Specifications and Contract Documents

for

Neighborhood Projects:

1.0 Lindale Park
2.0 Central Middle School
3.0 Channelview
4.0 Colony Park

City of Galveston
Texas

1839

September 2017
# CITY OF GALVESTON
## TEXAS

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00010-2
City of Galveston

REQUEST FOR PROPOSAL

Proposal Reference Number: 18-01

Project Title: Neighborhood Projects

Proposal Closing Date: 10:00 A.M.(CST), Tuesday, October 31, 2017

Original and one (1) copy and one media source required. No Proposals submitted after the above deadline will be accepted.

Contact: City of Galveston Purchasing Division at purchasing@galvestontx.gov or 409-797-3579.
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1. Introduction

A. Project Overview: The City of Galveston is requesting proposals with the intent of awarding a contract for the purchase of goods and services contained in Appendix J – Scope of Services.

B. Questions: Following are contacts for questions as identified.

i. RFP Clarifications: All questions related to requirements or processes of this RFP should be submitted in writing to the Purchasing Division. Contact information provided in section 2 below.

ii. Scope of Service Questions: All questions related to the scope of services should be submitted in writing to the contact person(s) noted in Appendix J – Scope of Services.

iii. Replies: Responses to inquiries which directly affect an interpretation or effect a change to this RFP will be issued in writing by addendum and posted to City website. All such addenda issued by City prior to the submittal deadline shall be considered part of the RFP. The City shall not be bound by any reply to an inquiry unless such reply is made by such formal written addendum.

iv. Acknowledgement of Addenda: The Proposer must acknowledge all addenda by signing and returning such document(s) or by initialing appropriate area of the proposal document or the submittal will marked Non-Responsive.

C. Notification of Errors or Omissions: Proposers shall promptly notify the City of any omissions, ambiguity, inconsistency or error that they may discover upon examination of this RFP. The City shall not be responsible or liable for any errors and/or misrepresentation that result from the solicitations which are inadvertently incomplete, ambiguous, inconsistent or obviously erroneous.

D. Conflict of Interest Questionnaire (Form CIQ): A person or business, and their agents, who seek to contract or enter into an agreement with the City, are required by Texas Local Government Code, Chapter 176, to file a conflict of interest questionnaire (FORM CIQ) which is found in Appendix C. The form must be filed with the City Secretary no later than seven (7) days after the date the person or business begins contract discussions or negotiations with the City, or submits an application, response to a request for proposals or proposals, correspondence, or other writing related to any potential agreement with the City. If no conflict exists the offeror must mark the form Not Applicable or NA and return with the proposal packet.

E. Disclosure of Interested Parties Form 1295: A person or business, who enters into a contract with the City, meeting the conditions according to Texas Local Government Code Sec. 2252.908, is required to file Form 1295 with Texas Ethics Commission. This form is not required unless there is a contract between the vendor and the City of Galveston. Do not submit this form unless you receive an award letter from the City.
2. **Contact Information**

**Mailing Address:** City of Galveston, Purchasing Division, Room 306, PO Box 779, Galveston, Texas 77553

**Physical Address:** City of Galveston, Purchasing Division, 823 Rosenberg Street, Room 306, Galveston, Texas 77550

**Email Address:** purchasing@galvestontx.gov

3. **General Information**

   A. **Tax Exempt Status:** City purchases are exempt from State Sales Tax and Federal Excise Tax. Do not include tax in the proposal. City will furnish Excise Tax Exemption Certificate upon request.

   B. **Public Inspection of Proposals:** The City strictly adheres to the Texas Public Information Act (Texas Government Code Chapter 552.001, et seq.) and all other governing statutes, regulations, and laws regarding the disclosure of RFP information. Proposal Documents are not available for public inspection until after the contract award. If the Proposer has notified the City, in writing, that the Proposal Document contains trade secrets or confidential information, the City will generally take reasonable steps to prevent disclosure of such information, in accordance with the Public Information Act. This is a statement of general policy only, and in no event shall the City be liable for disclosure of such information by the City in response to a request, regardless of the City’s failure to take any such reasonable steps, even if the City is negligent in failing to do so.

   C. All Proposers are hereby put on notice that if the Proposer is awarded a contract for procurement of goods or services, the City of Galveston is entering into that contract in its governmental capacity, and not a proprietary capacity.

   D. The City of Galveston is required to verify, that company does not do business with Iran, Sudan, or any Foreign Terrorist Organization, pursuant to Texas Government Code, Chapter 2252, Section 2252.152, and Section 2252.153.

4. **RFP Withdrawals and/or Amendments**

   A. **RFP Withdrawal:** The City reserves the right to withdraw this RFP for any reason.

   B. **RFP Amendments:** The City reserves the right to amend any aspect of this RFP by formal written Addendum prior to the Proposal submittal deadline and will endeavor to notify all potential Proposers that have notified the Purchasing Division of their intent to Proposal, but failure to notify shall impose no obligation or liability on the City.

5. **Estimated Quantities**

   The City does not guarantee to purchase any minimum or maximum quantity but does contemplate purchasing exclusively during the term of the contract from the successful vendor(s).

6. **Proposal Submittal Requirements**

   A. **Submittal Packet – How to submit:** All Proposals must be submitted in person or by mail at the addresses in Section 2, above. No Proposals will be accepted electronically, either by fax or email. Proposals submitted electronically will be marked non-responsive.
Proposals shall be sealed and marked clearly with the Proposal number, Proposal name, closing date and time, on the outside of the package or envelope. Unidentifiable Proposals will be unopened and marked as non-responsive.

B. **Submittal Packet – Required Contents:** All items in this Proposal are considered part of the Proposal package. Submittals must include the package in its entirety; signed in the appropriate places by an authorized representative of the company with an original signature. Proposals not including all of the above will be considered non-responsive. A Proposal requires an Original signed document, copies, and a media source. Please mark the Proposals “Original” and “Copy” and label the media source (preferred media is a jump/thumb drive). Please submit the original and correct number of copies indicated on the title page, or Proposal will be marked “Non-responsive”. Offerors must submit their Proposals on the forms provided herein, otherwise, it will be marked non-responsive.

C. **Submittal Deadline:** The deadline for submittal of Proposals shall be as identified on the title of the Proposal and on page 9 (nine) of Appendix A-Proposal. It is the Offeror’s responsibility to have the Proposal Documents, including Addenda, correctly submitted by the submittal deadline. No extensions will be granted and no late Proposals will be accepted.

D. **Proposals Received Late:** Proposers are encouraged to submit their Proposals as soon as possible. The time and date of receipt as recorded in the Purchasing Office shall be the official time of receipt. The City is not responsible for late submission regardless of the reason. Late Proposals will not be considered under any circumstances.

E. **Alterations or Withdrawals of Proposal Document:** Any submitted Proposal may be withdrawn or a revised Proposal substituted prior to the submittal deadline. Proposal Documents cannot be altered, amended or withdrawn by the Proposer after the submittal deadline.

F. **Proposal Document Format:** All proposal Documents must be prepared in single-space type, on standard 8-1/2” x 11” vertically oriented pages, numbered at the bottom, with the exception of plans or drawings, those may be submitted landscape on 8-1/2” x 11” pages. The package must be in the order required in the Scope of Services. The submittal must be written in pen or typed, signatures must be signed in pen, and anything written in pencil will not be accepted. Mistakes can be crossed out and corrections inserted and initialed in ink by the individual signing the proposal. The City only accepts proposals that are hand delivered or by mail, to the addresses in Section 2 of the proposal documents. No fax or email copies will be considered and will be marked “Non-responsive”.

G. **Questions and Responses:** Questions regarding proposals must be addressed to the Purchasing Division purchasing@galvestontx.gov. The subject line must read “Proposal 18-01 Neighborhood Projects”. The question deadline will be addressed in Appendix J-Scope of Services. Responses will be answered after the question deadline in the form of an Addendum. No responses will be given to questions submitted after the deadline. Questions submitted outside of the Purchasing Division will not be answered and any communication with a User Department prior to award by City Council will disqualify a vendor from being considered for award.

H. **Pre-Proposal Conferences:** The date and time of a pre-proposal conference, if necessary, will be found in Appendix J-Scope of Services.
I. **Validity Period:** Once the submittal deadline has passed, any proposal Document shall constitute an irrevocable proposal to provide the commodities and/or services set forth in the Scope of Services at the price(s) shown in the Proposal Document. Such proposal shall be irrevocable until the earlier of the expiration of ninety (90) days from the submittal deadline, or until a contract has been awarded by the City.

7. **Proposal Evaluation and Contract Award**

A. **Proposal Evaluation and Contract Award Process:** An award of a contract to provide the goods or services specified herein will be made using competitive sealed proposals, in accordance with Chapter 252 of the Texas Local Government Code and with the City’s purchasing policy. The City will evaluate all proposals to determine which offerors are reasonably qualified for the award of the contract, applying the anticipated evaluation factors and emphasis to be placed on each factor as identified in the Scope of Services. A variety of factors may be used in the evaluation of the submitted proposals for this project. The City may, at its option, conduct discussions with or accept proposal revisions from any reasonably qualified proposer. These discussions will be limited to issues and topics brought forth by the City. Any attempt by proposer or vendor at deviating from the issues and topics to discuss other issues and topics concerning the Proposal brought forth by the City of Galveston shall be grounds for disqualification. Vendors shall not contact any City of Galveston personnel during the proposal process without the express permission from the City’s Purchasing Supervisor.

B. All correspondence relating to this proposal, from advertisement to award, shall be sent to the City of Galveston’s Purchasing Division. All presentations and/or meetings between the City of Galveston and the vendor relating to this proposal shall be coordinated by the City of Galveston Purchasing Division. The City reserves the right to determine which proposal provides the City with the best value and which will be in the City’s best interest.

C. **Completeness:** If the Proposal Document is incomplete or otherwise fails to conform to the requirements of the RFP, the City alone will determine whether the variance is so significant as to render the Proposal non-responsive.

D. **Ambiguity:** Any ambiguity in the Proposal Document as a result of omission, error, lack of clarity or non-compliance by the Proposer with specifications, instructions and all conditions shall be construed in the favor of the City. In the event of a conflict between these standard RFP requirements and details provided in Appendix J – Scope of Services or Appendix A – Proposal, the Appendices shall prevail.

E. **Unit Prices and Extensions:** If unit prices and their extensions do not coincide, the City may accept the price most beneficial to the City, and the Proposer will be bound thereby.

F. **Additional Information:** City may request any other information necessary to determine Proposer's ability to meet the minimum standards required by this RFP.

G. **Partial Contract Award:** City reserves the right to award one contract for some or all of the requirements proposed or award multiple contracts for various portions of the requirements to different Proposers based on the unit prices proposed in response to this request, or to reject any and all Proposals and re-solicit for Proposals, as deemed to be in the best interest of City.

H. **No Commitment:** The Request for Proposal does not commit the City of Galveston to award any costs or pay any costs, or to award any contract, or to pay any costs associated with or
incurred in the preparation of a (Proposal/proposal) to this request, or to procure or contract for services or supplies.

I. Protest Procedures: Any actual or prospective proposer who is allegedly involved with the solicitation or award of a proposal may submit a protest to the decision. The protest must be submitted in writing to the City of Galveston’s Purchasing Supervisor within three working days after such aggrieved person knows of, or should have known of the facts giving rise thereto. If the protest is not resolved by mutual agreement, the Purchasing Supervisor will promptly issue a decision in writing to the protesting party.

   i. All protest lodged by potential or actual contractors or proposers must be made in writing and contain the following information.
       a. Name, address and telephone number of the protestor.
       b. Identification of the solicitation or contract number and time.
       c. A detailed statement of the protest’s legal and factual grounds, including copies of relevant documents.
       d. Identification of the issue(s) to be resolved and statement of what relief is requested.
       e. Arguments and authorities in support of the protest.
       f. A statement that copies of the protest have been mailed or delivered to all interested parties in the request for proposals process. In the case of request for proposals, the City of Galveston Purchasing Supervisor shall ask the protester to mail or deliver the protest to relevant parties.

   ii. The City of Galveston’s City Manager has the authority to render the final determination regarding the protest. Any determination rendered by the City of Galveston’s City Manager will be final.

J. Single Proposal Response: If only one bid or proposal is received in response to the Request for Proposal/Bid, a detailed cost proposal may be requested of the single contractor. A cost/price analysis and evaluation and/or audit may be performed of the cost proposal in order to determine if the price is fair and reasonable.

K. Re-Appropriation of Budget Items: The City may reduce the funds allocated and the services required under this Agreement at its discretion. The City shall notify Contractor in writing of this reduction. Contractor shall not perform any services subtracted from this Agreement. The de-obligation of funds does not require any formal amendment of this Agreement but shall be evidenced by a revised budget approved by City Council.

