipe to be sealed.
   c. Test Procedure:
      (1) The test head shall be placed at the top of the manhole frame in accordance with the manufacturer's recommendations.
      (2) A vacuum of 10 in. of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. of mercury.
      (3) The manhole shall be considered to pass the vacuum test if the time for the vacuum reading to drop from 10 in. of mercury to 9 in. of mercury meets or exceeds the values indicated in following table:

Minimum Test times for Various Manhole Diameters (ASTM C 1244)

DEPTH (ft)	DIAMETER (inches)				
	42	48	54	60	72
	TIME (seconds)				
8	17	20	23	26	33
10	21	25	29	33	41
12	25	30	35	39	49
14	30	35	41	46	57
16	34	40	46	52	67
18	38	45	52	59	73
20	42	50	53	65	81
22	46	55	64	72	89
24	51	59	64	78	97
26	55	64	75	85	105
28	59	69	81	91	113
30	68	74	87	98	121

(4) If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

d. Testing and Certification: Testing shall be done by the contractor and witnessed by the Engineer or his representative. All manholes and structures shall be tested as finished and completed for final acceptance. Any defective work or materials shall be corrected or replaced by the Contractor and retested. This shall be repeated until all work and materials are acceptable.

3.05 SERVICE CONNECTIONS

A. Install service connections at each dwelling or business place, or as directed by Engineer.

B. Services wyes: Install wyes of minimum 4-inch diameter unless shown otherwise on plans. See standard details on the Drawings.

C. Clean Outs: Provide clean out inside the Right of Way at the property line for each service line.

D. Risers: Use risers in lieu of wyes for service connections where invert of sewer is 15 feet or more below ground surface or where shown on plans.

E. Place suitable stopper in end of connection, cement stopper in place with cold bituminous joint compound.

F. Backfill trench only after recording exact location of service connection. Place Engineer-approved marker tape above service piping in excavation within 3-feet of the surface.

G. Make no connections to house sewers or extend service connections beyond the limits shown on the Drawings or indicated in the specifications without written permission of Engineer.

H. Backfill trench only after entire service line and wye connection has been inspected and approved by Engineer. Compact as specified in Section 02221 TRENCHING, BACKFILLING AND COMPACTING.

I. Street crossings shall have a minimum of 3 feet of cover to sub-grade.

J. No payment for service lines will be made until all specified requirements have been met.

3.06 CONNECTIONS TO EXISTING DRAINS AND SEWER SYSTEM

A. Connect existing sanitary service drains which cross new sewer line using Wyes of the same size as the new line and service drain.

B. Connect no storm drains to new sewers.

C. Connections to existing manholes:
   1. Cut hole in existing manhole at required elevation. Use appropriately sized hole saw when connecting to manhole. All other means of cutting are not allowed unless approved by the Engineer in writing.
   2. New pipe shall protrude from the manhole wall no more than 2 inches.
   3. At fiberglass manholes, complete using "Insert-a-Tee" type watertight compression connection or by fiberglass layup surrounding the entire connection on inside and outside of manhole. Fiberglass layup shall be in conformance with manhole manufacturer's standard recommendations.
   4. At concrete manholes, grout new pipe in place.
   5. Reconstruct manhole bottom to suit new connection.

D. Connections to existing sewer:
   1. Build new manhole around existing sewer.
   2. Break out existing sewer inside of manhole and construct bottom to suit new connection.

PART 4 - MEASUREMENT AND PAYMENT

4.01 SANITARY SEWER PIPE

A. Sanitary sewer pipe shall be measured from center of manhole to center of manhole or end of line. The sewer pipe shall be measured along the center of the pipe without considering fittings or other pipe connections. Sanitary sewer pipe will be paid at the contract bid price per linear foot, complete in place at various depths for the type, size and depth constructed.

B. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required by the construction of the sanitary sewer pipe, all in accordance with the Drawings and specifications.

C. If sanitary sewer pipe fails or does not pass appropriate mandrel test, Contractor shall remove and replace that part of the sewer pipe at no cost to the Owner.

4.02 SANITARY SEWER MANHOLE

A. Sanitary sewer manhole will be measured from the top of the ground to the sanitary sewer invert. Manholes shall be paid at the contract bid price per each at the various depths or as described in the bid proposal form. The size shall be the nominal inside diameter.

B. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required including excavation, dewatering, concrete foundation, backfill, removal and disposal of excess material, frame and cover, manhole insert, grade rings, testing, and any specified protective coatings if not included as a separate pay item.

END OF SECTION

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SECTION 02572 – COMBINATION AIR VALVES

1.00 PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Combination Air Release and Air and Vacuum valves for sewage including valves, fittings, and appurtenances.

1.02 SUBMITTALS

A. Procedures for Submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets.

C. Contract Closeout Submittals: Refer to Section 01700.

1. Project Record Documents: Accurately record installed location of valves.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Storage: Store all valves and appurtenances in accordance with the manufacturer's written instructions. Protect from damage. Protect after installation until final acceptance.

2.00 PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Combination Air Valves:

1. A.R.I. Flow Control Accessories, stainless steel, Model D-020 (Short Version)

2. Or approved equivalent.

2.02 SIZE

A. Nominal 2-inch

2.03 MATERIALS

A. Combination Air Valve:

1. Flushing Connection	Polypropylene
2. Seal Plug Assembly	Reinforced Nylon + Rubber EPDM
3. Float	Foamed Polypropylene
4. Clamping Stem	Reinforced Nylon
5. Body	Stainless Steel SAE 316
6. Crown Nut	Stainless Steel SAE 316
7. O-Ring	BUNA – N
8. Stopper	Acetal
9. Spring & Washer	Stainless Steel SAE 316
10. Stem, Clamp & Nut	Stainless Steel SAE 316
11. Base	Stainless Steel SAE 316

2.04 PRODUCT REQUIREMENTS

A. The valve shall be specially designed to operate with liquids carrying solid particles, which should not be expelled to the environment.

B. The valve shall have a conical shaped body with a cam lock back flush attachment as part of the working mechanism.

C. The float mechanism shall be spring loaded to allow for system vibrations and turbulence.

D. The operating mechanism shall be non-metallic and corrosion resistant.

E. Working pressure shall be 3 - 150 p.s.i.

F. The valve shall be capable of releasing large amounts of air, gases, and vapor during filling of the system and admitting large amounts of air when the system drains to prevent vacuum damage to the associated pipeline and accessories.

G. The valve must be capable of releasing accumulated air, gas, or vapor from the system while the system operates under pressure, while maintaining an air pocket separation between the liquid and the working mechanism. The air release orifice will be 0.0186 square inch and will be an integral extension of the air and vacuum orifice, which shall be rectangular in shape.

2.05 ACCESSORIES

A. Ball Valves:

1. A polypropylene ball valve shall be mounted between the air/vacuum valve and the pipeline to allow for isolation and removal of the valve when necessary.

2. The ball valve shall have a pressure rating equal to or greater than the pressure rating of the pipeline itself.

3. Valve components and operating mechanism shall be non-metallic and corrosion resistant.

3.00 PART 3 - EXECUTION

3.01 PREPARATION

A. Stake location of valve prior to installation for review by Engineer.

B. Prior to installing valves, remove foreign matter from within the valves. Inspect the valves to verify that parts are in satisfactory working condition.

3.02 INSTALLATION

A. Install valves in accordance with manufacturer's instructions at locations shown on Drawings. Set valves plumb and as detailed on Drawings.

B. Install fiberglass manhole for valve vault in accordance with Section 02607.

C. Refer to Section 15100 for pipe installation.

3.03 FIELD TESTING

A. Demonstrate proper operation of combination air release and pressure reducing valves after installation.

END OF SECTION

SECTION 02590 – POLYURETHANE PROTECTIVE COATINGS

1.00 PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. Provide polyurethane protective coating to the interior surfaces of manholes, wetwells, and other concrete and metal pipes as designated on plans or special conditions (except for fiberglass wetwells and manholes).

1.02 SUBMITTALS

A. Manufacturer's Literature: Descriptive data of installation methods and procedures.

B. Certificates: Manufacturer's certification that materials meet specification requirements.

2.00 PART 2 - PRODUCTS

2.01 COATING

A. Material shall be Polybrid (TM) Protective Coatings as manufactured by Zemex Corporation or approved equal.

B. Coating shall be of high build, anti-corrosive and anti-abrasive impact resistant, two component, 100% solids, non-solvent, hybrid polyurethane coating.

C. The material shall have full bonding capacity to the surface.

D. A shore "D" hardness of 57 at 77 degrees.

E. Comply with ASTM-D1737 for flexibility using cylinder mandrel of 0.5 inches.

F. Flash point of 450 degrees Fahrenheit open Zahn Cup.

G. Light beige or cream color.

H. Resistant to following:

SOLUTION	CONCENTRATION
Acetic Acid	5%
Sulfuric Acid	20%*
Sodium Hydroxide	5%
Ammonium Hydroxide	5%*
Nitric Acid	1%*
Ferric Acid	1%
Soap	0.1%
Detergent (Linear Alkyl Benzyl Sulfonite)	0.1%
Petroleum Oils and Greases	
Vegetable and Animal Oils	

*Volumetric percentages of concentrated CP grade reagents.

I. The complete coating shall be impermeable to sewer gases and liquids and nonconductive to bacterial or fungus growth.

J. The protective coating shall be capable of repair at any time during its life.

3.00 PART 3 - EXECUTION

3.01 GENERAL

A. Provide all labor, equipment and materials for complete installation.

3.02 SURFACE PREPARATION

A. Water blast or sand blast surface as directed by Engineer to expose a good grade of firm concrete.

B. All grease or residue shall be removed during surface preparation.

C. Low pressure water blasting with detergent shall not be allowed.

D. Prevent debris from surface preparation from entering sewer.

E. Do not proceed to installation until Engineer approves surface preparation.

3.03 INSTALLATION

A. The material shall be applied with airless spraying equipment at pressures of 2000 psi to 4200 psi.

B. Thickness of coating shall be 90 mil or as otherwise specified.

C. The coating contractor shall furnish two plugs to permit measurement of the thickness.

D. Only workmen trained by and licensed as installers by the manufacturer shall be used.

E. Take all necessary measures to prevent damage to installed coating from equipment and materials used in or taken through the work.

F. All tools, excess materials, etc., shall be removed and the structure left in a clean and presentable condition.

G. All men working in the area will wear the air support outfit as prescribed by the manufacturer.

4.00 PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Polyurethane protective coating, as authorized, shall be measured by the square foot applied.

4.02 PAYMENT

A. The accepted quantities of polyurethane protective coatings shall be paid for at the contract bid price per each.

B. When not listed as a separate contract pay item, polyurethane protective coating shall be considered as an incidental, and the cost thereof shall be included in such contract pay item as are provided in the proposed contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required by the work, all in accordance with the plans and these specifications.

D. If the polyurethane protective coating fails to meet the specifications herein, the Engineer may order the material replaced at no cost to the Owner.

E. The disposal of rejected material shall be at no cost to the Owner.

END OF SECTION

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PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fence and gate framework, PVC coated fabric, fence line and terminal posts, and accessories.

B. Excavation for post bases; concrete foundation for posts, and center drop for gates.

C. Manual gates and related hardware.

1.2 RELATED SECTIONS

A. Section 16010 - Electrical Systems: Site Grounding Systems.

1.3 REFERENCES

A. ASTM A116 - Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.

B. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric.

E. ASTM A428 - Weight of Coating on Aluminum-Coated Iron or Steel Articles.

F. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

G. ASTM A569 - Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.

H. ASTM C94 - Ready-mixed Concrete.

I. ASTM F567 - Installation of Chain-Link Fence.

J. ASTM F668 - Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric.

K. ASTM F669 - Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.

L. ASTM F1083 - Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

M. ASTM F1234 - Protective Coatings on Steel Framework for Fences.

N. Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual.

1.4 SUBMITTALS FOR REVIEW

A. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

B. Samples: Submit two samples of fence fabric, 30 x 30 inch in size illustrating construction and colored finish.

1.5 QUALITY ASSURANCE

A. Material standards: Comply with Chain Link Fence Manufacturers Institute Galvanized Steel Chain Link Fence Fabric and Industrial Steel Specifications for Fence Posts, Gates and Accessories.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. Materials and Components: Conform to CLFMI Product Manual.