L. Appropriation of Funds: The City of Galveston has established an appropriation (allocation) of funds for this project, if in the event that appropriated (allocated) funds are exhausted, the contractor’s only remedy shall be suspension or termination of its performance under this contract and shall have no other remedy in law or in equity against the City and no right to damages of any kind.

M. Terminate for Cause: The occurrence of any one or more of the following events will justify termination of the contract by the City of Galveston for cause:

   i) The successful Proposer fails to perform in accordance with the provisions of these specifications; or

   ii) The successful Proposer violates any of the provisions of these specifications; or
iii) The successful Proposer disregards laws or regulations of any public body having jurisdiction; or

iv) The successful Proposer transfers, assigns, or conveys any or all of its obligations or duties under the contract to another without written consent of the City.

v) If one or more of the events identified in Subparagraphs G i) through iv) occurs, the City of Galveston may, terminate the contract by giving the successful Proposer seven (7) days written notice of such termination. In such case, the successful Proposer shall only be entitled to receive payment for goods and services provided before the effective date of termination. The successful Proposer shall not receive any payment on account of loss of anticipated profits or revenue or other economic loss resulting from such termination.

vi) When the contract has been so terminated by the City of Galveston, such termination shall not affect any rights or remedies of the City then existing or which may thereafter accrue.

J. Terminate for Convenience: This contract may be cancelled or terminated at any time by giving vendor thirty (30) days written notice. Vendor may be entitled to payment for services actually performed prior to termination; to the extent said services are satisfactory.

8. Pursuant to Sec. 2-341 of the City Code – Declaration of Policy

A. It is the policy of the City of Galveston to stimulate growth of local minority and women-owned business enterprise (M/WBE) by encouraging their participation in all phases of its contract and procurement activity and by affording them the opportunity to compete for all City of Galveston contracts. The purpose and objectives of this article are to:

i. Increase the capacity of local M/WBE’s to provide products and services.

ii. Increase the opportunities for local M/WBE’s to expand their business with the city and other public and private sector business entities.

B. Provided, however, nothing herein shall require the city to award contracts for services or procurements to a M/WBE which is not also the lowest responsive and responsible Proposer and otherwise qualified unless the city may otherwise lawfully award the contract to someone other than the lowest responsive, responsible Proposer.

C. Additionally The City of Galveston has a Disadvantaged Business Enterprise, (DBE) program mandated by the US Department of Transportation, which is part of its M/WBE program.
Appendix A – Proposal Document

Submittal Checklist: (To determine validity of Proposal)

1. Appendix A (pages 9 through 18) must be included in the Proposal submittal.
2. Appendix B – G (pages 20 through 25) all forms must be complete and included in the submittal.
3. Appendix J (pages 29 and all documents requiring signatures) must be included in the submittal.

All Proposals submitted to the City of Galveston shall include this page with the submitted Proposal.

<table>
<thead>
<tr>
<th>RFP Number:</th>
<th>18-01</th>
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<tr>
<td>Project Title:</td>
<td>Neighborhood Projects</td>
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<tr>
<td>Submittal Deadline:</td>
<td>October 31, 2017 @ 3:00 p.m. CST</td>
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Submit in person: City of Galveston Purchasing Division., 823 Rosenberg St., Room 306, Galveston, Texas 77550
or by mail: City of Galveston Purchasing Division., PO Box 799, Galveston, Texas 77553

Proposer Information:

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<th>Proposer’s Legal Name:</th>
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<td>Address:</td>
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<td>City, State &amp; Zip</td>
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Proposer Authorization

I, the undersigned, have the authority to execute this Proposal in its entirety as submitted and enter into a contract on behalf of the Proposer.

Printed Name and Position of Authorized Representative: ________________________________

Signature of Authorized Representative: ________________________________

Signed this __________ (day) of _________________________ (month), ______ (year)

I learned of this Request for Proposal by the following means:

- [ ] Newspaper Advertisement
- [ ] Galveston Website
- [ ] Mailed Me a Copy
- [ ] City E-mail Notification
- [ ] Cold Call to City
- [ ] Other
Appendix A – Proposal Document (continued)

1. **REQUIRED PROPOSAL INFORMATION. IN ORDER FOR A PROPOSAL TO BE CONSIDERED COMPLETE, AND TO BE EVALUATED FOR A CONTRACT AWARD BY THE CITY, PROPOSER MUST SUBMIT ALL OF THE FOLLOWING INFORMATION**

1. **Proposed Products and/or Services**
   A. **Product or Service Description**: Proposers should utilize this section to describe the technical aspects, capabilities, features and options of the service or product and/or service proposed in accordance with the required Scope of Services as identified in Appendix J. Promotional literature, brochures, or other technical information may be used.
   
   B. **Additional Hardware Descriptions**: Proposers should also include in this section a detailed description of what additional hardware and/or software, if any, would be required by the City in order to fully utilize the goods and/or services proposed.
   
   C. **Guarantees and Warranties**: Each Proposer shall submit a complete copy of any warranties or guarantees provided by the manufacturer or Proposer with the Proposal submitted.
   
   D. **Project Schedule/Delivery Date**: Proposer must provide a project schedule noting all projected completion dates for segments of the Project, from start-up to completion, and all delivery dates for goods covered by the RFP. The Proposal Document must show the number of days required to deliver and install the product or equipment after the receipt of the City’s Purchase Order.

2. **Cost of Proposed Products and/or Services**
   A. **Pricing**: Pricing shall reflect the full Scope of Services defined herein, inclusive of all associated cost for delivery, labor, insurance, taxes, overhead, and profit.
   
   B. **Schedule of Pricing**: Proposer shall quote unit pricing in accordance with the itemized listing of products or contract segments stated in the Scope of Services and using the following format:

<table>
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<tr>
<th>Item #</th>
<th>Quantity</th>
<th>Description of Products/Services</th>
<th>Unit Cost</th>
<th>Extended Price</th>
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3. **Term of Contract and Option to Extend:**

   Any contract resulting from this RFP shall be effective upon execution by the City of Galveston and until work has been completed to the satisfaction of the City. The City anticipates that contract shall be renewed pursuant to the availability of funds and at the discretion of the City. The following clauses shall be included in the contract:

   A. **Option Clause**: This section left intentionally blank.
   
   C. **Price Increases Upon Extension**: This section left intentionally blank.
4. **Proposer’s Experience / Staff**

A. **Project Team**: Identify all members of the Proposer’s team (including both team members and management) who will be providing any services proposed and include information which details their experience.

B. **Removal or Replacement of Staff**: If an assigned staff person must be removed or replaced for any reason, the replacement person must be approved by City prior to joining the project.

C. **Business Establishment**: State the number of years the Proposer’s business has been established and operating. If Proposer’s business has changed names or if the principals operating the business operate any similar businesses under different names, or have operated any other businesses or changed the legal status or form of the business within the last five (5) years, all names, of predecessor business names, affiliated entities, and previous business entities operated by the principals, if different than present, must be provided;

   **State the number of years’ experience the business has: _____; and the number of employees: _______.**

D. **Project Related Experience**: All Bids must include detailed information that details the Proposer’s experience and expertise in providing the requested services that demonstrates the Proposer’s ability to logically plan and complete the requested project.

5. **References**

Proposer shall provide four (4) references where Proposer has performed similar to or the same types of services as described herein.

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Date and Scope of Services Provided:

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6. **Trade Secrets and/or Confidential Information**

**Trade Secrets and/or Confidential Information:** This proposal ___ (does) ___ (does not) contain trade secrets and/or confidential information. If applicable, describe such trade secrets and confidential information, and the basis for your assertion that such material qualifies for legal protection from disclosure.

7. **Federal, State and/or Local Identification Information**

A. Centralized Master Bidders List registration number: ______________________________.

B. Prime contractor HUB / MWBE registration number: ______________________________.

C. An individual Proposer acting as a sole proprietor must also enter the Proposer’s Social Security Number: #_______-_______-_______.

8. **Emergency Business Services Contact Notice**

During a natural disaster, or homeland security event, there may be a need for the City of Galveston to access your business for products or services after normal business hours and/or holidays. The City may request City employee pick up or vendor delivery of product or services.

For this purpose, a primary and secondary emergency contact name and phone number are required. It is critical the vendor’s emergency contact information remains current. City shall be contacted by E-mail with any change to a contact name or phone number of these emergency contacts. Updates may be emailed to purchasing@galvestontx.gov.

All products or services requested during an emergency event are to be supplied as per the established contract prices, terms and conditions. The vendor shall provide the fee (pricing) for an after-hours emergency opening of the business, if any. In general, orders will be placed using a City of Galveston procurement card (Master Card) or City issued Purchase Order. The billing is to include the emergency opening fee, if applicable.

The contractor shall provide the names, phone numbers and fee (pricing), if any, for an after-hours emergency opening of the business listed below.
Business Name: ____________________________________________

Contract #: _________________________________________________________________________

Description: _________________________________________________________________________

Primary Contact (Name): ______________________________________________________________

Primary Contact Phone Numbers: Home: ___________ Cell: ___________

Secondary Contact (Name): ______________________________________________________________

Secondary Contact Phone Numbers: Home: ___________ Cell: ___________

After Hours emergency opening fee, if applicable: $______________________________

9. Cooperative Governmental Purchasing Notice

Other governmental entities maintaining inter-local agreements with the City, may desire, but are not obligated, to purchase goods and services defined in this RFP from the successful Proposer. All purchases by governmental entities, other than the City, will be billed directly to and paid by that governmental entity. The City will not be responsible for another governmental entity’s debts. Each governmental entity will place their own orders with the successful Proposer and be responsible for ensuring full compliance with the RFP specifications. Prior to other governmental entities placing orders, the City will notify the successful Proposer of their intent.

Please indicate below if you will permit other governmental entities to purchase from your agreement with the City.

[   ] Yes, Others can purchase                  [   ] No, Only the City can purchase.

II. CONTRACT TERMS AND CONDITIONS.

EXCEPT WHERE PROPOSER MAKES SPECIFIC EXCEPTION IN THE SUBMITTED PROPOSAL, ANY CONTRACT RESULTING FROM THIS RFP WILL CONTAIN THE FOLLOWING TERMS AND CONDITIONS, WHICH PROPOSER HEREBY ACKNOWLEDGES, AND TO WHICH PROPOSER AGREES BY SUBMITTING A PROPOSAL:

1. Delivery of Products and/or Services

A. Payment Terms: Unless otherwise specified in the Scope of Services or otherwise agreed to in writing by the City, payment terms for the City are Net 30 days upon receipt of invoice. Refer to Texas Local Government Code 2251, Payment for Goods and Services. Otherwise known as the Prompt Payment Act. Send all invoices to City of Galveston Attention: Accounts Payable, PO Box 779, Galveston, Texas 77553 or email: accountspayable@galvestontx.gov. See Appendix H for ACH Payment Information, if you elect to receive your payments according to Appendix H, fill out the form and return with your documents.

B. Warranty of Products and Services: All products furnished under this contract shall be warranted to be merchantable and good quality and fit for the purposes intended as described in this Proposal, to the satisfaction of City and in accordance with the specifications, terms, and conditions of the Scope of Services, and all services performed
shall be warranted to be of a good and workmanlike quality, in addition to, and not in lieu of, any other express written warranties provided.

C. Late Delivery or Performance: If Proposer fails to deliver acceptable goods or services within the timeframes established in the Project Schedule, the City shall be authorized to purchase the goods or services from another source and assess any increase in costs to the defaulting Proposer, who agrees to pay such costs within ten days of invoice.

D. FOB (delivery charges): All products offered shall be FOB final destination, with all delivery charges to be prepaid by the Proposer. The City does not accept C.O.D. or collect shipments. The contract price shall include all charges, including delivery, installation and set-up fees. All packing, crating, or other debris resulting from the delivery or set-up of the commodity purchased shall be removed and properly disposed by the successful Proposer at no additional cost to the City.

E. Title to Goods and Risk of Loss: For goods to be provided by Proposers hereunder, if any, the title and risk of loss of the goods shall not pass to City until City actually receives, takes possession, and accepts the goods and the installation of such goods, has tested the system, and determined that it is in good and acceptable working order.

F. Force Majeure: If by reason of Force Majeure either party shall be rendered unable, wholly or in part, to carry out its responsibilities under this contract by any occurrence by reason of Force Majeure, then the party unable to carry out its responsibility shall give the other party notice and full particulars of such Force Majeure in writing within a reasonable time after the occurrence of the event, and such notice shall suspend the party’s responsibility for the continuance of the Forced Majeure claimed, but for no longer period. Force Majeure means acts of God, floods, hurricanes, tropical storms, tornadoes, earthquakes, or other natural disasters, acts of public enemy, acts of terrorism, sovereign conduct, riots, civil commotion, strikes or lockouts, and other causes that are not occasioned by either Party’s conduct which by the exercise of due diligence the party is unable to overcome and which substantially interferes with operations.