B. Fabric Size: CLFMI Standard Industrial service.

C. Intermediate Posts: Type II round.

D. Terminal, Corner, Rail, Brace, and Gate Posts: Type II round.

2.2 MATERIALS

A. General:
1. Pipe sizes indicated are commercial pipe sizes.
2. Tube sizes indicated are nominal flange dimensions.
3. Roll form section sizes are nominal outside dimensions.
4. Open seam material not allowed.
5. Hot dip galvanizing for iron or steel components:
   a. On pipe: Comply with ASTM-A53, 1.8 OZ/SF, minimum.
   b. On square tubing: Comply with ASTM-A123, 2 OZ/SF.
   c. On roll formed sections: Comply with ASTM-A53, minimum 1.8 OZ/SF.
   d. On hardware and accessories: Comply with ASTM-A153, minimum 1.4 OZ/SF.
   e. On fabric: Comply with ASTM-A392, Class 2, 2 OZ/SF, and withstand test of coating, as specified.
   f. On barbed wire: Comply with ASTM-A585, Type I.
   g. On miscellaneous items: Comply with ASTM-A53, minimum 1.8 OZ/SF.

B. Chain Link Fabric:
1. Woven 2 IN mesh of 9 GA wire.
2. Steel wire: minimum tensile strength after coating: 70,000 PSI.
3. Twisted and barbed at top selvages.

C. Line Posts:
1. 2-3/8 IN steel pipe, 5.79 LB/LF.
2. Of sufficient length to permit minimum 42 IN to be set in concrete footing.

D. Top, Mid and Bottom Rails:
1. 1-1/4 in steel pipe, 2.27 LB/LF.
2. Provide expansion couplings of outside sleeve type which provide rigid attachment and allow for anticipated movement.
3. Interrupt rails only at posts.
4. Provide top and bottom rails only at 42 IN site fence.

E. Terminal and Corner Posts:

1. 4 IN steel pipe, SCH 40.
2. Including end and pull posts.
3 Gate posts: 4 IN steel pipe.
4. Of sufficient length to permit minimum 42 IN to be set in concrete footing.
5. Gate post strength to support gate without sagging in open or closed position.

F. Top Marcelled Tension Wire:
1. 7 GA, comply with ASTM A-824.

G. Bracing:
1. Compression and tension members.
2. Compression: 1-1/4 IN steel pipe, 2.27 LB/LF.
3. Tension: 3/8 IN diameter steel truss rod with turnbuckles.

H. Tension Bars:
1. Minimum 3/16 x 3/4 IN, steel.
2. One piece for full height of fabric.

I. Metal Bands:
1. Minimum 0.115 x 7/8 IN wide steel.

J. Gates:
1. Minimum 2-3/8 IN steel pipe, SCH 40, weld corners.
2. Fasten fabric with adjustable hook bolts on every side.
3. Provide tension rods.
4. Fabricate with padlock hasp for Agency furnished padlock for swinging gates.
5. Provide 3 strands of barbed wire fastened to extended verticals of gate frame.

K. Concrete and Reinforcing: See Division 3.

L. Tie Wire:
1. 9 GA galvanized steel tie wires.

2.3 ACCESSORIES

A. Caps: Aluminum alloy, sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

C. Gate Hardware: Fork latch with gravity drop; two 180 degree gate hinges per leaf and hardware for padlock.

2.4 FINISHES

A. Components: Galvanized to ASTM A123; 2.0 oz/sq ft (600 g/sq m) coating.

B. Fabric: Vinyl coating, color as selected by Owner from standard colors, over coating of 2.0 oz/sq ft (600 g/sq m) galvanizing.
C. Vinyl Components: color as selected by Owner.
D. Hardware: Galvanized to ASTM A153, 2.0 oz/sq ft (600 g/sq m) coating.

E. Accessories: Same finish as fabric.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify suitability of areas to accept installation.

B. Correct unsatisfactory existing conditions.

C. Installation constitutes acceptance of responsibility for performance.

D. Install framework, fabric, accessories and gates in accordance with ASTM F567.

E. Place fabric on outside of posts and rails.

F. Set line terminal and gate posts plumb, in concrete footings with top of footing 2 inches (50 mm) above finish grade. Slope top of concrete for water runoff.

G. Line Post Footing Depth Below Finish Grade: four (4) feet.

H. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: four (4) feet.

I. Brace each gate and corner post to adjacent line post with horizontal center brace rail. Install brace rail one bay from end and gate posts.

J. Provide top rail through line post tops and splice with 6 inch (150 mm) long rail sleeves.

K. Install center and bottom brace rail on corner gate leaves.

L. Do not stretch fabric until concrete foundation has cured 28 days.

M. Stretch fabric between terminal posts or at intervals of 100 feet (30 m) maximum, whichever is less.

N. Position bottom of fabric 1 inch (25 mm) above finished grade.

O. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches (380 mm) on centers.

P. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

Q. Install bottom tension wire stretched taut between terminal posts.

R. Do not attach the hinged side of gate from building wall; provide gate posts.

S. Install gate with fabric to match fence. Install three hinges per leaf, latch, catches, drop bolt retainer and locking clamp.

T. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.2 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm).

B. Maximum Offset From True Position: 1 inch (25 mm).

C. Components shall not infringe adjacent property lines.

END OF SECTION

SECTION 03300 – CAST-IN-PLACE CONCRETE FOR SITE WORK

1.00 PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED

A. Mixing, placing, finishing and providing all related services necessary to construct all cast-in-place concrete work indicated on plans.

1.02 QUALITY ASSURANCE

A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes:

1. ACI 315 - Details and Detailing of Concrete Reinforcement.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 347 - Guide to Formwork for Concrete.
4. ASTM A36 – Carbon Structural Steel.
5. ASTM C33 - Concrete Aggregates.
6. ASTM C39 - Compressive Strength of Cylindrical Concrete Specimens.
7. ASTM C94 - Ready-Mixed Concrete.
8. ASTM C143 - Slump of Hydraulic-Cement Concrete.
9. ASTM C150 - Portland Cement.
10. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
11. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.
12. ACI 301 - Specifications for Structural Concrete.

B. Submit compliance submittals as specified in Division 1, including but not limited to the following: bar schedule, bar details, shop drawings including size and location of openings, waterstops, joint systems and curing method.

C. Submit proposed concrete mix proportions to Engineer prior to placing concrete.

1.03 SUBMITTALS

A. Conform to requirements of section 01300 SUBMITTALS.

B. Manufacturer's Literature: Manufacturer's descriptive literature and recommended method of installation.

C. Certificates: Manufacturer's certification that products meet specification requirements.

2.00 PART 2 - PRODUCTS

2.01 PORTLAND CEMENT

A. Type I, Type II or Type III conforming to ASTM C150.

B. Type I/II cement to be used.

C. Except when Type II specified, Type III may be used when the anticipated air temperature for the succeeding 12 hours will not exceed 60ºF.

D. All cement used in a monolithic placement shall be of the same type.

E. May be either bagged or bulk. Partially set or caked cement will be rejected.

F. All types of cements shall be "low alkali" cements.

2.02 WATER:

A. Clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter or other deleterious substances and shall not contain more than 1,000 parts per million of chlorides as C1 nor more than 1000 parts per million of sulfates as SO_4.

B. Water of known potable quality requires no testing. Other sources shall meet the requirements of AASHTO T026-79-UL.

C. Water shall have a pH of not less than 4.5 or more than 8.5.

2.03 FINE AGGREGATE

A. Natural sand, manufactured sand or a combination of the two.

B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, uncoated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.

C. The maximum permissible percentage, by weight of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate.

D. Gradation, percent of weight retained:

Sieve Size	Percent Retained
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	15 - 50
No. 30	35 - 75
No. 50	65 - 90
No. 100	90 - 100
No. 200	97 - 100

E. Fineness Modulus:

1. For Grade 1 only - 2.3 minimum, 3.1 maximum.

2.04 COARSE AGGREGATE

A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.

B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.

C. Crushed stone shall consist of the clean, dust free product resulting from crushing of stone. There shall be no adherent coatings, clay, loam organic or deleterious substances, salt or alkali, and other foreign material.

D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.00%
Shale, Slate or other similar material	1.00%
Clay lumps	0.25%
Soft fragments	3.00%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.00%
The sum of all deleterious substances exclusive of material removed by decantation, shall not exceed by weight	5.00%

E. Coarse aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.

F. Gradation, percent of weight retained on:

1. Grade No. 1 - Maximum Nominal Size 2 1/2-inches (63 mm)

Sieve	Percentage Retained
2 1/2-inches	0%
2-inches	0 - 20%
1 1/2-inches	15 - 50%
3/4-inches	60 - 80%
No. 4	95 - 100%

2. Grade No. 2 - Maximum Nominal Size 1 1/2-inches (37.5 mm)

Sieve	Percentage Retained
2-inches	0%
1 1/2-inches	0 - 5%
3/4-inches	30 - 65%
3/8-inches	70 - 90%
No. 4	95 - 100%

3. Grade No. 3 - Maximum Nominal Size 1-inch (25 mm)

Sieve	Percentage Retained
1 1/2-inches	0 - 5%
3/4-inches	10 - 40%
1/2-inches	40 - 75%
No. 4	95 - 100%

4. Grade No. 4 - Maximum Nominal Size 3/8-inch (9.5 mm)

Sieve	Percentage Retained

1/2-inches	0 - 5%
3/8-inches	5 - 30%
No. 4	75 - 100%

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:

1. One-sixth (1/6) of the least dimension between forms of that part of the structure in which concrete is to be placed.
2. Three-fourths (3/4) of the clear space between reinforcement.
3. The maximum size aggregate is defined as the clear space between the sides of the smallest square openings through which 95 percent of the weight of the aggregate can be passed.
4. Unless otherwise noted or restricted by above Grade No. 2, gradation shall be used.

2.05 PIT-RUN AGGREGATE

A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or coarse aggregates, and shall consist of hard, durable, uncoated pebbles or stone particles mixed with sand.

B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.

C. Pit-run aggregate shall be well graded from coarse to fine when tested by standard laboratory methods and shall meet the following minimum requirements for percentages by weight:

1. Retained on 1/4 in sieve 55 to 60%

D. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and above.

E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.07 REINFORCING STEEL

A. Reinforcing steel shall comply with Section 03200.

2.08 CURING MATERIALS

A. Liquid Membrane: white pigmented chlorinated rubber, ASTM C309.

B. Liquid Membrane: resin base, clear compound, permitting application of paint, W.R. Meadows, Inc. - 1100 Clear or equal.

C. Plastic Film: White pigmented, 0.00085-inches (minimum) thick.

D. Burlap: jute fabric, lean, free of impurities.

E. Surface Hardener: gray crystal, acidic fluosilicate base, slightly hygroscopic chemical surface hardener, SIKA Hardener, SIKA Chemical Corporation, or equal.

2.09 JOINT MATERIALS

A. Joint Sealer: hot poured, non-extruding, elastic, ASTM D6690.

B. Preformed Expansion Joint Filler: non-extruding, bituminous fiber, ASTM D1751.

2.10 WATERSTOP

A. Hydrophilic, pre-formed rubber strip.

B. Size to suit joinings.

2.11 FORM MATERIALS

A. Use plywood, metal, metal framed plywood faced or other acceptable panel-type material.

B. Coat forms with non-bonding, non-staining commercial compounds.

2.12 CONCRETE MIX DESIGN AND CONTROL

A. Submit not less than 10 days prior to the start of concreting operations to the Engineer:

1. Mix design, using a coarse aggregate factor acceptable to the Engineer.
2. Sufficient samples of all materials to be incorporated into the mix for testing.
3. Full description of the source of supply of each material component.

B. Coarse aggregate factor:

1. Not more than 0.82 when voids less than 48%.
2. Not more than 0.85 when voids exceed 48%.
3. Not less than 0.68.

C. No changes or deviations from proportions or sources of supply without approval of Engineer.

D. No concrete may be placed on the job site until the mix design has been approved by Engineer in writing to the Contractor.

2.13 CONCRETE QUALITY:

A. Consistency:

1. Mortar shall cling to the coarse aggregate.
2. The aggregate shall not segregate during transport.
3. The concrete and mortar shall show no free water when removed from the mixer.

B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.

C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.

D. Excessive bleeding shall be avoided.

E. Slump requirements shall be as follows:

	Average Slump	Maximum Slump
Structural Concrete	3	4

NOTE: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE

Class Of Concrete	Minimum Maximum SX Cement Per CY	Minimum Compressive Strength 28-day p.s.i.	Minimum Beam Strength 7-day p.s.i.****	Maximum Water Cement Item 2.1.1(c)(4)	Coarse Aggregate Number
A	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3**
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5-8.0	As Spec'd On plans	N/A	5.5	3

*Entrained Air. **No. 1 coarse aggregate may be used in foundations only (Except cased drilled shafts).
***Prestressed Concrete. ****ASTM C293 (Center Point).

2.14 GROUT:

A. Non-Shrink:

1. Use premixed non-shrink, Embeco Pre-Mixed Grout or Embeco Pre-Mixed Mortar by Master Builders Company or equal.
2. Keep water to a minimum for placing by the dry packing method.

3.00 PART 3 - EXECUTION

3.01 SUBGRADE

A. Insure subgrade is true to line and grade and compacted as specified.

B. Fill and recompact any ruts or depressions.

C. Check cross section with a template.

3.02 FORMS

A. Provide forms for all concrete work including footings and base slabs.

B. Construct forms so that completed concrete will conform to shapes, lines, grades and dimensions indicated and required.

C. Forms shall be true, plumb and level with reasonably tight joints. Adequately support and brace forms.

D. Place anchors, inserts, blots, sleeves and other devices indicated or required for the various portions of all the work.

E. Oil temporary forms with non-staining form oil before reinforcing steel is placed.

F. Rough form finish as defined by ACI 301 permitted for concealed concrete.

G. Smooth form finish as defined by ACI 301 permitted for concealed concrete.

H. Provide 3/4 inch chamfer on exposed corners and edges, and 1-foot below ground level.

3.03 REMOVAL OF FORMS

A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.

B. Remove formwork for columns, walls, beam sides and other parts not supporting the weight of the concrete as soon as the concrete has hardened sufficiently to resist damage from removal operations.

C. Formwork for slabs, beam soffits and other parts supporting the weight of the concrete shall remain in place until the concrete has reached its specified 28-day strength.

D. Protect concrete from damage prior to acceptance.

E. Prohibit traffic until concrete is at least 10 days old.

F. Cure areas previously covered by forms.

3.04 MIXING CONCRETE

A. Maintain all equipment, tools, and machinery used for hauling materials and performing any part of the work to insure completion of the work underway without excessive delays for repairs or replacement.

B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.

C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.

D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

E. The entire contents of the drum shall be discharged before any materials are placed.

F. Improperly mixed concrete will not be placed.

G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transit Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.
2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.
3. Concrete shall not be placed on the job after a period of 1 hour after the cement has been placed in the mixer, with mixer turning; 30 minutes without turning.

I. Continuous Volumetric Mix Concrete:

1. A mobile, continuous, volumetric mixer of the rotating puddle type may be used for when approved by Engineer.
2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mix them to the required consistency before discharging.
3. The mixers shall have adequate water supply and metering devices.
4. Calibration of these mixers will be required.

3.05 PLACING CONCRETE

A. The minimum temperature of all concrete at the time of placement shall not be less than 50ºF.

B. Clean transporting equipment, reinforcing and embedded items before placing concrete.

C. Batch trucks or paving equipment not permitted on prepared subgrade unless authorized by the Engineer based on actual job conditions.

D. Place no concrete until after inspection of forms by Engineer.

E. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

Air of Concrete Temperature	NonAgitated Concrete	Maximum Time
80ºF or Above 35ºF to 79ºF	26.6ºC 1.6ºC to 26.1ºC	15 minutes 30 minutes
Air of Concrete Temperature	Agitated Concrete	Maximum Time
90ºF and Above 75ºF to 89ºF 35ºF to 74ºF	32.2ºC 23.9ºC to 31.6ºC 1.6ºC to 23.3ºC	45 minutes 60 minutes 90 minutes

F. Prevent segregation during placing.

G. Consolidate flat work with one pass of a mechanical vibrator moving parallel to the centerline. Unusual sections and widths may be hand puddled and finished.

H. Place concrete continuously so that each pour unit will be monolithic in construction and will terminate at an expansion, contraction or construction joint. Permit no more that 30 minutes between depositing adjacent batches.

I. Place slab concrete over membrane waterproofing before waterproofing has become damaged or dirty.

J. Concrete placement will not be permitted when impending weather conditions will impair the quality of the work.

K. Slope horizontal surfaces of exterior concrete for drainage.

L. Deposit concrete in forms in horizontal layers not deeper than 24 inches. . Avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.

M. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

N. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate placed layer of concrete and at least 6-inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

3.06 PLACING CONCRETE IN WATER

A. Concrete shall be deposited in water only when specified on the plans or with written permission of the Engineer.

B. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is deposited.

C. Water pumping will not be permitted during the concrete placing, nor until it has set for at least 36 hours.

D. The concrete shall be placed with a tremie, closed bottom-dump bucket or other approved method.

E. The concrete shall not be allowed to fall freely through the water nor shall it be disturbed after it has been placed. Its surface shall be kept approximately level during placement.

F. The tremie shall consist of a water-tight tube 14-inches or less in diameter. It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete. It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow. The lower end of the tremie shall be submerged in the concrete at all times.

G. Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard. It shall be lowered gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.

H. The placing operations shall be continuous until the work is complete.

I. Unless otherwise specified, all concrete placed under water, except seal concrete, shall contain an additional sack of cement per cubic yard.

3.07 JOINTS

A. Contraction Joints:

1. Extend entirely across flat slabs at locations shown.
2. Location where not shown; maximum spacing is:
   a. Driveways: 10-feet.
   b. Sidewalks: 4-feet.
   c. Other flat slabs: 20 times slab thickness.
3. Saw depth not less than 1/4 slab thickness.

B. Filling Joints:

1. Fill not later than 14 days after sawing.
2. Fill immediately following cleaning.
3. Fill to 1/8-inch of surface.
4. Remove excess while material is still pliable.
5. Refill low areas where necessary.
6. Omit filling sidewalk joints.

3.08 FINISHING EXTERIOR FLAT WORK

A. Strike off and float as required.

B. Check surface with ten foot straight edge, maximum variance allowed -1.8-inch.

C. Drag concrete surface longitudinally with double thickness burlap drag after completion of straight edging unless noted otherwise.

D. Use edger on edges of slab.

E. Use hand finishing only when approved by Engineer.

3.09 FINISHING OTHER CONCRETE

A. Slabs: smooth, steel-troweled finish; use edger on exposed edges. Grind smooth defects.
B. Exterior walks and steps lightly broomed; finish transverse to traffic flow; use edger on exposed edges.

C. Other surfaces:

1. Remove fins, projections and loose material.
2. Clean surfaces of form oil.
3. Patch honeycomb, aggregate pockets, voids and holes as follows:
   a. Chip out until sound concrete is exposed to minimum depth of 1-inch.
   b. Prepare patching mortar with approximately two parts of normal Portland Cement, one part white cement, nine parts fine aggregate; vary proportions of aggregate as necessary to match color of adjacent concrete.
4. Fill holes left by form ties to within 1-inch of surface with non-shrink grout. Fill remainder with patching mortar specified hereinbefore.

D. Coordinate required finish with Engineer.

3.10 CURING

A. Contractor shall inform the Engineer fully of the methods and procedures proposed for curing; shall provide proper equipment and in adequate amounts; and shall have approval of the proposed method, equipment and materials prior to placing concrete.

B. All concrete shall be cured for a period of 4 curing days except as noted herein.

1. Exceptions to 4-day Curing.
   a. A curing day is defined as a calendar day when the ambient temperature, taken in the shade away from artificial heat, is above 50° Fahrenheit (10 ° C) for at least 19 hours, or the ambient temperature is 50 ° or less; and if satisfactory provisions are made to maintain the temperature at all surfaces of the concrete above 40 ° Fahrenheit (4.4 ° C) for the entire 24 hours.

C. Form Curing:

1. When forms are left in contact with the concrete, other curing methods shall not be required except for cold-weather protection.

D. Water Curing:

1. All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet requirements for concrete mixing water.
   a. Wet Mat:
      1) Cotton mats shall be used for this curing method. The mats shall not be placed in contact with the concrete until such time that damage shall not occur to the surfaces.
      2) Damp burlap blankets made from 9-ounce stock may be placed upon the damp concrete surface for temporary protection prior to the application of the cotton mats.
      3) The mats may be placed by and wetted down after placement.
      4) Mat curing, except for continuous placements, shall commence not later than three hours after finishing of the roadway slab.
      5) The mats shall be weighted down adequately to provide continuous contact with all concrete surfaces where possible.
      6) The surfaces of the concrete shall be kept wet for the required curing time.
      7) Surfaces which cannot be cured by contact shall be enclosed with mats, anchored positively to the forms, or to the ground, so that outside air cannot enter the enclosure. Sufficient moisture shall be provided inside the enclosure to keep all surfaces of the concrete wet.

   b. Water spray:
      1) This method shall be accomplished by overlapping sprays or sprinklers, so that all unformed surfaces are kept continuously wet.
   c. Ponding:
      1) This method requires the covering of the surface with a minimum of two inches (5 cm) of clean granular material, kept wet at all times; or water to a minimum depth of one inch (2.5 cm). Satisfactory provisions shall be made to provide a dam to retain the granular material or water.

E. Membrane Curing

1. Unless otherwise shown on the plans, Type 2 membrane curing compound may be used where permitted.
2. Membrane shall be applied in a single, uniform coating at the rate of coverage recommended by the manufacturer and as approved by the Engineer, but not less than nine gallons per 210 feet (.0038M^3 63M) of area. Tests for acceptance shall be at this specified rate.

3. Membrane curing shall not be applied to dry surfaces; but shall be applied to horizontal surfaces just before free moisture has disappeared.
4. Formed surfaces and surfaces which have been given a first rub shall be dampened and shall be moist at the time of application of the membrane.
5. When a membrane is used for complete curing, the film shall remain unbroken for the minimum curing period specified. A membrane which is damaged shall be corrected immediately by reapplication of membrane.

3.11 TESTING

A. Furnish at least three cylinders or beams from each 40 cubic yard, or portion thereof for test purposes unless otherwise directed by Engineer. Test one cylinder at 7 days, test second cylinder at 28 days and test third cylinder only if needed for confirmation of compression strength.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling-in: fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Use non-shrink grout as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
B. Equipment bases and foundations: provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing machines and equipment. Use non-shrink grout as shown on plans.
C. Steel pan stairs: provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screen, tamp and finish concrete surfaces as scheduled.
D. Reinforced masonry; provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

END OF SECTION

SECTION 03301 - CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes, for noncritical applications of concrete and for projects using small quantities of concrete.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

1.3 SUBMITTALS

A. General: In addition to the following, comply with submittal requirements in ACI 301.

B. Product Data: For each type of product indicated.

C. Design Mixtures: For each concrete mixture.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:

1. "General Requirements."
2. "Formwork and Formwork Accessories."
3. "Reinforcement and Reinforcement Supports."
4. "Concrete Mixtures."
5. "Handling, Placing, and Constructing."

D. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

A. Furnish formwork and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Plain-Steel Wire: ASTM A 82, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F. No more than 5%.

B. Normal-Weight Aggregate: ASTM C 33, graded, 1-1/2-inch (38-mm) nominal maximum aggregate size.

C. Water: ASTM C 94/C 94M**;** potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.7 CONCRETE MIXTURES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
3. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
4. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.3 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.4 CONCRETE PLACEMENT

A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Consolidate concrete with mechanical vibrating equipment.

3.5 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm).

1. Apply to concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.7 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engag**e** a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Tests: Perform according to ACI 301.

1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m) but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

3.9 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION

SECTION 07900 – JOINT SEALERS

1.00 PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. CAST-IN-PLACE CONCRETE: Section 03300.

1.02 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit samples, illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

B. Installer: A minimum of 5 years successful experience in applications of joint sealants specified.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.07 WARRANTY

A. Provide five year warranty under provisions of Section 01700.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

2.00 PART 2 - PRODUCTS

2.01 SEALANTS

A. Elastomeric Sealants: at control joints and expansion joints, vertical walls and horizontal surfaces.

1. One part acrylic polymer.

   a. Provide manufacturer's standard, non-modified, one-part polymer based, air-curing, elastomeric sealant, complying with FS TT-S-00230C, Class A, nonsag grade/type.

   b. Acceptable Manufacturers:

      1. Dynatrol; Pecora Corp.
      2. Sonolastic; Sonneborn/Contech
      3. General Electric

   c. Color: To be selected by Architect/Engineer from full range of manufacturers colors.