G. Liquidated Damages: The parties agree that, if the Project is not completed within the time specified plus any extensions of time allowed pursuant thereto, the actual damages sustained by the Owner because of any such delay will be uncertain and difficult of ascertainement, and that the reasonable foreseeable value of the use of said project by the Owner would be the sum of $250.00 per calendar day. The Contractor therefore agrees to pay, and the Owner agrees to accept, as liquidated damages and not as a penalty, the sum of $250.00 per calendar day for each day's delay in fully completing said project beyond the time specified in the Contract and any extensions of such time allowed there under.

H. Change Orders: per Texas Local Government Code Sec. 252.048. CHANGE ORDERS. (a) If changes in plans or specifications are necessary after the performance of the contract is begun or if it is necessary to decrease or increase the quantity of work to be performed or of materials, equipment, or supplies to be furnished, the governing body of the municipality may approve change orders making the changes.

(b) The total contract price may not be increased because of the changes unless additional money for increased costs is appropriated for that purpose from available funds or is provided for by the authorization of the issuance of time warrants.

(c) If a change order involves a decrease or an increase of $50,000 or less, the governing body may grant general authority to an administrative official of the municipality to approve the change orders.
(c-1) If a change order for a public works contract in a municipality with a population of 300,000 or more involves a decrease or an increase of $100,000 or less, or a lesser amount as provided by ordinance, the governing body of the municipality may grant general authority to an administrative official of the municipality to approve the change order.

(d) The original contract price may not be increased under this section by more than 25 percent. The original contract price may not be decreased under this section by more than 25 percent without the consent of the contractor.

2. **Miscellaneous**

A. **Independent Contractor:** Proposer agrees that Proposer and Proposer’s employees and agents have no employer-employee relationship with City. Proposer agrees that if Proposer is selected and awarded a contract, City shall not be responsible for the Federal Insurance Contribution Act (FICA) payments, Federal or State unemployment taxes, income tax withholding, Workers Compensation Insurance payments, or any other insurance payments, nor will City furnish any medical or retirement benefits or any paid vacation or sick leave.

B. **Assignments:** The rights and duties awarded the successful Proposer shall not be assigned to another without the written consent of the Purchasing Supervisor. Such consent shall not relieve the assigner of liability in the event of default by the assignee.

C. **Liens:** Proposer shall indemnify and save harmless the City against any and all liens and encumbrances for all labor, goods, and services which may be provided to the City by Proposer or Proposer’s vendor(s), and if the City requests, a proper release of all liens or satisfactory evidence of freedom from liens shall be delivered to the City.

D. **Gratuities / Bribes:** Proposer certifies that no bribes in the form of entertainment, gifts, or otherwise, were offered or given by the successful Proposer, or its agent or representative, to any City officer, employee or elected representative, with respect to this RFP or any contract with the City, and that if any such bribe is found to have been made this shall be grounds for voiding of the contract.

E. **Financial Participation:** Proposer certifies that it has not received compensation from the City to participate in preparing the specifications or RFP on which the Proposal is based and acknowledges that this contract may be terminated and/or payment withheld if this certification is inaccurate.

F. **Required Licenses:** Proposer certifies that he holds all licenses required by the State of Texas for a provider of the goods and/or services described by the Scope of Services herein.

G. **Authority to Submit Proposal and Enter Contract:** The person signing on behalf of Proposer certifies that the signer has authority to submit the Proposal on behalf of the Proposer and to bind the Proposer to any resulting contract.

H. **Authority to Enter Contract – City:** The City Manager is the only person authorized to execute contracts on behalf of the City. All signature pages must include “approved as to form” and be signed by the City Attorney before the City Manager will execute the contract. Neither department heads nor elected officials are authorized to sign any binding contracts or agreements prior to being properly placed on the City Councils agenda and approved in an open meeting. Department heads and other elected officials are not authorized to enter into any type of agreement or contract on behalf of the City of Galveston. Only the City Manager may enter into a contract on behalf of the City of Galveston as authorized by City Council and the City Charter. Additionally, department heads and other elected officials are not authorized to agree to any type of supplemental agreements or contracts for goods or services. Supplemental agreements are subject to review by the City’s Legal Department prior to being signed by the City Manager, (City’s authorized representative).
I. Compliance with Applicable Law: Proposer agrees that the contract will be subject to, and Proposer will strictly comply with, all applicable federal, state, and local laws, ordinances, rules, and regulations.

J. Non-Discrimination: During the performance of this contract, the contractor agrees as follows: (1) The contractor will not discriminate against any employee or applicant for employment because of race, age, disability, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants and employees are not discriminated against on the basis of race, age, disability, color, religion, sex or national origin. In the event the contractor violates this non-discrimination clause, such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause. (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, age, disability, color, religion, sex or national origin.


A. Insurance: The Proposer, consistent with its status as an independent contractor, shall carry, and shall require any of its subcontractors to carry, at least the following insurance in such form, with such companies, and in such amounts (unless otherwise specified in the Scope of Services, Appendix J) as City may require, naming the City of Galveston as the additional insured:

i. Worker’s Compensation and Employer’s Liability insurance, including All States Endorsement, to the extent required by federal law and complying with the laws of the State of Texas;

ii. Commercial General Liability insurance for at least One Million Dollars ($1,000,000) on a per occurrence basis, with a Two Million ($2,000,000) aggregate. Blanket Contractual Liability, Broad Form Property Damage, Personal Injury, Completed Operations/Products Liability, Premises Liability, Medical Payments, and Broad Form General Liability Endorsements;

iii. Comprehensive Automobile Liability insurance covering all owned, non-owned or hired automobiles to be used by the Contractor, with coverage at the minimum State of Texas requirements;

iv. Professional Liability, Errors and Omissions in an amount to be determined in the Scope of Services.

Insurance coverage shall be on an “occurrence basis”

B. Indemnification: In Accordance with State Law, the contractor agrees to indemnify, save, and hold harmless the City of Galveston, Texas, its employees, officials, and agents from any and all claims, actions, damages, lawsuits, proceedings, judgements, or liabilities, for personal injury, death, or property damage resulting from the acts or omissions of anyone under the contractor’s supervision or control.
In the event of any cause of action or claim asserted by a party to this agreement or any third party, the City will provide the contractor with timely notice of such claim, dispute or notice. Thereafter, the contractor shall at its own expense, faithfully and completely defend and protect the City against any and all liabilities arising from this claim, cause of action, or notice.

i. Indemnity for Intellectual Property: Proposer hereby warrants that the use or sale of the products, materials and services delivered hereunder will not infringe on the rights of any trade secrets, patent, copyright, registered trademark, or other intellectual property by right covering such materials and the successful Proposer agrees to indemnify and hold harmless the City for any and all costs, expenses, judgments, and damages which the City may have to pay or incur.

C. Bond Requirements: If applicable, per the Scope of Services (Appendix J, Section 3. Special Conditions), prior to the commencement of work on this Project, Proposer shall deliver to the City the following bonds issued by a good and sufficient surety licensed by the State of Texas and satisfactory to the City:

i. Proposal bonds are required for Proposals over $25,000.00 in the amount of 5% of the total Proposal amount.

ii. A payment bond in the amount of 100% of the total contract amount insuring the full and prompt payment of all persons performing labor and/or furnishing materials in connection with this Project;

iii. A performance bond in the amount of 100% of the total contract amount insuring full, faithful, and prompt performance of the responsibilities contained in this contract within the time parameters provided herein; and

iv. A maintenance bond insuring full and prompt maintenance, repair and/or replacement of the goods to be provided by Proposer for a period of two years from date of acceptance by the City.
Appendix B – Form CIQ

INFORMATION REGARDING VENDOR CONFLICT OF INTEREST QUESTIONNAIRE

**WHO:** The following persons must file a Conflict of Interest Questionnaire with the City if the person has an employment or business relationship with an officer of the City that results in taxable income exceeding $2,500 during the preceding twelve-month period, or an officer or a member of the officer's family has accepted gifts with an aggregate value of more than $250 during the previous twelve-month period and the person engages in any of the following actions:

1. contracts or seeks to contract for the sale or purchase of property, goods or services with the City, including any of the following:
   a. written and implied contracts, utility purchases, purchase orders, credit card purchases and any purchase of goods and services by the City;
   b. contracts for the purchase or sale of real property, personal property including an auction of property;
   c. tax abatement and economic development agreements;
2. submits a Proposal to sell goods or services, or responds to a request for proposal for services;
3. enters into negotiations with the City for a contract; or
4. applies for a tax abatement and/or economic development incentive that will result in a contract with the City

**THE FOLLOWING ARE CONSIDERED OFFICERS OF THE CITY:**

1. Mayor and City Council Members;
2. City Manager;
3. Board and Commission members and appointed members by the Mayor and City Council;
4. Directors of 4A and 4B development corporations;
5. The executive directors or managers of 4A and 4B development corporations; and
6. Directors of the City of Galveston who have authority to sign contracts on behalf of the City.

**EXCLUSIONS:** A questionnaire statement need not be filed if the money paid to a local government official was a political contribution, a gift to a member of the officer’s family from a family member; a contract or purchase of less than $2,500 or a transaction at a price and subject to terms available to the public; a payment for food, lodging, transportation or entertainment; or a transaction subject to rate or fee regulation by a governmental entity or agency.

**WHAT:** A person or business that contracts with the City or who seeks to contract with the City must file a “Conflict of Interest Questionnaire” (FORM CIQ) which is available online at [www.ethics.state.tx.us](http://www.ethics.state.tx.us) and a copy of which is attached to this guideline. The form contains mandatory disclosures regarding “employment or business relationships” with a municipal officer. Officials may be asked to clarify or interpret various portions of the questionnaire.

**WHEN:** The person or business must file:

1. the questionnaire – no later than seven days after the date the person or business begins contract discussions or negotiations with the municipality, or submits an application, responds to a request for proposals or Proposals, correspondence, or other writing related to a potential contract or agreement with the City; and
2. an updated questionnaire – within seven days after the date of an event that would make a filed questionnaire incomplete or inaccurate.

It does not matter if the submittal of a Proposal or proposal results in a contract. The statute requires a vendor to file a FORM CIQ at the time a proposal is submitted or negotiations commence.

**WHERE:** The vendor or potential vendor must mail or deliver a completed questionnaire to the Finance Department. The Finance Department is required by law to post the statements on the City’s website.

**ENFORCEMENT:** Failure to file a questionnaire is a Class C misdemeanor punishable by a fine not to exceed $500. It is an exception to prosecution that the person files a FORM CIQ not later than seven business days after the person received notice of a violation.

**NOTE:** The City does not have a duty to ensure that a person files a Conflict of Interest Questionnaire.
**CONFLICT OF INTEREST QUESTIONNAIRE**

*For vendor or other person doing business with local governmental entity*

<table>
<thead>
<tr>
<th>OFFICE USE ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Received</td>
</tr>
</tbody>
</table>

**FORM CIQ**

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.

#### 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

**THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.**
Appendix C - House Bill 89 Verification

I, ______________________________________ (Person name), the undersigned representative of (Company or Business Name) ____________________________ (hereinafter referred to as Company) being an adult over the age of eighteen (18) years of age, after being duly sworn by the undersigned notary, do hereby depose and verify under oath that the company named-above, under the provisions of Subtitle F, Title 10, Government Code Chapter 2270:

a. Does not boycott Israel currently; and

b. Will not boycott Israel during the term of the contract the above-named Company, business or individual with the City of Galveston, Texas.

Pursuant to Section 2270.001, Texas Government Code:

1. “Boycott Israel” means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and

2. “Company” means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or any limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of those entities or business associations that exist to make a profit.

DATE ____________________________________________________________
SIGNATURE OF COMPANY REPRESENTATIVE

STATE OF __________ §
COUNTY OF __________ §

On this day, BEFORE ME, the undersigned, personally appeared ______________________, the __________________ of Company, and personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual executed the instrument for purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this _____ day of __________, 2017.

[SEAL] NOTARY PUBLIC in and for the State of __________

THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.
Appendix D – Property Tax Statement

FAILURE TO COMPLETE THIS ATTACHMENT SHALL RESULT IN THE PURCHASING SUPERVISOR DEEMING YOUR BID OR PROPOSAL “NON-RESPONSIVE.”

The City of Galveston, Texas has adopted the following policy:

The City of Galveston will not do business with any person or business that owes delinquent property taxes to the City.

Please indicate whether you or your company, owe delinquent property taxes to the City whether an assumed name, partnership, corporation, or any other legal form.

_____ I do not owe the City property taxes that are delinquent.

_____ I owe City property taxes that are delinquent on property located at ________________________________

________________________________________________________________________________________

Proposer’s Printed or Typed Name

Proposer’s Signature

Date

THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.
Appendix E – Nepotism Statement

FAILURE TO COMPLETE THIS ATTACHMENT SHALL RESULT IN THE PURCHASING SUPERVISOR DEEMING YOUR BID OR PROPOSAL "NON-RESPONSIVE."