B. Non-Elastomeric Sealants: at roof flashings

1. Butyl Rubber Sealant

   a. Provide polymerized butyl rubber and insert fillers (pigments), solvent-based with minimum 75% solids, nonsag consistency, tack-free time of 24 hours or less, paintable, nonstaining, comply with FS TT-S-001657.

   b. Manufacturer:

      BC-158 Butyl Rubber; Pecora Corp.
      707 Butyl; Protective Treatments, Inc.
      Butyl Sealant; Tremco, Inc.
      Euco Synthetic Rubber; Euclid Chemical Co.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Sealant Backer Rod: Provide compressible rod stock of polyethylene foam, polyurethane foam, or polyethylene jacketed polyurethane foam, as recommended by sealant manufacturer for back-up of, and compatible with, sealant or caulking compound. Backer Rod shall be oversized 30 percent larger than joint width. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3.00 PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions except when more stringent requirements are shown or specified.

B. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.

D. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.

E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps, sags or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, tool joints to a slightly concave shape, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, tool joint to form a slight cove, so that joint will not trap moisture and dirt.

F. Install liquid-applied sealant to depths as shown, or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) sections of beads; (not applicable to sealants in lapped joints):

1. For normal moving joints sealed with elastomeric sealants, not subject to traffic, fill joints to a depth equal to 50% of joint width, but never more than 1/2" deep nor less than 1/4" deep.

2. For joints sealed with non-elastomeric sealant, fill joints to a depth in the range of 75% to 125% of joint width.

G. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

3.04 CURE AND PROTECTION

A. Cure sealants in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength, and surface durability.

B. Advise contractor of procedures required for cure and protection of joint sealers during the construction period, so that they will be free of embedded matter, and undamaged (other than normal wear and weathering) at time of substantial completion.

C. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects.

D. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION

SECTION 09865 - SHOP COATING

1.00 PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required for the surface preparation and application of shop primers on ferrous metals, excluding stainless and galvanized steels, as specified herein.

B. It is the intent of these Specifications to shop coat all exposed ferrous metals listed below:

1. Structural steel
2. Miscellaneous steel
3. Doors Frames
4. Steel hatches
5. Sluice gates
6. Operators
7. Posts
8. Pipe
9. Fittings
10. Valves
11. Pumps

All other work obviously required to be painted unless otherwise specified and minor items not mentioned in the schedule of work, shall be included in the work of this Section where they come within the general intent of the specifications as stated herein.

1.02 RELATED WORK NOT INCLUDED

A. Field coatings is included in Section 09900.

1.03 SUBMITTALS

A. Submit to the Engineer for approval, as provided in Section 01300, shop drawings, manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thickness.

B. Submit representative physical samples of the proposed primers, if required by the Engineer.

2.00 PART 2 - PRODUCTS

2.01 MATERIALS

A. All painting materials shall be equal to those manufactured by the Tnemec Company, Inc., or Sherwin Williams or equal. The painting schedule has been prepared on the basis of Tnemec products (unless otherwise noted) and Tnemec recommendations for application. No brand other than those named will be considered for approval unless the brand and type of paint proposed for each item in the following schedule together with sufficient data substantiated by certified tests conducted at no expense to the Owner, to demonstrate its equality to the paint(s) named, is submitted to the Engineer in writing for approval within 30 days after the signing of the Contract Agreement. The type and number of tests performed shall be subject to the

Engineer's approval.

B. All painting materials shall be delivered to the fabrication site in unbroken packages, bearing the manufacturer's brand and name. They shall be used without adulteration and mixed, thinned, and applied in strict accordance with manufacturer's directions for the applicable materials and surface and with the Engineer's approval before using.

C. Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with the finish paints to be used.

D. No paint containing lead will be allowed. Oil shall be pure boiled linseed oil.

E. Materials shall be in full compliance with the requirements of pertinent codes and fire regulations.

2.02 PAINTING SCHEDULE

A. All colors will be selected by the Engineer based on the color shown herein. The following surfaces shall have the types of paints specified below applied at the minimum dry film thickness (DFT) in mils per coat.

B. The following types of paints by Tnemec, unless otherwise indicated, have been used as a basis for the paint schedule:

1. Hi-build Epoxoline (Series 66) - Epoxy-Polyamide Coating
2. Versare Primer (Series 4) - Modified Alkyd Rust-Inhibitive Primer

C. All ferrous metals shall be shop coated according to the following areas of placement:

1. Process:
   a. Submerged 1 Coat Series 66 (4.0-6.0 DFT)
   b. All Non-Submerged 1 Coat Series 66 (3.0-4.0 DFT)
2. Non-Process
   a. 1 Coat Series 4 (2.0-3.0 DFT)

D. Non-Primed Surfaces - Gears, bearing surfaces, and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust-resistant coating. This coating shall be maintained as necessary to prevent corrosion during all periods of storage and erection and shall be satisfactory to the Engineer up to the time of the final acceptance test.

E. Compatibility of Coating Systems - Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with their corresponding primers and finish coats specified in Section 09900 for use in the field and which are recommended for use together.

3.00 PART 3 - EXECUTION

3.01 A. Surface Preparation and Priming

1. Non-submerged components scheduled for printing, as defined above, shall be sandblasted clean in accordance with SSPC- SP-6, Commercial Blast Cleaning immediately prior to priming.

2. Submerged components scheduled for priming, as defined above, shall be sandblasted clean in accordance with SSPC-SP-10, Near White Blast Cleaning, immediately prior to priming.

3. Surfaces shall be dry and free of dust, oil, grease and other foreign material before priming.

4. Shop prime in accordance with approved manufacturer's recommendations.

END OF SECTION

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SECTION 09900 - FIELD COATING

1.00 PART 1 - GENERAL

1.01 INTERIOR PIPE LINING FOR DUCTILE PIPING

A. Surface Preparation: All surfaces shall be dry, clean and free of all containments, traces of grease, oil asphalt and other soluble containments. Abrasive blast all surfaces with fine abrasive to remove all loose annealing oxides, rust, dirt and other foreign matter. Only slight stains and tightly adhering oxides are allowed to remain on the surface. Any area where rust reappears before application shall be reblasted. Any dust or other contaminants remaining after blasting shall be removed with dry, oil free compressed air or by vacuum cleaning. Anchor pattern shall be angular with profile of at least 3.0 mils.

B. Coating System: Tnemec Series 431 Perma-Shield PL applied 40.0 dry mils nominal thickness.

1.02 DUCTILE IRON PIPING, VALVES & FITTINGS IN IMMERSION

A. Surface Preparation

a. Clean all surfaces as per NAPF 500-03-01 Solvent Cleaning to remove all oil, grease, factory-applied tars and/or bitumastic coatings and all other soluble contaminants.
b. Prepare ductile iron pipe as per NAPF 500-03-04 Abrasive Blast Cleaning for ductile iron pipe providing a minimum 1.5 mil angular anchor profile.
c. Prepare ductile iron valves and fittings as per NAPH 500-03-05 Abrasive Blast Cleaning for Cast Ductile Iron Fittings.
d. If existing ductile is factory coated with Tnemec Series N140, please follow recoat windows listed on the current product data sheet.

B. Coating System
a. One Coat: Tnemec Series 431 Perma-Shield PL or Series 435 Perma-Glaze applied 30.0 dry mils nominal thickness. Total minimum dry film thickness shall be **30.0** mils.

1.03 CONCRETE

A. Surface Preparation: Allow new concrete to cure 28 days. Level protrusions and mortar spatter. Abrasive blast as per SSPC-SP13/NACE 6 for “Severe Service,” achieving a surface profile equal to ICRI CSP-5. Fill voids and bugholes with Tnemac Series 218 MortarClad.

B. Coating System
a. First Coat: Tnemec Series 218 MortarClad applied at a minimum of 1/16” nominal dry film thickness.
b. Second Coat: Tnemec Series 436 Perma-Shield FR applied at 80.0 dry mils.
c. Total minimum dry film thickness shall be **140.0** mils.

END OF SECTION

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SECTION 11005 – EQUIPMENT: GENERAL REQUIREMENTS

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements of this Section apply to all equipment provided on the Project including that found in Divisions 11, 15 and 16, even if not specifically referenced in individual "Equipment" articles of those Specifications.

B. Related Sections include but are not necessarily limited to:

1. Section 11060 – Pumping Equipment: General Requirements.

2. Section 11322 – Submersible Lift Station

3. Section 16010 – Electrical: Basic Requirements.

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Bearing Manufacturers Association (ABMA).

2. American Gear Manufacturers Association (AGMA).

3. American Society for Testing and Materials (ASTM) F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

4. Institute of Electrical and Electronics Engineers (IEEE)112, Standard Test Procedure for Polyphase Induction Motors and Generators.

5. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment.
   b. ICS 6, Enclosures for Industrial Control and System.
   c. MG 1, Motors and Generators.

6. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).

B. Miscellaneous:

1. A single manufacturer of a "product" to be selected and utilized uniformly throughout Project even though:
   a. More than one manufacturer is listed for a given "product" in Specifications.
   b. No manufacturer is listed.
   c. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls, and system components shall FULLY comply with specific NEC area and NEMA 250 and ICS-6 designations shown on the Contract Drawings and defined in Section 16010.

1.03 DEFINITIONS

A. Product: Manufactured materials and equipment.

B. Major Equipment Supports - Supports for Equipment: Located on or suspended from elevated slabs with supported equipment weighing 2,000 lbs. or greater, or:

1. Located on or suspended from roofs with supported equipment weighing 500 lbs. or greater, or:

2. Located on slab-on-grade or earth supported with equipment weighing 5000 lbs. or more.

C. Equipment: One or more assemblies capable of performing a complete function. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic or hydraulic connection. Not limited to items listed under "Equipment" article within specifications.

D. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project site. Installer and applicator are synonymous.

1.04 SUBMITTALS

A. Shop Drawings: Refer to Section 01300.

B. General for all equipment:

1. Acknowledgment that products submitted comply with the requirements of the standards referenced.

2. Manufacturer's delivery, storage, handling, and installation instructions.

3. Equipment identification utilizing numbering system and name utilized in Drawings.

4. Equipment installation details:
   a. Location of anchorage.
   b. Type, size, and materials of construction of anchorage.
   c. Anchorage setting templates.
   d. Manufacturer's installation instructions.

5. Equipment area classification rating.

6. Shipping and operating weight.

7. Equipment physical characteristics:
   a. Dimensions (both horizontal and vertical).
   b. Materials of construction and construction details.
   c. Equipment factory primer and paint data.

8. Manufacturers recommended spare parts list.

9. Equipment lining and coatings.

10. Equipment utility requirements include air, natural gas, electricity, and water.

C. Mechanical and process equipment:

1. Operating characteristics:
   a. Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
   b. Brake horsepower requirements.
   c. Copies of equipment data plates.

2. Piping and duct connection size, type and location.

3. Equipment bearing life certification.

4. Equipment foundation data:
   a. Equipment center of gravity.
   b. Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.

D. Electrical and control equipment:

1. Electric motor information:
   a. Nameplate data.
   b. Service factor on motors 1/2 HP and above.
   c. Motor enclosure type.
   d. NEMA frame size.
   e. NEMA design code.
   f. Insulation type.
   g. Locked rotor current.
   h. Efficiency and power factor at full load, 3/4 load, and no load.

2. Control panels:
   a. Panel construction.
   b. Point-to-point wiring diagrams.
   c. Scaled panel face and subpanel layout.
   d. Technical product data on panel components.
   e. Panel and subpanel dimensions and weights.
   f. Panel access openings.
   g. Nameplate test.
   h. Panel anchorage.

E. Operation and Maintenance Manuals: Refer to Section 01730.

F. Miscellaneous Submittals:

1. Sample form letter for equipment field certification.

2. Certification that equipment has been installed properly, has been initially started up, has been calibrated and/or adjusted as required, and is ready for operation.

3. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.

4. Field noise testing reports if such testing is specified in narrow scope sections.

5. Field vibration testing reports if vibration testing is specified in narrow scope sections.

6. Notification, at least one (1) week in advance, that motor testing will be conducted at factory.

7. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the supplier/installer of those interfacing systems.

8. Motor test reports.

9. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.

2.00 PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Submersible Pumps - Refer to Section 11322.

B. Submit requests for substitution in accordance with Section 01300.

2.02 ACCESSORIES

A. Cast-in-place anchorage:

1. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment and support systems.