The Bidder or Proposer or any officer, if the Bidder or Proposer is other than an individual, shall state whether Bidder or Proposer has a relationship, either by blood or marriage, with any official or employee of the City of Galveston by completing the following:

If the Proposer or Bidder is an individual:

_____ I am not related by blood or marriage to any official or employee of the City of Galveston

_____ I am related by blood or marriage to the following official(s) or employee(s) of the City of Galveston

Name and title of City Official

Or employee: ________________________________

Relationship: ________________________________

If the Bidder or Proposer is NOT an individual:

_____ The officers of the company submitting this bid or proposal are not related by blood or marriage to any official or employee of the City of Galveston.

_____ The officers of the company submitting this Proposal are related by blood or marriage to the following official(s) or employee(s) of the City of Galveston.

Name and title of officer: ________________________________

Employee and title of City Official or Employee: ________________________________

Relationship: ________________________________

THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.
Appendix F – Non-Collusion Statement

THE UNDERSIGNED AFFIRM THAT THEY ARE DULY AUTHORIZED TO EXECUTE THIS CONTRACT, THAT THIS COMPANY, FIRM, PARTNERSHIP OR INDIVIDUAL HAS NOT PREPARED THIS PROPOSAL IN COLLUSION WITH ANY OTHER PROPOSER, AND THAT THE CONTENTS OF THIS PROPOSAL AS TO PRICES, TERMS OR CONDITIONS OF SAID PROPOSAL 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 PROPOSAL.

VENDOR__________________________________________________________________________________________________________

ADDRESS________________________________________________________________________________________________________

PHONE __________________________________________________________________________________________________________

FAX __________________________________________________________________________________________________________

PROPOSER (SIGNATURE) __________________________________________________________________________________________

PROPOSER (PRINTED NAME) ______________________________________________________________________________________

POSITION WITH COMPANY __________________________________________________________________________________________

SIGNATURE OF COMPANY OFFICIAL AUTHORIZING THIS PROPOSAL __________________________________________________________________________________________________________

COMPANY OFFICIAL (PRINTED NAME) ________________________________________________________________________________

OFFICIAL POSITION ________________________________________________________________________________________________

THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.
Appendix G – Document 00435

THE CITY OF GALVESTON, TEXAS

DOCUMENT 00435, REQUIRED BY ALL PROPOSERS WHO WILL RECEIVE FEDERAL FUNDS IN PAYMENT OF PROCUREMENT.

PROPOSER’S CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION (49 CFR PART 29)

The undersigned certifies, by submission of this proposal or acceptance of this contract, that neither Contractor nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntary excluded from participation in this transaction by any Federal department or agency. Proposer agrees that by submitting this proposal that Proposer will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the Proposer or any lower tier participant is unable to certify to this statement, that participant shall attach an explanation to this document.

Certification— the above information is true and complete to the best of my knowledge and belief.

__________________________
(Printed or typed Name of Signatory)

__________________________
(Signature)

__________________________
(Date)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001

END OF DOCUMENT 00435-FAA

THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE PROPOSAL.
Appendix H – No Intent to Submit Form

If your firm has chosen **not** to submit a Proposal for this procurement, please complete this form and submit to:

City of Galveston
Purchasing Division
PO Box 779
Galveston, Texas 77553

City of Galveston
Purchasing Division
823 Rosenberg St. Room 306
Galveston, Texas 77550

Please check all items that apply:

- [ ] Do not sell the item(s) required
- [ ] Cannot be competitive
- [ ] Cannot meet specifications highlighted in the attached request
- [ ] Job too large
- [ ] Do not wish to do business with the City of Galveston
- [ ] Cannot submit electronically
- [ ] Cannot provide Insurance required
- [ ] Cannot provide Bonding required
- [ ] Cannot comply with Indemnification requirement
- [ ] Job too small
- [ ] Other: ___________________

COMPANY NAME (Please print): _____________________________________________

Authorized Officer Name (Please print): _______________________________________

Telephone: (_____) _____________  Fax: (_____) ________________

You may also email this form to: purchasing@galvestontx.gov.
The City of Galveston would like to thank you for the services you and your company have provided for us in the past, present, and in the future. For those services provided you have more than likely received payments via a paper check in the mail. As we all know, that process is slow, inefficient, and costly for us and for you as the recipient.

Mail can be delayed, lost, or even stolen causing payments to be late and we may then face penalties and late fees. The City of Galveston would like to streamline our payment process with electronic payments. These payments will be transferred electronically from our financial institute to your financial institute. The process will get your payments to you in a quicker, more reliable, and more efficient manner.

If you would like to sign up to start receiving all of your payments via ACH / Wire Transfers, please fill out the authorization forms and return to the City of Galveston Finance Department.

Please email to:
accountspayable@galvestontx.gov

Or mail to:
City of Galveston
Finance Department
P.O. Box 779
Galveston, TX 77553

If you have any questions or concerns, please do not hesitate to call Accounts Payable at 409.797.3569. Please put the Purchase Order Number on your invoices to ensure prompt payment. Again, we appreciate you and the services your business provide for the City of Galveston.

Sincerely,

Michael W. Loftin
Assistant City Manager – Finance
Appendix I – ACH Form continued

City of Galveston

ACH Payment Agreement Form

Authorization Agreement

I hereby authorize City of Galveston to initiate ACH deposits to my account at the financial institution named below.

Further, I agree not to hold City of Galveston responsible for any delay or loss of funds due to incorrect or incomplete information supplied by me or by my financial institution or due to an error on the part of my financial institution in depositing funds to my account. This agreement will remain in effect until City of Galveston receives a written notice of cancellation from me or my financial institution, or until I submit a new ACH Payment form to the City of Galveston Finance Department. You may keep this form to submit with your first invoice.

Account Information

Name of Financial Institution: ________________________________

Financial Institute Address: ________________________________

Routing Number: ________________________________

Account Number: ________________________________

SWIFT Code: (if applicable) ________________________________

Signature

Company Name: ________________________________

Authorized Signature: ________________________________ Date: ____________

THIS FORM IS OPTIONAL; IT CAN BE RETURNED WITH INVOICE IF AWARDED THE CONTRACT.
Appendix J – Scope of Services

1. **Project Title:** RFP 18-01 Neighborhood Project.

2. **Scope of Services Contact**
   Questions about the technical nature of the Scope of Services will be directed to the Purchasing Division, Phone. 409.797.3579, e-mail: purchasing@galvestontx.gov.

3. **Special Conditions**
   A bid bond of 5% of the total amount proposed is required for this project. Performance and Payment Bonds are required at the time the contract is executed by the awarded vendor.
   All copies, including media source, must be the same as the original proposal and include all documents, including correct pricing. Pricing on copies must be the same as the original proposal document, including the document on the media source. Failure to include the above may result in the disqualification of the submittal.
   Proposals must be submitted in the following order: (bound copies should be spiral, comb, or binder clipped)
   - A. Pricing
   - B. Bid Bond
   - C. Required Documents – Appendix A, Appendix B, Appendix C, Appendix D, Appendix E, Appendix F, Appendix E, and Acknowledgement of Addenda
   - D. References
   - E. Timeline
   - F. Statement of Bidders’ Qualifications
   - G. Financial Statements
   Failure to follow the above order may result in the disqualification of the submittal.

4. **Proposal Evaluation Factors**

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<th>Factor</th>
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<tbody>
<tr>
<td>40%</td>
<td>Cost</td>
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<tr>
<td>30%</td>
<td>Past performance on similar projects of size and scope</td>
</tr>
<tr>
<td>20%</td>
<td>Overall experience of project manager and site superintendent</td>
</tr>
<tr>
<td>20%</td>
<td>References</td>
</tr>
<tr>
<td>10%</td>
<td>Schedule</td>
</tr>
</tbody>
</table>

5. **Brand Manufacture Reference**
   The City has determined that any manufacturer’s brand defined in the Scope of Services meets the City’s product and support need. The manufacturer’s reference is not intended to be restrictive, and is only descriptive of the type and quality the City desires to purchase. Quotes for similar manufactured products of like quality will be considered if the Proposal is fully noted with the manufacturer’s brand name and model. The City reserves the right to determine products and support of equal value, and whether other brands or models meet the City’s product and support needs.
### 6. Key Events Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date/Time</th>
</tr>
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<tbody>
<tr>
<td>Proposal Release Date</td>
<td>October 5, 2017</td>
</tr>
<tr>
<td>Pre-Proposal Conference</td>
<td>October 18, 2017 @ 2:00 p.m. CST</td>
</tr>
<tr>
<td>Deadline for Submittal of Written Questions</td>
<td>October 23, 2017 @ 2:00 p.m. CST</td>
</tr>
<tr>
<td>Sealed Proposals Due to and Opened by City</td>
<td>October 31, 2017 @ 10:00 a.m. CST</td>
</tr>
<tr>
<td>Anticipated Committee Evaluation Review Date</td>
<td>November 3, 2017</td>
</tr>
<tr>
<td>Anticipated Award Date</td>
<td>November 2017</td>
</tr>
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</table>
### 1.0 LINDALE PARK WALKING TRAIL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNITS</th>
<th>UNIT PRICE</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Mobilization for Lindale Park and Bonds for the whole project</td>
<td>LS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Plan, implementation and maintenence for SWPPP</td>
<td>LS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Topsoil stripping, scarifying, clearing and grade preparation</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Concrete Walking Trail</td>
<td>SY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>Curb and gutter</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>109</td>
<td>Tree protection</td>
<td>LS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>110</td>
<td>Plan, implementation and maintenence Traffic Control</td>
<td>LS</td>
<td></td>
<td></td>
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<tr>
<td>111</td>
<td>12 inch RCP</td>
<td>EA</td>
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</table>

**SUBTOTAL BID AMOUNT 1.0**

### 2.0 CENTRAL MIDDLE SCHOOL SIDEWALK REPAIRS

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<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<th>UNIT PRICE</th>
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</thead>
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<tr>
<td>201</td>
<td>Mobilization</td>
<td>LS</td>
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<tr>
<td>202</td>
<td>Implementation and Maintenence for SWPPP</td>
<td>LS</td>
<td></td>
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<tr>
<td>203</td>
<td>Add 68' of 6.0' wide concrete walk</td>
<td>SY</td>
<td></td>
<td></td>
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<tr>
<td>204</td>
<td>Add 53' of 5.0' wide concrete walk</td>
<td>SY</td>
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<td></td>
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</tr>
<tr>
<td>205</td>
<td>Add 15' of concrete curb</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>Relocation of existing fence and gate (by panels) and providing additional</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>similar fencing/gate, if necessary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>207</td>
<td>ADA Ramps &amp; Grading including landing</td>
<td>EA</td>
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<tr>
<td>208</td>
<td>Topsoil stripping, scarifying, clearing, grade preparation and sodding</td>
<td>SF</td>
<td></td>
<td></td>
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<tr>
<td>209</td>
<td>Traffic Control</td>
<td>LS</td>
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</table>

**SUBTOTAL BID AMOUNT 2.0**

### 3.0 CHANNELVIEW (77th St.) SIDEWALK AND CURBS

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>301</td>
<td>Mobilization</td>
<td>LS</td>
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<tr>
<td>302</td>
<td>Implementation and Maintenence for SWPPP</td>
<td>LS</td>
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</tr>
<tr>
<td>303</td>
<td>Concrete 7” Curb</td>
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<tr>
<td>304</td>
<td>Concrete Gutter Pan</td>
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<tr>
<td>305</td>
<td>4 feet Wide Concrete sidewalks</td>
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<td>306</td>
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<td>Flushed Transitions with Truncated Domes</td>
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<tr>
<td>308</td>
<td>Grading and sodding</td>
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**SUBTOTAL BID AMOUNT 3.0**

### 4.0 2017 COLONY PARK SIDEWALK AND CURB REPAIRS

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<tr>
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<td>402</td>
<td>Implementation and Maintenence for SWPPP</td>
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<tr>
<td>403</td>
<td>Colony Park Circle curb repair</td>
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**SUBTOTAL BID AMOUNT 4.0**

### Total Subtotal

**SUBTOTAL BID AMOUNT 3.0**
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<td>Colony Park Circle sidewalk repair</td>
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<td>LF</td>
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<tr>
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**SUBTOTAL BID AMOUNT** 4.0

**TOTAL BID AMOUNT** 5.0

### 5.0 ALTERNATES INCLUDING RAMP LANDINGS

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**SUBTOTAL ALTERNATE AMOUNT 5.0**
STATEMENT OF BIDDER’S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information it desires.

Date: ________________________________
Bidder (Legal Name of Firm): ________________________________
Date Organized: ________________________________
Name of Owner(s): ________________________________
Address: _______________________________________

Date Incorporated ________________________________
Federal ID Number: ________________________________
Number of Years in contracting business under present name ________________________________
List all other names under which your business has operated in the last 10 years:

<table>
<thead>
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<th>Work Presently Under Contract:</th>
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<tr>
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Type of work performed by your company:
________________________________________________________________________

Total Staff employed by Firm (Break down by Managers and Trades on separate sheet):
________________________________________________________________________

Have you ever failed to complete any work awarded to you?  Yes  No
(If yes, please attach summary of details on a separate sheet. Include brief explanation of cause and resolution)

Have you ever defaulted on a contract?  Yes  No
(If yes, please attach summary of details on a separate sheet.)

Has your organization had any disbarments or suspensions that have been imposed in the past five years or that was still in effect during the five year period or is still in effect?  Yes  No
(If yes, list and explain; such list must include disbarments and suspensions of officers, principals, partners, members, and employees of your organization.)

List the projects most recently completed by your firm (include project of similar importance):

<table>
<thead>
<tr>
<th>Project</th>
<th>Amount $</th>
<th>Mo/Yr Completed</th>
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Major equipment available for this contract:
________________________________________________________________________

Are you in compliance with all applicable EEO requirements?  Yes  No
(If no, please attach summary of details on a separate sheet.)

Are you a Section 3 business?  (see below)  □ Yes  □ No
Section 3 Business Concerns:
a) Businesses that are 51 percent or more owned by Section 3 residents;
b) Businesses whose permanent, full-time employees include persons, at least 30 percent of whom are currently Section 3 residents, or within three years of the date of first employment with the firm were Section 3 residents;
c) Businesses that provide evidence of a commitment to subcontract in excess of 25 percent of the dollar amount of all subcontracts to be awarded to businesses that meet the qualifications described above; or
d) Businesses located within the Grant Recipient’s jurisdiction that identifies themselves as Section 3 Business Concerns because they provide economic opportunities for low- and very low income persons.

Bank References
Address: ____________________________  Contact Name: ________________
City & State: ______________________  Zip: ________________  Phone Number: ________________
Credit available: $ ________________

Has the firm or predecessor firm been involved in a bankruptcy or reorganization?  Yes  No
(If yes, please attach summary of details on a separate sheet.)

List on a sheet attached hereto all judgements, claims, arbitration proceedings, or suits pending or outstanding against bidder over the last five (5) years with amount of claim and brief description.

List on a sheet attached hereto all lawsuits or requested arbitration with regard to construction contracts which bidder has initiated within the last five (5) years and brief explanation of claim and outcome.

Attach resume(s) for the principal member(s) of your organization, including the officers as well as the proposed superintendent for the project.

Signed this __________ day of ______________________, 20____.

____________________________
Signature

____________________________
Printed Name and Title

____________________________
Company Name

Notary Statement:
______________________________.  being duly sworn, says that he/she is the _______Position/Title
______________________________ of ______________________ (Firm Name), and hereby swears that the answers to the foregoing
questions and all statements therein contained are true and correct.  He/she hereby authorizes and requests any person,
firm, or corporation to furnish any information requested City/County of ______________________ in verification of the
recitals comprising this Statement of Bidder’s Qualifications.

Subscribed and sworn before me this __________ day of __________, 20____.

Notary Public

____________________________
Signature

____________________________
Printed Name
My Commission Expires: ______________,
The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
BID BOND

THE STATE OF TEXAS

SURETY’S NO.______________

KNOWN ALL MEN BY THESE PRESENTS, THAT _________________

_________________________________________________________ of the City of
___________, County of ____________________, and State of _________________
as Principal, and ___________________________ as Surety,

Are held and firmly bound unto the City of Galveston, Texas, a home rule municipal corporation of Galveston County, Texas, as Obligee, in the amount of:

________________________________________________________________________

______________________________ (written amount); ($ _________________),

DOLLARS for payment whereof the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid to enter into a certain written contract with the Obligee for:

NEIGHBORHOOD PROJECT 2017

NOW, THEREFORE, the condition of the obligation is such that if the Principal shall faithfully enter into such written contract, then this bid bond shall be void; otherwise this bid bond shall remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if the Principal withdraws its Bid any time after such Bid is opened and before official rejection of such Bid by Obligee or, if the Principal is successful in securing the award of the contract, and fails to enter into the Contract or furnish satisfactory Performance and Payment Bonds (if required), the Obligee, in either of such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

PROVIDED, further that if any legal action is filed upon this Bond, venue shall lie in Galveston County, State of Texas.
IN WITNESS THEREOF, the Principal and Surety does sign and seal this instrument.

This___________________day of ______________________2017.

Principal

By___________________________

Surety

By___________________________

Address ______________________

Address ______________________

___________________________

___________________________

APPROVED AS TO FORM:

_________________________________

Office of the City Attorney

NOTE: Attach Power of Attorney
# INDEX TO GENERAL CONDITIONS OF THE AGREEMENT

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**GENERAL CONDITIONS OF THE AGREEMENT**

1. **OWNER:** Whenever the word “Owner” is used in this contract, it shall be understood as referring to the City of Galveston, Texas. The City acts through its City Manager when he has been authorized by City Council, otherwise the City acts through City Council.

2. **CONTRACTOR:** Whenever the word “Contractor” is used, it shall be understood to mean the person, persons, co-partnership or corporation, to-wit:

   ________________________________ who has agreed to perform the work embraced in this contract.

3. **OWNER'S REPRESENTATIVE:** Whenever the word Owner's Representative or representative is used in this contract, it shall be understood to mean:

   ________________________________, who offices at: Galveston, Texas, under whose supervision these contract documents, including the plans and specifications, were prepared, and who will inspect construction; or to such other representative, supervisor, or inspector as may be authorized by the Owner to act under this Agreement. Engineers, supervisors or inspectors will act for the Owner under the direction of Owner's Representative, but shall not directly supervise the Contractor or employees acting in behalf of the Contractor.

4. **CONTRACT DOCUMENTS:** The contract documents shall consist of the Notice to Bidder, Invitation to Bid, General Instructions to Bidders, Bid Proposal, Signed
Contract, Statutory Bonds (if required), General Conditions of the Agreement, Special Conditions of the Agreement, Specifications, Plans, Insurance Certificates, Notice of Acceptance, Notice to Proceed, Advertisement for bids, and all other documents made available to Bidder for his inspection in accordance with the Notice to Bidders. The Contract Documents shall be bound together, and every document included in the binding is part of the contract. Additionally, oversized plans and specifications shall be considered part of the Contract Documents even if not so bound.

The Contract Documents are complimentary and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order unless otherwise provided: Signed Agreement, Performance & Payment Bonds, Special Bonds (if any), Proposal, Special Conditions of Agreement, Notice to Contractors, Technical Specifications, Plans, and General Conditions of Agreement.

5. **INTERPRETATION OF PHRASES:** Whenever the words "Directed", "Required", "Permitted", "Designated", "Considered Necessary", "Prescribed", or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the Owner's Representative is intended; and similarly, the words "Approval", "Acceptable", "Satisfactory", or words of like import shall mean approval by or acceptable or satisfactory to the Owner's Representative.

Whenever in the Specifications or Plans accompanying this Agreement, the terms or description of various qualities, relative finish, workmanship, or other qualities of similar kind which cannot from their nature be specifically and clearly described and specified, are necessarily described in general terms, the fulfillment of which must depend on individual judgment, then, in all such cases, any questions of the fulfillment of said Specifications or Plans shall be decided by the Owner's Representative and said work shall be done in accordance with the Owner's interpretations of the meaning of the words, terms, or clauses defining the character of the work.

6. **SUBCONTRACTOR:** The term “Subcontractor”, includes only those having a direct contract with the Contractor for performance of work on the project contemplated by these documents. Contractor shall submit the names and addresses of all proposed subcontractors to the Owner. Subcontractors may be disqualified by Owner for the same reason that a Contractor may be disqualified. Owner shall have no responsibility to any Subcontractor employed by Contractor for performance of work on the project contemplated by these contract documents, but Subcontractors will look exclusively to Contractor for any payments due to the Subcontractor.

7. **WRITTEN NOTICE:** Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or an officer of the corporation for whom it is intended, or if delivered at or sent certified mail to the last business address known to the Party who gives the notice.
8. **WORK:** Unless otherwise stipulated, the Contractor shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and all water, light, power, fuel, transportation and all other facilities necessary for the execution and completion of the work covered by the contract documents. Unless otherwise specified, all material 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. Materials or work described in words that so applied have well known, technical or trade meaning shall be held to refer to such recognized standards. All work shall be done and all materials furnished in strict conformity with the contract documents.

9. **SUBSTANTIALLY COMPLETED:** The term “Substantially Completed” means that the structure or project contemplated by the contract documents has been made suitable for use or occupancy, or the facility is in a condition to serve its intended purpose but still may require minor miscellaneous work and adjustment. The Engineer, or his designee, shall certify whether the project is substantially completed.

10. **LAYOUT OF WORK:** Except as specifically provided, the Contractor shall be responsible for laying out all work and shall accomplish this work in a manner acceptable to the Owner's Representative. The Owner's Representative will check the Contractor's layout of all major structures and other layout work done by the Contractor at Contractor's request, but this check does not relieve the Contractor of the responsibility of correctly locating all work in accordance with the Plans and Specifications.

11. **KEEPING OF PLANS AND SPECIFICATIONS ACCESSIBLE:** The Contractor shall be furnished with Five (5) copies, of all Plans, Profiles and Specifications without expense to Contractor and shall keep one copy of the same consistently accessible on the job site.

12. **RIGHT OF ENTRY:** The Owner's Representative may make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. The Owner’s Representative will not be required to make exhaustive or continuous on-site inspection to check the quality or quantity of the work, nor will the Owner’s Representative be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions. The Representative’s efforts will be directed toward providing assurances for the Owner that the completed project will conform to the requirements of the contract documents, but the Representative will not be responsible for the Contractor's failure to perform the work in accordance with the contract documents. On the basis of on-site observations, the Representative will keep the Owner informed of the progress of the work and will endeavor to guard the Owner against defects and deficiencies in the work of the Contractor.

13. **LINES & GRADES:** The construction plans include a horizontal control line (baseline) and vertical control points (bench marks). These will be established or
shown to the Contractor prior to commencing construction. After construction has started, the Contractor shall be responsible for protecting and preserving these controls. From these controls the Contractor shall stake all alignments for the work and will be responsible for all horizontal and vertical construction staking.

14. **OWNER'S REPRESENTATIVE'S AUTHORITY AND DUTY:** Unless otherwise specified, it is mutually agreed between the Parties to this Agreement that the Owner's Representative shall review all work. The Representative has the authority to stop work whenever, in his/her opinion, such stoppage may be necessary to ensure the proper execution of the contract.

In order to prevent delays and disputes and to discourage litigation, it is further agreed that the Owner's Representative shall, in all cases, determine the amounts and quantities of the several kinds of work that are to be paid for under this contract. The Owner’s Representative shall also determine all questions in relation to said work and the construction, and shall in all cases decide questions concerning the contract raised by the Contractor in consultation with the project’s design professional where the Representative deems such consultation appropriate.

The Owner's Representative shall, within ten (10) business days of the date of the Contractor’s question(s)/claim, render and deliver to both the Owner and the Contractor a written decision on all claims and on all questions which may arise relative to the execution of the work or the interpretation of the contract, specifications and plans. This includes determinations with regard to whether a Change Order should issue. Should the Owner's Representative fail to make such decision within the above stated time, the failure shall be considered a denial of Contractor’s request.

Should Owner's Representative render any decision or give any direction, which in the opinion of the Contractor, is not in accordance with the meaning and intent of this contract, Contractor may file with Owner (with a copy to the City Manager) written objections to and appeal of the decision or direction within ten (10) business days. The Objection and Appeal to the Owner is a condition precedent to and shall reserve the Party’s right to submit the question to mediation and litigation and to any rights of the Contractor to receive any additional money or time under this contract.

However, because it is the intent of this Agreement that there shall be no delay in the execution of the work, decisions or directions of the Owner's Representative, as rendered, shall at all times be promptly carried out, and any claim/objection arising from such decision or direction shall be submitted to the Owner prior to mediation which is a condition precedent to any litigation that may be initiated.

No person, including the Owner’s Representative, has authority to increase the cost of this project to more than the amount authorized by City Council without obtaining a Change Order from City Council.
15. **SUPERINTENDENCE AND INSPECTION:** The Contractor agrees that the Owner's Representative shall be and is authorized to appoint from time to time such subordinate engineers, supervisors, or inspectors as the Owner's Representative deems proper to determine if the materials furnished and the work done under this Agreement is done in accordance with the Specifications.

The Contractor shall furnish all reasonable aid and assistance required by the subordinate engineers, supervisors, or inspectors for the proper observation and examination of the work. The Contractor shall regard and obey the written instructions of any subordinate engineer, supervisor, or inspectors so appointed. However, should the Contractor object to any written instruction by any subordinate engineer, supervisor or inspector, the Contractor may, within ten (10) business days of the instruction, make written appeal to the Owner's Representative in the manner set out above. However, no observation by the Owner’s Representative shall affect Contractor’s responsibility for proper construction in accordance with the plans and specifications furnished by Owner nor shall it affect Contractor’s liability for failure to do so.