2. Configuration and number of anchor bolts shall be per manufacturer's recommendations.

3. Provide two nuts for each bolt.

B. Drilled anchorage:

1. Epoxy grout.

2. Threaded rods same as cast-in-place.

C. Data Plates:

1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.

2. Permanently stamp information on data plate including manufacturer's name, equipment operating parameters, serial number and speed.

D. Lifting Eye Bolts or Lugs:

1. Provide on all equipment 50 LBS or greater.

2. Provide on other equipment or products as specified in the narrow specifications.

2.03 FABRICATION

A. Design, fabricate, and assemble equipment in accordance with modern engineering and shop practices.

B. Manufacture individual parts to standard sizes and gages so that repair parts, furnished at any time, can be installed in field.

C. Furnish like parts of duplicate units to be interchangeable.

D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.

E. Furnish equipment requiring periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping or equipment or similar major efforts. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.

F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option. Provide drain connection for 3/4 IN PVC tubing.

G. Machine the mounting feet of rotating equipment.

H. Fabricate equipment which will be subject to Corrosive Environment in such a way as to avoid back to back placement of surfaces that can not be properly prepared and painted. When such back to back fabrication can not be avoided, provide continuous welds to seal such surfaces from contact with corrosive environment.

2.04 SHOP OR FACTORY PAINT FINISHES

A. Electrical Equipment:

1. The standard factory-applied paint coating system(s) of the approved manufacturers of the following equipment are acceptable:
   a. Panel boards.
   b. Electrical panels.
   c. Safety switches.
   d. Motor starter equipment.

3.00 PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment as shown on Drawings and in accordance with manufacturer's directions.

B. Utilize templates for anchorage placement for slab-mounted equipment.

C. DO NOT construct foundations until major equipment supports are approved.

D. Extend all non-accessible grease fittings using stainless steel tubing to a location which allows easy access of fittings.

E. Construct subbases, either concrete, steel or cast iron, level in both directions. Particular care shall be taken at hold-down bolt locations so these areas are flat and level.

F. Machine Base:

1. Mount machine bases of rotating equipment on subbases in manner that they are level in both directions according to machined surfaces on base. Use machinist level for this procedure. Level machine bases on subbases and align couplings between driver and driven unit using steel blocks and shims.
   a. Size blocks and shims to provide solid support at each anchor bolt location. Area size of blocks and shims shall be approximately 1-1/2 times area support surface at each anchor bolt point.
   b. Provide blocks and shims at each anchor bolt. Blocks and shims that are square shape with "U" cut out to allow blocks and shims to be centered on anchor bolts.

c. After all leveling and alignment has been completed and before grouting, tighten anchor bolts to proper torque value.
d. Do not use nuts below the machine base on anchor bolts for base leveling.

G. Couplings:

1. Align in the annular and parallel positions.
   a. For equipment rotating at 1200 rpm or less, align both annular and parallel within 0.001 inch tolerance for couplings 4 inches in size and smaller. Couplings larger than 4 inches in size: Increase tolerance 0.0005 inch per inches of coupling diameter, i.e., allow 6 inch coupling 0.002 inch tolerance, and allow a 10 inch coupling 0.004 inch tolerance.
   b. For equipment rotating at speeds greater than 1200 rpm allow both annular and parallel positions within a tolerance rate of 0.00025 inch per inch coupling diameter.

H. If equipment is delivered as a mounted unit from factory, verify factory alignment on site after installation and realigned if necessary.

I. Check surfaces for runout before attempting to trim or align units.

J. Grouting:

1. After machine base has been shimmed, leveled, couplings aligned and anchor bolts tightened to correct torque value, a dam or formwork shall be placed around base to contain grouting. Extend dam or formwork at least 1/2 inch above the top of leveling shims and blocks.

2. Saturate top of roughened concrete subbase with water before grouting. Add grout until entire space under machine base is filled to the top of the base underside. Puddle grout by working a stiff wire through the grout and vent holes to work grout in place and release any entrained air in the grout or base cavity.

3. When the grout has sufficiently hardened, remove dam or formwork and finish the exposed grout surface to fine, smooth surface. Cover exposed grout surfaces with wet burlap and keep covering sufficiently wet to prevent too rapid evaporation of water from the grout.

4. When the grout has fully hardened (after a minimum of 7 days) tighten all anchor bolts and recheck driver-driven unit for proper alignment.

3.02 INSTALLATION CHECKS

A. For all equipment specifically required in detailed specifications, secure services of experienced, competent, and authorized representative(s) of equipment manufacturer to visit site of work and inspect, check, adjust and approve equipment installation. In each case, representative(s) shall be present during placement and startup of equipment and as often as necessary to resolve any operational issues which may arise.

B. Secure from equipment manufacturer's representative(s) and provide to Owner’s Representative a written report certifying that equipment:

1. Has been properly installed and lubricated.

2. Is in accurate alignment.

3. Is free from any undue stress imposed by connecting piping or anchor bolts.

4. Has been operated under full load conditions and that it operated satisfactorily.

C. No separate payment shall be made for installation checks. All or any time expended during installation check does not qualify as O&M training or instruction time when specified.

D. Wiring Connections and Termination:

1. Clean wires before installing lugs and connectors.

2. Terminate motor circuit conductors with copper lugs bolted to motor leads.

3. Connections to carry full ampacity of conductors without temperature rise.

E. Field Quality Control:

1. Furnish equipment manufacturer services as specified in the individual equipment specifications.

2. Inspect wire and connections for physical damage and proper connection.

3. Check rotation of motor before connection to driven equipment, before couplings are bolted or belts installed. Before motor is started to check rotation, determine that motor is lubricated.

4. Subbase that supports the equipment base and that is made in the form of a cast iron or steel structure that has supporting beams, legs and cross member that are cast welded or bolted, shall be tested for a natural frequency of vibration after equipment is mounted. Keep the ratio of the natural frequency of the structure to the frequency of the disturbing force out of the range from 0.5 to 1.5.

3.03 DEMONSTRATION

A. Demonstrate equipment in accordance with the requirements of these specifications.

END OF SECTION

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SECTION 11060 – PUMPING EQUIPMENT: GENERAL REQUIREMENTS

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Pumping appurtenances.

B. Related Sections include but are not necessarily limited to:
   1. Forms of Contract, Bond and Proposal.
   2. General Specifications.
   3. Section 11005 – Equipment: General Requirements.
   4. Section 11322 – Submersible Lift Station

1.02 QUALITY ASSURANCE

A. Referenced Standards:
   1. Hydraulic Institute (HI):
      a. Standards for centrifugal, rotary and reciprocating pumps.
      b. Fully coordinate all mechanical seal systems specified to ensure pump and seal compatibility.

1.03 SUBMITTALS

A. Shop Drawings: Refer to Section 01300.

B. Product technical data including:
   1. Performance data and curves with flow (gpm), head (ft), horsepower, efficiency, NPSH requirements, submergence requirement.
   2. Pump accessory data.
   3. Bearing supports, shafting details and lubrication provisions.
   4. Solids passage information.

C. Certifications:
   1. Certified pump performance curves.
   2. Statement relative to installation and start-up per paragraph 3.02-A.4.

D. Test reports: Factory hydrostatic test.

2.00 PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Mechanical seals:
      a. Chesterton.
      b. Garlock.

2.02 ACCESSORIES

A. Refer to Section 11005.
   1. Each Unit:
      a. Lifting eye bolts or lugs.
      b. Plugged gage cock connection at suction and discharge nozzles.
      c. Tapped and plugged openings for casing and bearing housing vents and drains.

d. Fittings for properly adding flushing lubricant.
e. Pressure relief fittings for grease lubrication.

B. Packing Seal:
1. Provide unless mechanical seal specified in narrow-scope pump sections.
2. Minimum of five rings graphite impregnated synthetic packing.
3. Provide minimum 1/4 inch diameter supply tap and 1/2 inch diameter minimum drain tap.
4. Provide split Teflon or bronze water seal ring.
5. Adjustable split follower cast iron or bronze gland.

C. Mechanical Seals: Provide as specified in the narrow-scope pump sections.

2.03 FABRICATION

A. Pump Support:
1. Design base to support weight of drive, shafting and pump.
2. Comply with HI vibration limitations.
3. Mount horizontal pump, motor and coupling on single piece drip lip type baseplate.
4. Mount vertical pumps on single piece pedestal baseplate.
5. Fabricate to withstand all operating loads transmitted from the pump and drive.

2.04 SOURCE QUALITY CONTROL

A. If specifically required in the individual pump specification sections, provide factory tests.

B. All units: Hydrostatic test at 150 percent of shutoff head for a minimum of 5 minutes.

C. Constant speed units:
1. Head (ft) versus flow (gpm) pump curves.
2. Efficiencies along curve.
3. Brake horsepower along each curve.

D. Results certified by a registered professional engineer in the State of Texas.

E. Statically and dynamically balance each pump per HI standards.

3.00 PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 11322.
1. Submersible Units:
a. Assemble connecting piping with gaskets in place and minimum of four bolts per joint installed and tightened. Test alignment by loosening flange bolts to see if there is any change in relationship of piping flange with equipment connecting flange. Realign as necessary, install flange bolts and make equipment connection.
b. Pumps shall be shop coated as per manufacturer’s recommendations.
c. Provide pressure gage on discharge of all pumps and on suction of all non-submersible units.

3.02 FIELD QUALITY CONTROL

A. Provide services of equipment manufacturer's field service representative(s) to:
1. Inspect equipment covered by these Specifications.
2. Supervise pre-start adjustments and installation checks.

3. Conduct initial startup of equipment and perform operational checks.
4. Provide a written statement that manufacturer's equipment has been installed properly, started up and is ready for operation by Owner's personnel.
5. Instruct Owner's personnel for a minimum 4 (four) hours at the jobsite on operation and maintenance of pumping equipment.

END OF SECTION

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SECTION 11322 - SUBMERSIBLE LIFT STATION

PART 1. GENERAL

1.01 This specification shall govern for all work necessary for furnishing, installing and placing into initial operation the submersible pumps, accessories, and control panel for the Lift Station.

1.02 GENERAL DESCRIPTION
The pumps shall be designed for handling a raw unscreened wastewater. The equipment shall be designed such that the pump unit can be automatically and firmly connected to the discharge piping when lowered into place on a mating discharge connection permanently installed in the wet pit. The pumps should be easily removable from the lift station, without the need for personnel to enter the wet pit, for inspection or maintenance.

1.03 QUALITY ASSURANCE

A. The pumps shall be furnished by a manufacturer engaged in the production of the specific type of pump for a minimum of 10 years. The manufacturer shall have furnished similar pumps for a least 5 other installations in Texas performing similar duty. Each installation shall have performed satisfactorily for at least 5 years and are still in operation.

B. All manufacturer parts and components shall be engineered for long, continuous and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts.

C. Where like items are incorporated into equipment systems (i.e. motors, push buttons, etc.) such items must be identical to achieve standardization for appearance, operation, maintenance, spare parts, and service. Corresponding parts of multiple units shall be interchangeable.

D. All stages of the manufacturing process shall be carefully inspected at the factory by factory inspectors who shall use whatever means necessary to assure the proper fit of all field connections and compliance with all material and fabrication requirements of the specifications.

E. The pump, pump monitoring, and level control panel shall be factory wired and assembled. Assembly and wiring shall be to the point where the only field interconnections to numbered terminal blocks are required.

F. It is absolutely imperative that parts be available within 160 miles of the project site for immediate repairs should repairs become necessary. Unless it can be demonstrated that parts and service have been available at a service center within 160 miles of the project site through the same financially sound firm on a continuing basis for at least 10 years, the spare parts listed in these specifications must be furnished with the pumps at no additional cost to the City.