16. **CONTRACTOR'S DUTY AND SUPERINTENDENCE:** The Contractor shall give personal attention to the faithful prosecution and completion of this contract. The Contractor shall have on the jobsite a competent superintendent and any necessary assistants having good communication skills, all satisfactory to Owner's Representative. The superintendent shall represent the Contractor in the Contractor’s absence and all directions given to the superintendent shall be binding as if given to the Contractor. Adequate supervision by competent and reasonable representatives of the Contractor is essential to the proper performance of the work; lack of such supervision shall be grounds for suspending operations of the Contractor.

The work, from its commencement to completion, shall be under the exclusive charge and control of the Contractor and all risk shall be borne by the Contractor.

The Owner or Owner's Representatives shall not be responsible for the acts or omissions of the Contractor, or any subcontractors, or any of the Contractor’s agents or employees, or any other persons performing any of the work.

17. **CONTRACTOR'S UNDERSTANDING:** It is understood and agreed that the Contractor, after careful examination, is satisfied as to the nature and location of the work, the confirmation of the ground, the character, quality and quantity of materials to be encountered, the character of equipment and facilities needed before and during the work, and the general and local conditions, and all other matters which in any way affect the work under this contract.

No verbal agreement or conversation with any officer, agent, representative or employee of the Owner, either before or after the execution of this contract, shall effect or modify any of the terms or obligations herein contained.
18. AGREEMENT OF WORKERS: The Contractor agrees to employ only orderly and competent workers, skillful in the performance in the type of work required under this contract. Contractor agrees that whenever the Owner's Representative shall inform the Contractor in writing that any workers are incompetent, unfaithful, or disorderly, such worker or workers shall be discharged from the work and shall not again be employed on the work without the Owner's Representative's written consent.

19. CONSTRUCTION PLANT: The Contractor shall provide all labor, tools, equipment, machinery and materials necessary in the prosecution and completion of this contract where it is not otherwise specifically provided that Owner shall furnish same, and it is also understood that Owner shall not be held responsible for the care, preservation, conservation, or protection of any materials, tools, equipment or machinery or any part of work until the work is finally completed and accepted.

The building of structures for the housing of workers or equipment will be permitted only at such places as the Owner's Representative shall designate, and the sanitary conditions of the grounds in or about such structure shall at all times be maintained in a manner satisfactory to the Owner's Representative.

20. SANITATION: Necessary sanitary conveniences for the use of laborers on the work site, properly screened from public observation, shall be provided, constructed and maintained by the Contractor in such manner and at such points as shall be approved by the Owner's Representative. Contractor shall strictly enforce use of sanitary conveniences.

21. OBSERVATION AND TESTING: The Owner or Owner's Representative shall have the right at all reasonable times to observe and test the work. Contractor shall make necessary arrangements and provide proper facilities and access for such observation and testing at any location wherever work is in preparation or progress. Contractor shall ascertain the scope of any observation which may be contemplated by Owner or Owner's Representative and shall give ample notice as to the time each part of the work will be ready for such observation. Owner or Owner's Representative may reject any work found to be defective or not in accordance with the contract documents, regardless of the stage of its completion or the time or place of discovery of such errors, and regardless of whether Owner's Representative has previously accepted the work through oversight or otherwise. In the event that any part of the work is being fabricated or manufactured at a location where it is not convenient for Owner or Owner's Representative to make observations of such work or require testing of said work, then in such event Owner or Owner's Representative may require Contractor to furnish Owner or Owner's Representative certificates of inspection, testing or approval made by persons competent to perform such tasks at the location where that part of the work is being manufactured or fabricated. All such tests will be in accordance with the methods prescribed by the American Society for Testing and Materials or such other applicable organization as may be required by law, good practice, or the contract documents.
If any work which is required to be inspected, tested, or approved, is covered up without written approval or consent of the Owner or Owner's Representative, it must, if requested by the Owner or Owner's Representative, be uncovered for observation and testing at the Contractor's expense. The cost of all such inspections, tests, and approvals shall be borne by the Contractor unless otherwise provided. Any work which fails to meet the requirements of such tests, inspections or approval, and any work which meets the requirements of any such tests or approval but does not meet the requirements of the contract documents shall be considered defective. Such defective work shall be corrected at the Contractor's expense.

Neither observations by the Owner or Owner's Representative, nor inspections, tests, or approvals made by Owner, Owner's Representative, or other persons authorized under this agreement to make such inspections, tests, or approvals, shall relieve the Contractor from his obligation to perform the work in accordance with the requirements of the contract documents.

22. DEFECTS AND THEIR REMEDIES: It is further agreed that if any part of the work or any material brought on the site for use in the work, is deemed by the Owner or Owner's Representative as unsuitable or not in conformity with plans, specifications, and contract documents, the Contractor shall, after receipt of written notice from the Owner's Representative, immediately remove such material and rebuild or otherwise remedy such work so that it shall be in full accordance with this contract. It is further agreed that any remedial action shall be at Contractor's expense.

23. CHANGES AND ALTERATIONS: The Contractor further agrees that the Owner may make such changes and alterations as the Owner deems necessary, in the line, grade, form, dimensions, plans or materials for the work, either before or after the beginning of the construction, without affecting the validity of this contract and the accompanying bond.

If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for Contractor’s claim for damages, or anticipated profits on the work that has been accepted. If the changes or alterations increase the amount of work, and the increased work can fairly be classified within the specifications, such increase shall be paid according to the quantity actually done and at the unit price established for such work under this contract; otherwise such additional work may be paid for as provided under Extra Work if the Contractor Obtains a Change Order. In case the Owner shall make changes or alterations that makes useless any work already done or material already furnished or used, then the Owner shall still be required to compensate the Contractor for any material or labor so used.

24. EXTRA WORK: The term "Extra Work" shall mean and include all work that may be required in writing by the Owner to be done by the Contractor to accomplish any change, alteration or addition to the work shown on the plans, and specifications or
contract documents, and not covered by the Contractor's Proposal, except as provided under “Changes and Alterations.”

The Contractor shall perform all Extra Work under the direction of the Owner when presented with a Written Extra Work Order signed by the Owner. The compensation to be paid the Contractor for performing said Extra Work shall be determined by one or more of the following methods:

Method (A) - By agreed unit prices; or

Method (B) - By agreed lump sum; or

Method (C) - If neither Method (A) or Method (B) is agreed upon before the Extra Work is commenced, then the Contractor shall be paid the "actual field cost" of the work, plus fifteen (15%) percent.

In the event Extra Work is performed and paid for under Method (C), the provisions of this paragraph shall apply. "Actual cost" is defined to include the cost of all workmen, such as foremen, timekeepers, mechanics and laborers; and materials, supplies, teams, trucks, rentals or machinery and equipment, for the time actually employed or used on such Extra Work; actual transportation charges necessarily incurred if the kind of equipment or machinery is not already on the job, together with all power, fuel, lubricants, water and similar operating expenses. Also, all necessary incidental expenses incurred directly on the account of such Extra Work, like Social Security, Old Age Benefits, Compensation, and all insurance as may be required by any law or ordinance, or directed by the Owner, Owner may direct the form in which account of actual field cost shall be kept and records of these accounts shall be made available to Owner. The Owner may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment to be used, otherwise these matters shall be determined by the Contractor.

Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using 100 percent of the latest of Equipment Expense adopted by the Associated General Contractors of America for this region. Where practicable the terms and prices for the use of machinery and equipment shall be incorporated in the Written Extra Work Order. The fifteen (15%) percent of the "actual field cost" to be paid the Contractor shall cover and compensate the Contractor for profits, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced with the "actual field cost" as defined, unless the Contractor's Camp or Field Office must be maintained primarily on account of such Extra Work, then the cost to maintain and operate the same shall be included in the "actual field cost".

No claim for Extra Work of any kind will be allowed unless the work is ordered in writing by the Owner's Representative and Contractor has requested a written
Change Order which is denied by Owner. In case any orders or instructions, either oral or written, appear to the Contractor to involve Extra Work for which the Contractor should receive additional compensation, or cause the Contractor to need more time, notwithstanding any other provision of this contract, the Contractor must do the following to preserve his right to additional compensation: a) if the original order was oral, the Contractor shall immediately request a written order, and b) regardless of whether the request was oral or written, the Contractor shall within ten (10) business days of the date of the order make a written request to the Owner’s Representative for written Change Order authorizing such “Extra Work” or granting Contractor additional time. Contractor shall provide copies of the request to the Owner. Should the Contractor delay more than ten (10) business days from the date of the order before requesting the Change Order after being directed to do any work for which it believes it is entitled to additional compensation/additional construction time, the Contractor waives all right to additional compensation/time.

Should a disagreement between the Owner’s Representative and the Contractor arise as to what does or does not constitute Extra Work, or as to the payment for what Contractor believes is Extra Work, or the need for additional time, and the Contractor has also made a request for a written Change Order that was not granted, then the Contractor shall keep an accurate account of the "actual field cost", as provided in Method (C) above, and then within ten (10) business days file a written Objection and Appeal of the disputed directly with the Owner (with a copy to the City Manager) explaining his objection to the decision. It is intended that the Contractor follow these instructions and the instructions regarding disputes found in sections 14 and 47. The Parties agree that this is the only way the Contractor can preserve the right to submit the matter of payment/time to mediation and (only if mediation does not resolve the dispute) to litigation. This procedure must be followed in all Extra Work disputes, and is a condition precedent for both mediation and litigation.

25. DISCREPANCIES AND OMISSIONS: It is further agreed that it is the intent of this contract that all work described in the proposal, the specifications, plans and other contract documents, shall be done for the prices quoted by the Contractor and that such price shall include all appurtenances necessary to complete the work in accordance with these contract documents as interpreted by Owner's Representative.

If the Contractor finds any discrepancies, omissions, or ambiguities in the plans, specifications, or contract documents, the Contractor should notify the Owner's Representative and obtain clarification and/or correction to such discrepancies, omissions, or ambiguities before the bid opening time. It shall be considered that the Contractor fully understands the work to be performed and has provided sufficient sums in the proposal to complete the work in accordance with these plans. It is further understood that any request for clarification must have been submitted no later than five (5) business days prior to opening of bids.

26. RIGHT OF OWNER TO MODIFY METHODS AND EQUIPMENT: If, at any time, the methods or equipment used by the Contractor are found to be inadequate to
secure the quality of work or the rate of progress required under this contract, the Owner or Owner's Representative may order the Contractor, in writing, to increase safety or improve character and efficiency, and the Contractor shall comply with such order.

If at any time the work force of the Contractor is inadequate for securing the progress of the contract, as determined by the Owner’s Representative or Engineer, the Contractor shall, if so ordered in writing, increase the workforce or equipment, at Contractor’s sole expense, to such extent as to give reasonable assurance of compliance with the schedule of progress.

27. INDEMNIFICATION; PROTECTION AGAINST ACCIDENT TO EMPLOYEES AND PUBLIC: The Contractor shall procure Workmen's Compensation Insurance with an insurance company licensed to transact business in the State of Texas. Such policy shall comply with the Workmen's Compensation laws of the State of Texas. The Contractor shall at all times exercise reasonable precaution for the safety of employees and others on or near the work site and shall comply with all applicable provisions of federal, state, and municipal laws and building and construction codes. All machinery and equipment and other physical hazards shall be guarded in accordance with the "Manual of Accident Prevention in Construction" of Associated General Contractors of America, except where incompatible with federal, state or municipal laws or regulations.

INDEMNITY CLAUSE: THE CONTRACTOR, SURETIES, AND INSURANCE CARRIERS SHALL DEFEND, INDEMNIFY AND SAVE HARMLESS THE OWNER AND ALL OF ITS OFFICERS, AGENTS AND EMPLOYEES FROM AND AGAINST ANY CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS AND LIABILITY OF EVERY KIND, INCLUDING ALL EXPENSES ASSOCIATED WITH DEFENSE AGAINST THE CLAIM, WHERE THE CLAIM/LOSS/DAMAGE/CAUSE OF ACTION/SUIT/LIABILITY IS BASED ON ANY TORTIOUS OR NEGLIGENT ACT, OMISSION OR FAULT OF THE CONTRACTOR OR ANY SUBCONTRACTOR, THEIR AGENTS OR EMPLOYEES.

The Contractor or any subcontractor shall provide necessary barricades, warning lights, or signs. Contractor shall forfeit to Owner an amount equal to any assessment against the Owner or any of its officers, agents, or employees for the payment of any judgment, including attorney fees, or portion thereof, resulting to Contractor’s negligence. The safety precautions taken shall be the sole responsibility of the Contractor. Inclusion of this paragraph in the Agreement, as well as any notice which may be given by the Owner or the Owner's Representative concerning omissions under this paragraph as the work progresses, are intended as reminders to the Contractor of the Contractor’s duty and shall not be construed as any assumption of duty to supervise safety precautions by either the Owner or Owners Representative.