1.04 PERFORMANCE (Operating Conditions)

A.	One pump running duty point	861 gpm @ 46.4’ tdh
B.	Duty point efficiency	87.5%
C.	Max. Active Motor Input Power	
	1. Design duty point	216.0 Kw

D.	Max. Total Motor Input Power	
	1. One pump running duty point	15.0 HP
E.	Max pump speed	1765 rpm
F.	Max NPSHR	
	1. One pump running duty point	22.6 Feet
G.	Voltage/Cycle/Phase	460/60/3
H.	Motor design Type	NEMA B
I.	Motor Service Factor	1.15
J.	Motor Insulation	Class H
K.	Max. Motor pole number	4 Pole
L.	Max. Rated current (FLA)	19 Amps
M.	Min. Rated power factor	82%
N.	Max. Locked rotor current	114 Amps
O.	Max. NEC Code Letter	H
P.	Min. Pump discharge size	6 Inches

1.05 WARRANTY

A. General

1. Pump manufacturer will pay cost of parts and labor during the warranty period, provided that the pump, with cable attached, is returned prepaid to an authorized repair facility for repairs. Coverage of parts and labor will be provided for periods indicated below.
2. This warranty shall not apply to any product or part of product which has been subjected to misuse, misapplication, accident, alteration, neglect, or physical damage and monitoring equipment has been bypassed or removed.
3. Warranty does not cover costs for standard and/or scheduled maintenance or parts that, by virtue of their operation require replacement through normal wear, unless a defect in material or workmanship can be determined by manufacturer.
4. Warranty period shall be as follows and from the date of shipment from the factory or other manufacturer approved point in time but no later than startup and beneficial use of pumping system.
   a. 0 – 24 months warranty is 100%.
   b. 25 – 39 months warranty is 50%
   c. 40 – 60 months warranty is 25%

PART 2. PRODUCTS

2.01 PUMPS

A. Manufacturers

1. Pumps shall be NP3153 MT 3- 435, the product of Xylem Water Solutions USA, Inc.-Flygt Products.
2. Engineer approved pump manufacturer.

B. Design

1. General

a. Major pump components shall be of gray cast iron, Class 35, with smooth surfaces devoid of blowholes and other irregularities.
b. Exposed nuts and bolts shall be AISI type 316 stainless steel or brass construction.
c. All surfaces, other than stainless steel, shall be factory sprayed with alkyd primer and synthetic resin enamel rubber paint finish.
d. All mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber o-rings.
e. No secondary sealing compounds, rectangular gaskets, elliptical O-rings, grease or other devices shall be used.

2. Impeller
   a. The impeller shall be of 25% chrome cast iron, ASTM A-532 (Alloy III A), dynamically balanced, semi-open, multi vane, backswept, non-clog design.
   b. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a machined spiral groove located on the stationary insert ring maintaining an unobstructed leading edge.
   c. The impeller shall have induction hardened, screw shaped leading edges and shall be capable of handling solids, fiberous materials, heavy sludge and other matter found in wastewater.
   d. Impellers shall be locked to the shaft and shall be coated with alkyd resin primer.
   e. Impellers shall be trimmed to specifically meet the conditions of operation.

3. Insert Ring
   a. A hardened, replaceable insert ring made of 25% chrome cast iron, ASTM A-532 (Alloy III A), having an integral machined spiral shaped groove shall be installed in the pump volute.
   b. The clearance between the insert ring and the impeller shall be adjustable.

4. Flush Valve
   a. Furnish and install a Flygt flush valve to mix the wastewater automatically. The valve is to be mounted directly on the pump volute to direct part of the pumped discharge to flush solids into suspension at the start of each pumping cycle. The valve shall be positioned on the pump volute to provide a non-clogging flow operation

   b. The pump volute must have a special mounting flange to allow for the proper flow exit angle and to strengthen the volute wall in order to withstand the shock loads imposed by the valve. The valve and the volute location is specific to certain pump models. The valve manufacturer and the pump manufacturer must both certify the use of the valve on the pump being used. A letter in writing must be provided by each manufacturer certifying the use of the valve on the pump, including a written warranty. The pump shall have a boss on the volute to accept the valve.

   c. The valve shall be open at the beginning of each pumping cycle and close under full pump discharge pressure after a pre-selected time. The valve shall be operated be the liquid being pumped through a self-contained hydraulic system. No external power source should be required to operate the valve. The valve shall be controlled by hydraulic pressure from the pump, external electrical, hydraulic or pneumatic lines shall not be allowed. A means of adjustment should be provided to achieve a 30 second flushing period for different head and flow conditions.

5. Volute
   a. Pump volutes shall be single piece gray cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as indicated herein.
   b. Minimum inlet and discharge size shall be as indicated herein.

6. Motor
   a. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, water tight chamber.
   b. The submersible motor shall be FM or UL Listed for Class I, Division 1, Groups C and D explosion-proof hazardous locations.
   c. The stator windings shall be insulated with moisture-resistant Class H insulation for 180 degrees C. The motor shall be designed for continuous duty capable of fifteen (15) evenly spaced starts per hour. Automatic reset, normally closed thermal sensors shall be imbedded in each phase of the motor windings to provide overheating protection.
   d. The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%.
   e. The motor shall be designed for continuous duty while handling pumped media of up to 104 degrees F.
   f. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of fastening devices used to hold or locate the stator and that penetrate the stator housing are not acceptable.
   g. The motor service factor shall be 1.15. The motor shall have a voltage tolerance of +/- 10%.
   h. The motor shall be designed for a continuous operation in up to a 40 degree C ambient and shall have a NEMA Class B maximum operating temperature rise of 80 degrees C.
   i. Motor horse power shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out.
   j. Motor shaft shall be one-piece, extending through the pump and motor. Extension couplings shall not be acceptable. Shaft shall be ASTM A572 Grade 50 carbon steel shaft material. If shaft is exposed to the pumped media it shall be constructed of 431 stainless steel. Shaft sleeves shall not be acceptable.
   k. The power cable entry seal design shall preclude specific torque requirements to insure a watertight seal and shall allow simple field changing of power and pilot cables without affecting pump or motor warranty. The cable entry assembly shall consist of a seal flange designed and machined to provide precise compressions of cylindrical elastomer grommets flanked by stainless steel washers all having a close tolerance fit against the outside diameter of the cable and the inside diameter of the entry body. Cable sizing shall conform to NEC requirements for portable power use.
   l. A separate junction chamber shall be provided inside the pump for connection of power and pilot cables to stator leads. The chamber shall be sealed by a nonmetallic terminal board bolted to a machined surfaced and utilizing an O-ring to obtain a watertight seal.
   m. Power shall be multi-conductor externally jacketed with oil resistant chloroprene rubber. Internal tinned copper conductor's insulation shall be ethylene propylene rubber and shall be color coded to identify each power lead.
7. Mechanical Seal
   a. Pumps shall be provided with a mechanical seal system consisting of two totally independent seal assemblies operating in an oil chamber between the

pump volute and motor chamber for seal lubrication and cooling. The oil shall be a white paraffin based oil meeting the standards of FDA 172.87B.

b. The lower seal shall act as the primary unit to prevent entry of pumped liquid to the oil chamber. The upper seal shall act as a secondary unit to prevent pumped liquid or oil from entering the stator housing. The seal system shall allow continuous pump operation with the motor exterior totally dry.

c. Each seal unit shall consist of a positive driven rotation ring, a stationary ring and an independent spring to maintain interface contact. The upper and lower seals for all pumps shall have tungsten carbide rotation and stationary rings.

8. Bearings
   a. The pumps shall be equipped with grease lubricated bearings with a system B-10 life of 100,000 hours at any point along the pump curve at maximum speed.
   b. The upper bearings shall be roller bearings.
   c. The lower bearings shall be two angular contact ball bearings.

9. Pump protection devices
   a. The pump manufacturer shall provide a pump monitoring system which shall consist of pump protective devices and monitoring unit mounted back plate of control panel.
   b. Pump protective devices
      1). Three thermal switches in the stator coils.
      2). A leakage sensor shall be provided in the stator housing to detect water intrusion.
   c. Monitoring and Status Unit
      1). The monitoring and status unit shall be designed to mount on the back plate or swing out door of the control panel.
      2). All monitoring devices shall connect to the control and monitoring unit.

10. Accessories
    a. The pump manufacturer shall furnish all station hardware and accessories for use with the pumps furnished or for any future requirements or revisions as may be indicated in the Plans or other sections of the Contract Specifications.
    b. All items inside the wet well shall be stainless steel or aluminum as indicate below.
    c. To insure compatibility, all access covers in structures containing submersible pumps shall be provided by the supplier of the submersible pumps. Guide rail system shall consist of no less than two bars. Each bar shall be minimum Schedule 40 wall thickness pipe to assure future availability for replacement. Guide bars shall be 2 or 3 inch as indicated on the Plans. Guide bars spanning 20 feet or less between upper and lower supports shall not require intermediate bracing. Guide bar material shall be stainless steel, type 316.

11. Testing
    a. A certified factory performance test shall be performed on each pumping unit, larger than 10 horse power, in accordance with Hydraulic Institute Standards, latest edition. Tests shall be sufficient to determine the curves of head, input horsepower, and efficiency relative to capacity from shutoff to 150% of design flow. A minimum of six points, including shutoff, shall be taken for each test. At least one point of the six shall be taken as near as possible to each specified condition.
    b. Results of the performance tests shall be certified by a Texas Registered Professional Engineer and submitted for approval before final shipment.

.02 Mechanical Accessories:

A. General:

1. The Pump Manufacturer shall furnish and be responsible for coordinating proper fit and suitability of all station hardware and accessories for the use with the pumps furnished or for any future requirements or revisions as may be indicated on the Drawings or other sections of the Contract Specifications. All items furnished shall be guaranteed, to the Owner, suitable for the intended use and shall be warranted against defective workmanship, materials and excessive corrosion for a period of two years after startup and/or beneficial use by the Owner.

B. Guide Rail Brackets:

1. Dual rail upper guide rail brackets shall be provided by the pump supplier for each pump. Each bracket shall have two 3/16" hooks for supporting pump power cables and lifting assemblies. The upper guide rail bracket shall be constructed of 316 stainless steel.
2. Dual rail intermediate guide rail brackets shall be provided by the pump supplier for guide rails which exceed 20 feet in length. Intermediate guide rail brackets shall be located at each 20' increment of guide rail or at mid-point of guide rail span. The intermediate guide rail bracket shall be constructed of 316 stainless steel.

C. Float Cable Racks:

1. Level sensor floats shall be suspended in the wet well from a cable rack bolted to the access opening or cover frame. Each rack shall be provided with six, 3/16" minimum diameter hooks over which the level sensor cables shall be looped. The cable rack shall be 316 stainless steel.

D. Power Cable Supports:

1. A stainless steel or non-metallic cable grip shall be provided for each pump power and pilot cable. The grip shall have a loop on one end, which will hang from a hook provided on the upper guide bar bracket.

E. Pump Lifting Assembly:

1. Each pump shall be supplied with a stainless steel chain that has a working load limit equal to 50% greater than the pump weight. Minimum length shall be depth of lift station plus 5 feet.
2. Chains and attachment hardware shall be of stainless steel material certified and approved for overhead lifting.

F. Lift Station Hardware:

1. All nuts, bolts, washers, anchor bolts or any attachment hardware used inside the wet well shall be constructed of 316 stainless steel.

2.03 Electrical Control Panel:

1.0 The Pump Manufacturer shall provide and be responsible for proper electrical protection and control operation. The Pump Supplier shall supply the pump control panel in order to assure unit responsibility for equipment selection, component compatibility, startup and operational checks and future service. Electrical equipment supplied must comply with all requirements of Division 16 Electrical and with the Electrical Drawings.

PART 3.0 EXECUTION

3.01 Installation

A. Installation of the pumps shall be in strict accordance with the manufacturer's instructions and recommendations.

B. The locations of the discharge piping is shown on the construction drawings. The location of the pumps, access covers, and discharge connection are approximate. The precise placement and alignment of anchor bolts, discharge assembly, guide rails, access cover and associated connections shall be in accordance with the supplemental construction details provided by the pump manufacturer. The manufacturer shall check alignment during start up field testing. Improper alignment shall be corrected by the Contractor prior to continuation of testing.

3.02 Startup and Field testing

A. After the pumps have been completely installed and wired, the Contractor shall remove the pumps to the wet pit top deck and an authorized representative of the pump manufacturer shall inspect each pump for proper installation.

1. Megger stator and power cable
2. Measure and record stator and power cable resistance
3. Check for proper rotation
4. Check power supply voltage
5. Measure Motor no load current
6. Check level control operation and sequence
7. Review recommended operation and maintenance procedure
8. Review warranty with Owner's personnel

B. After initial inspection, the Contractor shall lower the pumps into place in the wet pit and provide water for an initial operation check. The manufacturer's service representative shall supervise lowering and connection of the pumps to the discharge connection confirming proper guide rail and discharge connection alignment. The service representative shall then perform an initial operation check of each pump including:

1. Motor current in each phase
2. Supply voltage with one, two and three pumps running
3. Vibration
4. Discharge connection seating

C. On completion of initial inspection and operational checks, the pump manufacturer shall furnish the Engineer with a written report of the findings and data determined with regard to the pumps, motors, accessories, level control and electrical protection devices. The final report shall bear the stamp and signature of a Registered Professional Engineer employed or retained by the pump supplier to indicate engineering review and approval of field test data. A copy of the report shall be included in the operation and maintenance manuals.