Note that there are several indemnity clauses throughout the Contract Documents.
Notwithstanding any provision to the contrary, if there are conflicting enforceable indemnity provisions, then the clause that provides the most favorable indemnification to the Owner shall prevail.

28. **CONTRACTOR'S INSURANCE:** The Contractor shall refer to Invitation to Bid for required insurance.

29. **PROTECTION AGAINST CLAIM OF SUBCONTRACTORS, LABORERS, MATERIALMEN, AND FURNISHERS OF MACHINERY, EQUIPMENT AND SUPPLIES:** THE CONTRACTOR AGREES TO INDEMNIFY AND SAVE THE OWNER HARMLESS FROM ALL CLAIMS ARISING OUT OF ANY DEMANDS OF SUBCONTRACTORS, LABORERS, WORKERS, MECHANICS, MATERIALMEN, AND FURNISHERS OF MACHINERY AND PARTS THEREOF; ANY EQUIPMENT, POWER TOOLS, ALL SUPPLIERS, INCLUDING COMMISSARY, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THIS CONTRACT. When Owner so desires, and along with demand for final payment, the Contractor shall furnish satisfactory evidence that all obligations to third parties set forth above have been paid, discharged or waived.

If during the progress of the work, Contractor shall allow any indebtedness to accrue for work furnished by any of those designated in the preceding paragraph and shall fail to pay and discharge any such indebtedness within five (5) days after demand is made, then Owner may, during the period for which such indebtedness shall remain unpaid, withhold from the unpaid portion of this contract, a sum equal to the amount of such unpaid indebtedness or may apply the sum so withheld to discharge any such indebtedness at Owner’s option.

30. **PROTECTION AGAINST ROYALTIES OR PATENTED INVENTION:** The Contractor shall pay all royalties and license fees. Contractor shall provide for the use of any design, device, material or process covered by patents or copyrights by suitable legal agreement with the Patenteer or Owner thereof.

The Contractor shall defend all suits or claims for infringement of any patent or copyrights and shall indemnify, defend and save the Owner harmless from any loss on account thereof. Owner shall defend all such suits and claims and shall be responsible for all such loss when a particular manufacturer or manufacturers is specified or required in these contract documents by Owner; provided, however, if choice of alternate design, device, material or process is allowed to the Contractor, then Contractor shall indemnify, defend, and save Owner harmless from any loss on account thereof.

If the material or process specified or required by Owner is a patent infringement, the Contractor shall be responsible for such loss if the Contractor had the option to use other materials or processes and did not
promptly gives written notice to the Owner prior to such infringement.

31. **LAWS AND ORDINANCES:** The Contractor shall at all times observe and comply with all Federal, State and local laws, codes, ordinances, rules and regulations. Contractor shall indemnify, defend, and save harmless the Owner against any claims arising from the violation of any such laws and ordinances, codes and regulations, whether by the Contractor, Contractor's employees or third parties. If the Contractor observes that the plans and specifications are at variance with a law, ordinance, code, rule or regulation, Contractor shall promptly notify the Owner's Representative in writing and request the necessary changes with adjustments as provided in the contract for changes in the work. If the Contractor performs any work contrary to such laws, ordinances, rules, codes and regulations, and without such notice to the Owner's Representative, Contractor shall bear all costs of remediation. This paragraph additionally requires Contractor to obtain all necessary permits at Contractor’s expense.

The Owner is a municipal corporation of the State of Texas. All laws applicable to municipal corporations, or the conditions or manner under which the Owner may enter into contracts, shall be controlling and shall be considered part of this contract to the same effect as though embodied herein. Provisions in violation of applicable laws are void.

32. **ASSIGNMENT AND SUBLETTING:** The Contractor agrees to retain personal control and give personal attention to the fulfillment of this contract. The Contractor further agrees that subletting of any portion or feature of the work, or materials required in the performance of this contract shall not relieve the Contractor from the Contractor’s full obligation to the Owner.

33. **TIME FOR COMPLETION AND LIQUIDATED DAMAGES:** Time for completion is set out in the Invitation to Bid for this project, usually in the paragraph concerning “Liquidated damages”. It is hereby understood and mutually agreed by and between the Contractor and the Owner, that the date of beginning and time for completion as specified in the Contract of work to be done hereunder are essential conditions of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the Notice to Proceed.

If the Contractor should neglect, fail, or refuse to complete the work within the time specified, or any proper extension of time granted by the Owner, then Contractor agrees that the Owner may withhold permanently from Contractor's total compensation, the sum stated in the Special Conditions of the Agreement Paragraph 18, not as a penalty, but as liquidated damages for the breach of the contract as set forth for each and every calendar day that the Contractor is in default after the time stipulated for completing the work.
It is expressly understood and agreed, by and between Contractor and the Owner, that the time for the completion of the work described is a reasonable time for the completion of the same, taking into consideration the average climatic change and conditions and usual industrial conditions prevailing in this locality.

The amount for liquidated damages is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty in fixing and ascertaining actual damages the Owner would in such event sustain. The amount is agreed to be damages the Owner would sustain and shall be retained by the Owner from current periodical estimates for payments or from final payment.

It is further agreed and understood between the Contractor and Owner that time is of the essence of this contract.

34. **TIME AND ORDER OF COMPLETION:** It is the meaning and intent of this contract, unless otherwise specifically provided, that the Contractor shall be allowed to prosecute the work at such time and sessions, in such order of precedence, and in such manner as shall be most conductive to economy of construction. However, the order and time of prosecution shall be such that the work shall be substantially completed as a whole and in part, in accordance with this contract, the plans and specifications and within the time of completion designated in the Invitation to Bid and or proposals. When the Owner is having other work done, the Owner's Representative may direct the time and order of work done under this contract, so that conflicts will be avoided and the construction of the various jobs shall be harmonized.

The Contractor shall submit, along with the first request for payment, and at such other times as requested by the Owner's Representative, schedules that shall show the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the several parts of the work, and estimated dates of completion of the several parts.

35. **EXTENSION OF TIME:** The Contractor agrees that the Contractor’s proposal has been submitted in full recognition of the time required for the completion of this project, taking into consideration the average climatic range, possible rain days, and industrial conditions prevailing in this locality, and has considered the liquidated damage provisions of paragraph 33. Contractor shall not be entitled to an extension of time on this contract, except when the work has been delayed by an act or neglect of the Owner, Owner's Representative, employees of the Owner or other Contractors employed by the Owner; by changes ordered in the work; by strike, walk-outs, acts of God, or public enemies, fire or flood. Contractor may request extensions of time to complete the contract if he does so in writing to the Owner’s Representative within ten (10) business days after the event causing the delay. Untimely requests for
extensions of time shall be denied and the Contractor’s right, if any, to payment and or extra time is waived. Additionally, Contractor shall notify Owner promptly whenever there is reason to believe that Contractor may be unable to complete the project timely.

The Owner’s Representative decide the request for additional time, and notify the Contractor. Should the Contractor disagree with the action of the Owner’s Representative denying or reducing the Contractor’s request for additional time, the Contractor shall present the matter by certified mail to the Owner with a copy to the City Manager within ten (10) business days. Denied requests not timely submitted for review as set out herein are waived. It shall be a condition precedent for mediation and then litigation if necessary, that the Owner denied or reduced Contractor’s request for additional time. To the extent the extension is Granted, the Contractor must promptly make a written request for a Change Order.

36. **HINDRANCES AND DELAYS:** In executing the contract agreement, the Contractor agrees that in undertaking to complete the work within the required time, the Contractor has taken into consideration and made allowances for all hindrances and delays incident to such work, whether arising out of delays in securing material or workers or otherwise. No charge shall be made by the Contractor for hindrances or delays from any cause during the progress of any part of the work embraced in this contract except if a Change Order has been obtained because the work was stopped by order of the Owner or Owner's Representative for the Owner's convenience, in which event such expense as in the judgment of the Owner's Representative and the Owner that is caused by such stoppage shall be paid by Owner to Contractor. Costs caused by delays or activities of a subcontractor or other third parties under the supervision of the Contractor, shall be the responsibility of the Contractor.

Force Majeure: If by reason of Force Majeure either party shall be rendered unable, wholly or in part, to carry out its responsibilities under this contract by any occurrence by reason of Force Majeure, then the party unable to carry out its responsibility shall give the other party notice and full particulars of such Force Majeure in writing within a reasonable time after the occurrence of the event, and such notice shall suspend the party’s responsibility for the continuance of the Forced Majeure claimed, but for no longer period. Force Majeure means acts of God, floods, hurricanes, tropical storms, tornadoes, earthquakes, or other natural disasters, acts of public enemy, acts of terrorism, sovereign conduct, riots, civil commotion, strikes or lockouts, and other causes that are not occasioned by either Party’s conduct which by the exercise of due diligence the party is unable to overcome and which substantially interferes with operations.

37. **QUANTITIES AND MEASUREMENTS:** No extra or customary
measurements of any kind will be allowed, but the actual measured or computed length, area, solid contents, number and weight only shall be considered, unless otherwise specifically provided.

In the event this contract is let on a unit price basis, then Owner and Contractor agree that this contract, including the specifications, plans and other contract documents are intended to show clearly all work to be done and material to be furnished hereunder. Where the estimated quantities are shown for the various classes of work to be done and material to be furnished under this contract, they are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing their proposals offered for the work. It is understood and agreed that the actual amount of work to be done and the materials to be furnished under this contract may differ somewhat from these estimates, and that where the basis for payment under this contract is the unit price method, payment shall be for the actual amount of work done and materials furnished on the project. Notwithstanding the foregoing, however, the Contractor must notify the Owner’s Representative in writing (with a copy to the City Manager) as soon as the Contractor is within $15,000 of the amount authorized for the entire project by City Council less retainage. The Contractor will not be paid more than the amount authorized by City Council unless the City Council approves a Change Order increasing the total contract amount. Should the Contractor fail to give this advance notice and continue to work on the project so that the total payment due would exceed the amount authorized by City Council, the Contractor waives any and all rights to payment for the work exceeding the authorized sum.

38. **PROTECTION OF ADJOINING PROPERTY:** The Contractor shall take proper measures to protect the adjacent or adjoining property or properties which may be injured or seriously affected by any process of construction. Contractor shall be liable for any and all claims for such damage resulting from the Contractor’s failure to fully protect all adjacent property. **THE CONTRACTOR AGREES TO INDEMNIFY, DEFEND, SAVE AND HOLD HARMLESS THE OWNER AGAINST ANY CLAIMS FOR DAMAGES (AND EXPENSES FOR DEFENDING SAME) DUE TO ANY INJURY TO ANY ADJACENT OR ADJOINING PROPERTY, ARISING OR GROWING OUT OF CONTRACTOR’S PERFORMANCE OF THIS CONTRACT.** Such indemnity shall not apply to any claim arising out of the mere existence or character of the work.

39. **PRICE FOR WORK:** In consideration of the furnishing all necessary labor, equipment and material, and the completion of all work by the Contractor, and on the delivery of all material embraced in this contract in full conformity with the specifications and stipulations, the Owner agrees to pay the Contractor the prices set forth in the attached proposal, which has been made a part of this contract. The Contractor agrees to receive such prices as full compensation, including but not limited to furnishing all materials and all
labor required for the work, and for all expenses incurred by the Contractor, in performing the same, in the manner and according to this Agreement, the attached specifications, plans, contract documents and requirements of Owner's Representative.

40. **PAYMENTS:** No payments made or certificates given shall be considered as conclusive evidence of the performance of the contract, either wholly or in part. No payments made or certificates given shall be considered as acceptance of defective work. Contractor shall, at any time requested during the progress of the work, furnish the Owner or Owner's Representative with a verifying certificate showing the Contractor's total outstanding indebtedness in connection with the work. Before final payment is made, Contractor shall satisfy Owner, by affidavit or otherwise, that there are no outstanding claims for payment, or liens against Owner's premises, by reason of any work under the contract.

Acceptance by Contractor of final payment of the contract price shall constitute a waiver of all Contractor’s claims against Owner which have not been timely filed as provided in this contract.

41. **PARTIAL PAYMENTS:** On or before the 5th day of each month the Contractor shall submit to Owner's Representative an application for partial payment. Owner's Representative shall review the application for partial payment and the progress of the work made by the Contractor. If Owner’s Representative finds Contractor’s application to be in order, Owner’s Representative shall prepare a certificate for partial payment showing as completely as practical the total value of the work done by the Contractor up to and including the last day of the preceding month and the value of all sound materials delivered on site of the work that are to be fabricated into the work.

The Owner shall then pay the Contractor on or before the fifteenth day of the current month the total amount of the Owner's Representative Certificate of Partial Payment, less a percentage retained until final payment. The percentage of payment retained is determined by the contract amount. Five (5) percent shall be retained, if total contract award is $400,000 or more. If total contract award is less than $400,000, 10% will be retained. Such 5 or 10 percent shall be retained until final payment is made. However, it is understood that in case the whole work is near to completion and some unexpected and unusual delay occurs due to no fault or negligence on the part of the Contractor, the Owner may upon written recommendation of Owner's Representative pay a reasonable and equitable portion of the retained percentage due Contractor.