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SECTION 13443 – LIFT STATION CONTROLS

1.00 PART 1 - GENERAL

1.01 SUMMARY

A. The control system shall be designed to operate the required number of pumps specified on the drawing at 480V / 3PH, 60HZ.
B. The control function shall provide for the operation of the pumps under normal conditions, and shall alternate the pumps on each pump down cycle to equalize the run time. In the event the incoming flow exceeds the pumping capacity of the lead pump, subsequent pumps shall automatically start to handle the increased flow. As the flow decreases, the pumps shall cut off at the elevations as shown on the plans.
C. The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from supplying a system that will function as required.

1.02 MECHANICAL

A. The enclosure shall be a NEMA 4X Stainless steel enclosure. The enclosure shall be a rack mount type with a minimum depth of 10" sized to adequately house all the components. Enclosures larger than 60”high x 36” wide shall be provided with 12” high leg stands. The enclosure door gaskets shall be rubber composition with a retainer or seamless foamed in place to assure a positive weatherproof seal. The gasket material shall not retain memory. The door shall open a minimum of 180 degrees.

B. A polished aluminum dead front inner door shall be mounted on a continuous aircraft type hinge and shall contain cutouts for mounted equipment and provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. All control switches, indicator pilot lights, elapsed time meters, and other operational devices shall be mounted on the external surface of the dead front. The dead front shall open a minimum of 150 degrees to allow access to equipment for maintenance. A 3/4" break shall be formed around the perimeter of the dead front to provide rigidity.

C. The back plate shall be manufactured of 12 gauge sheet steel and be finished with a primer coat and two 2 coats of baked on white enamel. All hardware mounted to the subpanel shall be accomplished with machine thread tapped holes. Sheet metal screws are not acceptable. All devices shall be permanently identified using engraved name plates. Use of DYMO type labels is not acceptable

1.03 ELECTRICAL

A. The panel power distribution shall include all necessary components and be completely wired with tinned, stranded copper conductors rated at 90 degrees c. All conductor terminations shall be as recommended by the device manufacturer.

B. Branch circuit breakers shall be heavy duty thermal magnetic or motor circuit protectors similar and equal to SQUARE D type HDL. Each motor breaker shall be adequately sized to meet the pump motor operating characteristics and shall have a minimum of 18,000 amps at 480 VAC. The control circuit shall individually be controlled by a heavy duty breaker.

1. Circuit breakers shall be indicating type, providing "on-off-trip" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position indicating "trip".

2. Thermal magnetic motor breakers shall be quick-make and quick-break on manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.

3. Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handle ties shall not be acceptable.

4. A main circuit breaker shall be supplied for incoming power of type molded case with electronic trip. A breaker for each motor as well as controls and auxiliary equipment.

C. Motor starters shall be open frame, across the line NEMA rated with individual class 10 overload protection in each leg. Motor starter contact and coil shall be replaceable from the front of the starter without removing from its mounted position. Overload heaters shall be block type, utilizing melting alloy spindles, and shall have visual trip indication. Overload shall be sized for the full load amperage draw of the pumps. Definite purpose contactors, fractional size starters and IEC contactor relays shall not be acceptable. Overloads shall be resettable without opening the inner door.

D. Control transformers shall be provided to provide the 120 VAC and/or 24 VAC for control circuits when required. Transformers shall be fused on the primary and secondary circuits. The secondary windings shall be grounded. A 2 kVA is control transformer required and protected on secondary with breakers.

E. A surge protecting device with tell-tale warning lights on each phase to indicate loss of protection on the individual phases shall be provided. The device shall be solid state with a response time of less than 5 nanoseconds with withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.

F. The Phase Monitor shall be a 12 pin, plug in style unit. The Phase Monitor shall monitor Under Voltage, Phase Reversal, Loss of Power and Phase Imbalance. The motor starter circuits shall be de-energized upon sensing of any of the faults and shall automatically restore service upon return to normal power. The Phase Monitor shall be available to monitor Over Voltage. The output relay shall be DPDT rated at 10A at 480 VAC. The Phase

1.04 ALARM SYSTEM /AUTODIALER

A. The alarm light shall be a weatherproof, shatterproof, red light fixture to indicate alarm conditions. The alarm light shall be turned on by the high level alarm and flash until the condition has been corrected. An open contact shall be provided for remote monitoring. The Alarm light shall be as manufactured by Federal Signal LP3M-012-048R, or equal.

B. The alarm horn shall be mounted on the exterior of the cabinet. The alarm horn shall provide a signal of not less than 90db at 10 feet. The alarm horn shall not degrade the listing of the enclosure. An alarm silence switch shall deactivate the alarm horn; however, the alarm light will flash until the alarm condition ceases to exist. At that time the alarm reset function will reset for normal operation.

C. The alarm shall be operated by an Alarm Charger and 12vdc battery for alarming on power loss. A Battery Operated Alarm with Charger as manufacture by MP Electronics shall be supplied, or equal.

D. The wireless, web-based alarm detection and notification system shall consist of a RACO AlarmAgent Model 900AA-102DCRT with Model 802AA-PANC18 cable and antenna kit and one-year prepaid standard service agreement or approved equal. All materials, equipment, labor, and services necessary to achieve the monitoring functions described herein shall be provided to interface the alarm detection and notification system with the triple redundant AlarmAgent secure network server. The easy to install wireless RTU shall provide robust monitoring and control functionality via custom user templates and straightforward user interface. Equipment status shall be visible via the front panel indicators and shall also be available 24/7 via a web enabled device or by calling a toll-free number. The dedicated website system dashboard shall allow for on-demand of status of system and alarms as well as custom reporting capability to include alarm status/history and battery status. Provide on-site training and remote technical assistance in order to support the Owner with necessary understanding of the function and operation of the website and cellular monitoring system. The cellular monitoring system shall interface with the gas detector controller and send an alarm when a high level of gas has been detected.

1.05 LEVEL CONTROL SYSTEM

A. An automatic electronic alternator shall be provided to change pump sequence after each operating cycle. The alternator shall be equipped with a three-position switch to allow automatic alteration or to lock in a 1-2 on 2-1 sequence. LED indicators shall be provided to show lead pump position. Coil voltage shall be 120 volt. Contact rating shall be 10 amp resistive at 120 volts. The alternator unit shall be UL listed. The alternator shall be a Sta-Con 008-120-12S or approved equal.
B. A 120v surge arrestor shall be included for added protection.
C. Current transformers shall be included for pump monitoring.

1.06 ANCILLARY EQUIPMENT

A. A three position HOA switch shall be provided for each pump. The switch shall be NEMA 4x rated with 25 amp contacts except when provided on a dedicated controller kit. A position indicating legend plate shall be provided. The HOA switches shall be mounted on the inner dead front door unless provided in the controller units.

B. A green run pilot indicator shall be mounted on the dead front door. Pilot lights shall be full size NEMA 4 oil tight as manufactured by squared class 9001, or equal.

C. An elapsed time meter shall be mounted on the dead front door. The meter shall operate on 120 VAC and shall indicate in hours (6 digits) and tenths and shall be non-resettable.

D. The alternator shall be a plug in, solid state unit with lead-lag-auto selector and test switches except when provided in a dedicated control device. The unit shall operate on 120 vac and provide double pole, double throw ten amp rated contacts. Two LEDs shall indicate the next position to run as lead pump.

E. A thermal heater and thermostat shall be installed to maintain the internal temperature of the enclosure above the dew point.

F. Control wiring shall be copper, tinned, UL1015, 18ga. minimum.

G. One Mini-Cas 120 unit shall be supplied for each pump to monitor the pump for over-temperature and moisture leakage. The unit shall have an 11pin, round base to mate with a standard 11 pin socket. The unit shall also be flanged in order to allow deadfront door mounting with use of 11 pin reverse socket, Omron part number P3GA-11.

   a. The unit is to be able to be powered by 24VAC, 24VDC, or 120VAC, and to contain LED indication for power on, over-temp, and leakage conditions. The unit shall contain an over-temp reset bush-button to reset the unit after the fault has cleared, as well as a selector switch that that allows the selection of manual or automatic reset.

   b. Full size pilot lights shall indicate moisture and over temperature conditions for each pump.

   c. The sensor input circuitry is to contain both hardware and software filters for noise immunity, as well as sensor input short circuit protection. The Mini-Cas 120 unit shall be model 14-407129, as supplied by Flygt Corporation.

H. A mechanical float switch shall be supplied for back up level control and be suspended at the desired height from its own cable. The float switch case shall be made of polypropylene and the cable is sheathed with a special PVC compound. The float switch cables shall be supplied with 50’ of cable.

1.07 MANUFACTURER

A. Miscellaneous:

a. A final as built drawing encapsulated in mylar shall be attached to the inside of the front door. Schematics shall be done in ladder logic with wire numbers and line numbers. Real time cross referencing of relay contact to line numbers shall be given as well as written description of component function on each circuit of the drawings. From and to wire and termination reports shall be shown on the as built drawings. Drawings shall be available in HTML format. Terminal strip layouts shall be provided for ease of connecting external devices.

b. All component parts in the control panel shall be permanently identified with engraved legend plates as designated on the drawings. A list of all legends shall be available in Excel format and attached with the schematics on the panel door.

c. All equipment shall be tested to the operational requirements. Each control function shall be activated to check for proper indication.

d. All equipment shall be guaranteed for a period of one year from the date of project substantial completion. The guarantee is effective against all defects in workmanship and/or defective component.

e. The manufacturer shall be a UL508 shop and provide evidence on the end product. The panel shall be as manufactured by Xylem Flygt part number 130528 or approved equal.

f. Provide pump control panel with SCADA ready module.

1.08 SPARE PARTS

A. Provide spare parts as recommended by pump and control manufacturer.

END OF SECTION

SECTION 13450 – PORTABLE HOIST

1.0 PART 1-GENERAL

1.01 Furnish all materials, labor, and equipment and install hoist as shown on the Drawings and as specified herein.

2.0 PRODUCTS

2.01 PORTABLE HOIST:

A. The portable hoist shall be series DB as manufactured by Halliday Products Inc. of Orlando, Florida or approved equal.

B. The unit shall be sized to facilitate equipment placement and removal.

C. The portable hoist shall be all T-304 stainless steel construction with marine grade brake winch and 30 feet (9m) of 1/4" (7mm) T-304 stainless steel cable with galvanized safety hook.

D. The davit arm shall adjust in 1inch increments from 24 to 36 inches (610 to 914mm) and the overall unit height shall be 60" (1.5m) (1.5m).

E. The hoist shall have a load capacity of 1000 pounds.

3.00 PART 2-GUARANTEE

3.01 GUARANTEE:

A. The portable hoist shall be guaranteed against defects in material and or workmanship for a period of 3 years.

END OF SECTION

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SECTION 15076 – TAGGING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Stencils.
5. Valve tags.
6. Warning tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: **Stainless steel, 0.025-inch** minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel **rivets or self-tapping screws**.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, **1/8 inch (3.2 mm)** thick, and having predrilled holes for attachment hardware.
2. Letter Color: **Black**.
3. Background Color: **Black**.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel **rivets or self-tapping screws**.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, **1/8 inch (3.2 mm)** thick, and having predrilled holes for attachment hardware.

B. Letter Color: **Black**.

C. Background Color: **Yellow**.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel **rivets or self-tapping screws**.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch (19 mm) for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: **Fiberboard or metal**.
2. Stencil Paint: Exterior, gloss, **acrylic enamel** black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, **acrylic enamel** in colors according to ASME A13.1 unless otherwise indicated.

2.5 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: **Stainless steel, 0.025-inch** minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass **wire-link chain**.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.6 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: **Approximately 4 by 7 inches**.
2. Fasteners: **Brass grommet and wire**
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Division 9 Section.

B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels **with painted** on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of **50 feet** along each run. Reduce intervals to **25 feet** in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

D. Pipe Label Color Schedule:

1. Domestic Water Piping:

a. Background Color: **White**.
b. Letter Color: **Black**.

2. **Sanitary Waste** Piping:

a. Background Color: **White**.
b. Letter Color: **Black**.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. Cold Water: **2 inches square**.
b. Hot Water: **2 inches square**.
c. Sanitary Sewer Force Main: **2 inches square**.

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

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SECTION 15100 – VALVES AND APPURTENANCES

1.00 PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

B. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.

C. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

D. All exposed valves, where applicable, shall have “open-closed” position indicators. The position indicators shall be conveniently located for easy visibility.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Piping is specified Division 2.

1.03 DESCRIPTION OF SYSTEMS

All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water and domestic wastewater.

1.04 QUALITY ASSURANCE

All of the types of valves and appurtenances shall be products of well established reputable firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

1.05 SUBMITTALS

A. Submit to the Engineer within 15 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer for approval in accordance with the requirements of the General Conditions.

1.06 TOOLS

Special tools, if required for normal operation and maintenance, shall be supplied with the equipment.

2.00 PART 2 - PRODUCTS

2.01 RESILIENT SEATED GATE VALVES

A. Gate valves shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 (valves 12-inch and smaller) or AWWA C515 (valves larger than 12-inch) or latest revision and be UL listed and FM approved. All valves shall be rated for 250 psi working pressure and be tested in strict accordance with AWWA C509/C515. The valves shall be tested and certified to ANSI/NSF 61. Valve shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

B. The valve body, bonnet, stuffing box and disc shall be ASTM A-126, Class B grey iron or ASTM A395 or A536 ductile iron. Flanges shall conform to ANSI B16.1 Class 125.

C. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating, 10 mils minimum.

D. The valves are to be non-rising stem (NRS) with the stem made of cast, forged, or rolled bronze per AWWA C509/C515. The stem shall have at least one “anti-friction” thrust washer above and below the stem collar to reduce operating torque. The design of the NRS valve stem shall be such that if excessive input torque is applied, stem failure shall occur above the stuffing box at such a point as to enable the operation of the valve with a pipe wrench or other readily available tool. Valves with two-piece stem collars do not meet the requirements of AWWA C509/C515 and are unacceptable.

E. The valves shall have bolts and nuts for the stuffing box and bonnet fabricated of ASTM A-307, Grade B zinc plated steel or type 316 stainless steel. Refer to Paragraph 3.01.

F. The NRS valves shall have a stuffing box that is o-ring sealed. Two o-rings shall be placed above and one o-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the o-rings from the waterway and from outside contamination providing permanent lubrication for long term ease of operation. Valves without a stuffing box are unacceptable. Valves without at least three stem o-rings are also unacceptable.

G. The sealing mechanism shall consist of disc and guide lugs completely encapsulated in SBR ASTM D2000 rubber material. The peel strength shall not be less than 75 pounds per inch. Guide caps of an Acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque. Guide lugs placed over bare metal are not acceptable. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

H. Non-buried valves shall have an arrow cast on the handwheel showing opening direction. Buried valves shall be provided with a 2” square operating nut, and the bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation. All valves shall turn counter-clockwise to open, and clockwise to close.

I. Tapping valves where indicated on the drawings shall have an inlet flange conforming to ANSI B16.1 Class 125 for attachment to a tapping sleeve or cross. In addition, the valve inlet flange shall have a machined projection or raised face complying with MSS SP-60 for accurate alignment to the mating recess in the tapping sleeve flange. The seat opening of the tapping valves shall be at least .30” larger than the nominal pipe size to permit full size shell cutters.

J. The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture.

K. Valves shall be Mueller A2360 or A2361 Series or approved equal.

2.02 VALVE STEM EXTENSIONS

A. Extension stems shall be provided as necessary to situate the operating nut no greater than 18 inches below the valve cover.

B. Extension stems shall be equipped with stem guides affixed to the valve box at intervals not to exceed ten feet.

C. Stem guides shall be considered a part of the extension. Extension stems and stem guide shall be manufactured items or approved equal.

2.03 VALVE BOXES

A. All buried valves shall have cast-iron three piece valve boxes as shown on the Draw.

B. Valve boxes shall be provided with suitable heavy bonnets and be set to finished grade.

C. The barrel shall be two-piece, sliding type, having 5-inch shaft. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling and shall be complete with cast iron covers.

D. Covers shall have “WATER” cast into the top for all water mains and “SEWER” cast into the top of all wastewater lines.

E. All valves shall have actuating nuts extended to top of valve boxes.

F. Valve boxes shall be provided with concrete base.

2.04 CHECK VALVES

A. Check valves for PVC and ductile iron pipelines shall be resilient disc swing type suitable for cold working pressures of 250 psig in water and wastewater and shall conform to ANSI/AWWA C508 standards. Valve shall be hydrostatically tested at 1.5 times the rated cold working pressure.

B. The valves shall be ductile iron body conforming to ASTM A536 Grade 65-45-12. Body shall have full flow area equal to the nominal pipe diameter. The seating surface shall be on a 45 degree angle to minimize disc travel. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line.

C. Top access shall be full size, allowing removal of the disc without removing the valve from the line. The cover shall be domed in shape to provide flushing action over the disc for operation in lines containing high solids content.

D. Resilient disc shall be one-piece construction of precision molded Buna-N (NBR), conforming to ASTM D2000-BG, with an integral o-ring type sealing surface. Disc shall have steel and nylon reinforcement in the hinge. Non-slam closing characteristics shall be provided through a short 35 degree disc stroke and a disc accelerator. The flex portion of the disc shall be warranted for twenty-five (25) years.

E. Disc accelerator shall be one-piece, stainless steel construction and provide rapid closure of the valve in high head applications. The disc accelerator shall be enclosed within the valve and shall be field adjustable and replaceable without removal of the valve from the line. The disc accelerator shall be securely held in place by being captured between the cover and disc. It shall be formed with a large radius to allow smooth movement over the disc surface.

F. Valve shall be cycle tested 1,000,000 times with no signs of wear, cracking, or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures. Manufacturer shall have 5 years minimum experience in the manufacture of resilient disc check valves.

G. Ends shall have Class 125 ANSI B16.1 flanges.

H. Valve shall have mechanical disc position indicator remaining in continuous contact with the disc under all operating conditions.

I. Provide screw-type backflow actuator of rising-stem design with a stainless steel T-handle to allow opening of valve during no-flow conditions. Buna-N seals shall be used to seal the stainless steel stem in a bronze bushing.

J. Exterior and interior of the valve shall be coated with an NSF 61 approved fusion bonded epoxy shop coating.

K. Valve shall be Surgebuster™ Series #7200 as manufactured by Val-Matic Valve & Manufacturing Corporation, Elmhurst, IL, or approved equal.

2.05 COMBINATION AIR/VACUUM VALVES FOR SANITARY SEWER SERVICE

A. The air-vacuum release valves for use in sanitary sewer force mains shall be installed as shown on the Drawings.

B. Valve shall release air and gases at a flow equal to or greater than the pumping capacity during filling of the system and admit air under vacuum conditions. Valve shall maintain an air pocket separation between the pumped liquid and the working mechanism.

C. The operating mechanism shall be non-metallic and corrosion resistant. The valve body, floats, float guide, and stem shall be of stainless steel Type 316. The resilient seat shall be of Buna N.

D. The valve shall be suitable for 230 PSIG working pressure. Valve shall have standard NPT inlets and outlet ports. Provisions shall be made for back-flushing the valve with clean water via cam lock attachment.

E. Provide valve with 316 stainless steel ball valve of equal size to the air valve inlet to permit removal of the valve while maintaining the pumping system in service.

F. The air release valve for sanitary sewer service shall come with a five year warranty.

G. Valve shall be as manufactured by ARI Flow Control, Model D-020 or approved equal.

2.06 BACKFLOW PREVENTERS

A. Reduced pressure backflow prevention assemblies shall be installed on water service line entrances at all sanitary sewer lift stations to prevent backflow due to backsiphonage and/or backpressure.

B. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve.

C. There shall be no threads or screws in the water way exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts.

D. Assembly shall include two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting.

E. Provide 3/4-inch size for service lines 1-inch and smaller.

F. The assembly shall meet the requirements of USC Manual 8th Edition; ASSE Std. 1013; AWWA Std. C511; and CSA B64.4. Assembly shall be Series 009QTSH as manufactured by Watts Regulator Company, Andover, MA or equal.

2.07 SHOP PAINTING

Ferrous surfaces of valves and appurtenances shall receive a coating of rust inhibitive primer as specified in Section 02556 for ductile iron. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.00 PART 3 - EXECUTION

3.01 INSTALLATION

A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.

B. Pipe for use with flexible couplings shall have plain ends.

C. Flanged joints shall be made with 316 stainless steel bolts, nuts and washers. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint comparable to Inertol No. 66 Special Heavy.

D. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and out-side of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections

then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

E. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

F. Air Valve Locations: The Contractor shall install the air release valves as shown on the plans. The connection to the main shall be by a stainless steel flange connection, or as shown on the Drawings.

G. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

H. Backflow Preventer Installation: Install backflow assembly 1½ feet above natural ground. Encase vertical water service piping to and from the backflow assembly in concrete-filled 4-inch steel pipe similar to the standard detail for lawn hydrants shown on the Drawings.

END OF SECTION

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SECTION 19000-TRENCH PROTECTION

1.00 PART 1 - GENERAL

1.0 THE GENERAL CONDITIONS, SPECIAL PROVISIONS and applicable requirements of DIVISION 1 - GENERAL REQUIREMENTS are hereby made a part of this section.

1.1 SCOPE: This section covers excavation and supporting systems for trenches necessary to protect the safety of workers. This specification shall govern for construction of all types of trenches except where the requirements of this section are explicitly revised or superseded by another section. Additional requirements as set forth by federal, state, and local government regulations will be applicable and must be followed. The contractor shall be responsible for the design, placement, and inspection of all trench safety systems in conformance with the Occupational Safety and Health Administration (OSHA) standards as contained in Subpart P, Part 1926, Title 29 of the Code of Federal Regulations (29 CFR 1926). Other OSHA construction standards shall also apply.

1.2 **Section 01420 contains a geotechnical engineering study with** boring logs for your information. It is the Contractor's responsibility to determine and evaluate soil conditions at the site and design adequate trench safety systems. The Contractor will be responsible for detecting varying soil conditions which may be hazardous and take appropriate action. The contractor, at his expense, shall be responsible for obtaining any geological data required for his design of the trench safety system.

1.4 APPLICABILITY: These specifications apply to any trench excavation which is over five (5) feet in depth from the ground surface, or trench excavations that are less than five (5) feet in depth located in areas where unstable soil conditions are present (Ref. OSHA Safety and Health Regulations, Part 1926, Subpart P, Paragraph 29 CFR 1926.652, Subparagraph (a)).

1.5 LIABILITY: It is the Contractor's responsibility that all excavation work and site conditions are within the regulations as established by OSHA. Any property damage or bodily injury (including death) that arises from use of the trench safety systems, from the Contractor's negligence in performance of the contract work, shall remain the sole responsibility and liability of the Contractor.

1.6 EXISTING UNDERGROUND INSTALLATIONS: Underground installations are shown in approximate locations on the Drawings. It is the Contractors responsibility to verify the size, locations and elevations of all existing utilities in the construction area prior to commencement of excavation operations.

1.7 SURCHARGE LOADS: The Contractor's trench safety system shall be designed to take into account all surcharge loads including, but not limited to adjacent structures, contractor's equipment and heavily loaded truck traffic which will be routed near the work site.

2.00 PART 2 - MATERIALS

Not applicable.

3.00 PART 3 - INSTALLATION

Not applicable.

4.00 PART 4 - MEASUREMENT & PAYMENT

4.1 MEASUREMENT: Trench Excavation Protection shall be measured by the lump sum for the trenching and excavations shown or implied in the plans.

4.2 PAYMENT: Payment for Trench Excavation Protection, measured as prescribed above, shall be made at the unit price bid for "Trench Excavation Protection".

A. Payment shall include all components for design and construction of the Trench Protection System which can include, but not be limited to sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage. Payment shall also include the additional excavation and backfill required, any jacking, jack removal, and removal of the trench supports after completion.

B. Payment of all work prescribed under this item shall be full compensation for all additional excavation and backfill; for furnishing, placing and removing all shoring, sheeting, or bracing; for dewatering or diversion of water; for all jacking and jack removal; and for all other labor, materials, tools, equipment and incidentals necessary to complete the work.

END OF SECTION