42. **FINAL COMPLETION AND ACCEPTANCE:** Within thirty-one (31) days after the Contractor has given the Owner's Representative written notice that
the work has been completed, or substantially completed, the Owner's Representative and the Owner shall inspect the work. If

(a) the work is found completed or substantially completed in accordance with the contract documents, and

(b) the Contractor has provided the Owner's Representative a set of “as built” drawings, the Owner's Representative shall issue to the Owner and Contractor a certificate of completion. The work shall not be considered “completed” or “substantially completed” in accordance with the contract until such time as the certificate has been issued; and no certificate shall be issued until the Owner has been given “as-built” drawings of the project by the Contractor.

43. FINAL PAYMENT: Upon the issuance of the Certificate of Completion the Engineer shall make final measurements and prepare a final statement of the value of all work performed and materials furnished under the terms of the Agreement plus a statement of all outstanding and unsettled claims and a list of any work that Contractor must correct or complete and shall certify this statement to the Owner. The Owner shall pay to the Contractor on or before the 31st day after the date of the Certificate of Completion the balance due the Contractor under the terms of the Agreement, provided the Contractor has fully performed all contractual obligations under the terms of this Contract. The payment shall become due in any event upon performance by the Contractor. Neither the Certificate of Completion, the final payment, nor any provision in the Contract Documents, shall relieve the Contractor of any obligation under this contract, or of the obligation for fulfillment of any warranty which may be required in the Special Conditions of this contract or required in specifications made a part of this contract. Acceptance of final payment by the Contractor, a subcontractor, or a material supplier shall constitute a waiver of claims by that payee, except for those claims previously made in writing and identified in writing by that payee as unsettled at the time of final application for payment.

44. CORRECTION OF WORK BEFORE FINAL PAYMENT FOR WORK: Contractor shall promptly remove from Owner's premises all materials whether actually incorporated in the work or not, condemned by the Owner's Representative. Contractor shall at Contractor's own expense promptly replace such condemned materials with other materials conforming to the requirements of the contract. Contractor shall also bear the expense of restoring all work of other Contractors damaged by any such removal or replacement. If Contractor does not remove and replace any such condemned work within a reasonable time after a written notice by the Owner or the Owner's Representative, Owner may remove and replace the materials at Contractor's expense.

45. CORRECTION OF WORK AFTER FINAL PAYMENT: Neither the final
payment nor certificate of completion nor any provision in this contract shall relieve the Contractor of responsibility for faulty materials or workmanship. Contractor shall immediately remedy any defects and pay for any damage to other work resulting from any defects that appear within a period of one (1) year from the date of final completion. The Owner or Owner's Representative shall give notice of observed defects with reasonable promptness.

46. **PAYMENT WITHHELD:** The Owner may, upon subsequently discovering defects in the work, withhold payment if any monies remain and/or nullify the whole or part of any certificate to such extent as may be necessary to protect the Owner from loss caused by:

(a) Defective work not remedied.
(b) Claims filed or reasonable evidence indicating possible filing of claims.
(c) Failure of the Contractor to make payments promptly to sub-Contractors or to pay for material or labor; or
(d) Damage to another Contractor.

When the above are cured, or the Contractor provides a surety bond protecting the amounts withheld, satisfactory to the Owner, payment shall be made.

47. **TIME OF FILING CLAIMS:** It is further agreed by both parties that all questions of dispute or adjustment presented by the Contractor shall be in writing and filed with the Owner's Representative within ten (10) business days after the disputed action is known to Contractor or could have been known if Contractor had been diligent, Contractor must obtain a written denial from the Owner’s Representative to proceed further with any claim. Contractor must then (within 10 business days) file a written objection and appeal of the disputed decision, to the Owner (with copy to the City Manager in the same time period), fully explaining the disputed matter.

In case the Contractor does not agree with the Owner’s decision and wishes to litigate that decision, Contractor shall—within 10 days of the Owner’s decision—first file a written demand for mediation with the Owner's Representative with a copy to the City Manager, Mediation is a condition precedent to litigation. It is further agreed that acceptance by the Contractor of the final payment shall be a bar to any claim by Contractor, except as noted otherwise in the contract documents. See also section 14.

48. **ABANDONMENT BY CONTRACTOR:** In case the Contractor should abandon and fail or refuse to resume work within ten (10) days after written notification from the Owner or the Owner's Representative, or if the Contractor fails to comply with the orders of the Owner's Representative, when such orders are consistent with this contract, the Owner shall notify the Surety on the bond, in writing. The Owner shall direct the Surety to complete the work and a copy of said notice shall be delivered to the Contractor.
After receiving a copy of Owner’s notice to the Surety, the Contractor shall not remove from the job site any machinery, equipment, tools, materials, or supplies, materials and equipment for use on the job, by the Owner, the Surety of the Contractor, or another Contractor, for completion of the work. The Contractor shall not receive any rental or credit for such use. Contractor agrees and understands that the use of such equipment and materials will ultimately reduce the cost to complete the work and be reflected in the final settlement.

In case the Surety should fail to commence compliance with Owner’s notice for completion, within ten (10) days after receipt of such notice, then the Owner may provide for completion of the work in either of the following manners:

(a) The Owner may employ such force of workers, use of machinery, equipment, tools, materials and supplies as Owner may deem necessary to complete the work. Owner may charge the expense of such labor, machinery, equipment, tools, materials and supplies to Contractor, and the expense so charged shall be deducted and paid by the Owner out of monies as may be due, or that may become due to the Contractor under and by virtue of this agreement. If such expense is less than the sum which would have been payable to Contractor under this contract, if the same had been completed by the Contractor, then Owner shall pay the difference to the Contractor. In case such expense is greater than the sum which would have been payable under this contract, if the same had been completed by the Contractor, then the Contractor or the Contractor’s Surety shall pay the amount of such excess to the Owner; or

(b) The Owner, under sealed bids, after notice published as required by law, at least twice in a newspaper having a general circulation in the County of location of the work, may let the contract for the completion of the work under substantially the same terms and conditions which are provided in this contract. In case of any increase in cost to the Owner under the new contract, as compared to what would have been the cost under this contract, such increase shall be charged to the Contractor and the Surety shall be and remain bound therefore. However, should the cost to complete any such new contract prove to be less than that which would have been the cost to complete the work under this contract, the Contractor and Contractor’s Surety shall be credited with the difference between the new contract and this contract.

When the work has been completed or substantially completed, the Contractor and Surety shall be so notified and a certificate of completion issued, as provided in paragraph 42.

A complete itemized statement of the contract accounts, certified to by the
Owner's Representative as being correct shall be prepared and delivered to Contractor and Contractor’s Surety. Upon delivery to the Contractor or Contractor’s Surety, the Contractor or Surety shall pay the balance due, if any, as reflected by the statement, within thirty (30) days after the date of certificates of completion. Contractor and Surety shall be held jointly and severally liable for any balance due.

In the event the statement of accounts shows that the cost to complete the work is less than the cost to the Owner had the work been completed by the Contractor under the terms of this contract, or when the Contractor and Surety shall pay the balance shown to be due by them to the Owner, then all machinery, equipment, tools, materials or supplies left on the site of the work shall be released to the Contractor and/or its Surety. Should the cost to complete the work exceed the contract price, and amount due the Owner within the time designated, and there remains any machinery, equipment, tools, materials or supplies on the site of the work, Owner shall mail notice of amounts due, together with an itemized list of such equipment and materials to the Contractor and its Surety. After mailing such notice, such property shall be held at the risk of the Contractor and its Surety, subject only to the duty of the Owner to exercise ordinary care to protect such property.

After fifteen (15) days from the date of receipt of notice, the Owner may sell all machinery, equipment, tools, materials or supplies and apply the proceeds, less costs and expense of the sale to the credit of the Contractor and its Surety. Such sale may be made at either public or private sale, with or without notice, as the Owner may elect. The Owner shall release any machinery, equipment, tools, materials or supplies which remain on the job site that belong to persons other than the Contractor or its Surety, to their lawful owners.

49. **ABANDONMENT BY OWNER:** If the Owner shall fail to comply with the terms of this contract and refuses to comply with such terms within ten (10) days after the receipt of written notification by the Contractor, then the Contractor may suspend or wholly abandon the work, and may remove all machinery, tools and equipment and all materials on the ground that have not been included in the payments to the Contractor or incorporated into the work.

The Owner's Representative shall make an estimate of the total amount earned by the Contractor, which estimate shall include the value of all work actually completed by said Contractor, at the prices stated in the attached proposal, the value of all partially completed work, at fair and equitable price, and the amount of all authorized Extra Work performed at the prices agreed upon or as provided for by the terms of this contract, and a reasonable sum to cover the cost of any provisions made by the Contractor to complete the work, and which cannot be utilized. The Owner's Representative shall then make a final statement of the balance due the Contractor by deducting from the above
estimate all previous payments by the Owner and all other sums that may be retained by the Owner under the terms of this Agreement. Owner’s Representative shall certify the final statement to the Owner who shall pay to the Contractor on or before thirty (30) days after the date of Owner’s receipt of certification, the balance shown by the final statement. In no event shall Owner owe more than the amount authorized by City Council.

50. **BONDS:** The successful bidder shall be required to furnish a performance bond and payment bond, in accordance with Tex. Gov’t. Code, section 2253.001, et seq., in the amount of 100% of the total contract price, in the event the contract price exceeds $50,000.00. If the contract price does not exceed $50,000.00 and payment for work shall be made in one lump sum payment after completion and final acceptance of the work, the Owner shall not require the statutory bonds.

All bonds, if required, shall be submitted on forms supplied by the Owner, and executed by an approved surety company authorized to do business in the State of Texas. It is further agreed that this contract shall not be in effect until such bonds are so furnished and accepted by the Owner.

51. **SPECIAL CONDITIONS:** In the event special conditions are contained in these contract documents and such special conditions conflict with any of the general conditions contained in these documents, the special conditions shall control.

52. **LOSSES FROM NATURAL CAUSES:** Unless otherwise stated, all loss or damage to the Contractor arising out of the nature of the work to be done or from unusual obstructions or difficulties which may be encountered in the prosecution of the work, shall be sustained and borne by the Contractor at Contractor’s own cost and expense.

53. **INDEPENDENT CONTRACTOR:** Contractor is and shall remain an independent Contractor, with full, complete and exclusive power and authority to direct, supervise, and control Contractor’s own employees and to determine the method of the performance of the work covered by this contract.

The fact that the Owner or Owner's Representative shall have the right to observe Contractor's work during Contractor’s performance and to carry out the other prerogatives which are expressly reserved to and vested in the Owner or Owner's Representative, is not intended to and shall not at any time change or affect the status of the Contractor as an independent Contractor, with respect to either the Owner or Owner's Representative or to the Contractor's own employees or to any other person, firm or corporation.

54. **CLEANING UP:** The Contractor shall at all times keep the premises free from accumulations of debris and at the completion of the work, shall remove all
such debris and all tools, scaffolding and surplus materials and shall leave the
worksite broom clean or its equivalent. The work shall be left in good order
and condition. In case of dispute or should Contractor fail to clean the
premises, Owner may remove the debris and charge the cost to the Contractor.

55. **CONTRACTOR'S RIGHT TO TERMINATE:** The Contractor shall have the
right to terminate the contract at any time when, through no fault of the
Contractor, circumstances beyond the Contractor's control, such as a declared
emergency, occur which prohibit the completion of the agreement as
contemplated by the parties at the time of execution. Should the Contractor
choose to terminate this agreement, except as set forth above, Contractor shall
accrue no rights to full payment and shall receive only a pro rata payment for
the work actually performed and accepted by Owner, and the amount of such
payment shall be assessed by Owner. Should the Contractor choose not to
terminate even though cause exists under this provision, liquidated damages,
as set forth in these documents shall remain in full force and effect.

56. **OWNER'S RIGHT TO TERMINATE CONTRACT:** In the event any of the
provisions of this contract are violated by the Contractor, or by any of his
subcontractors, the Owner may serve written notice upon the Contractor and
the Surety of its intention to terminate this contract. Such notices shall
contain the reasons for such intention to terminate the contract. Unless
within ten (10) days after the serving of such notice upon the Contractor, the
violation or delay ceases and satisfactory arrangements for correction of any
violation are made, the contract shall, upon the expiration of the ten (10)
days, cease and terminate. In exceptional cases where life or property is in
danger, Owner may terminate the Contract immediately. In the event of any
termination, the Owner shall immediately serve notice of termination upon the
Surety and Contractor. The Surety shall have the right to perform the
contract. If the Surety does not commence performance of the contract within
ten (10) days from the date of the receipt of Owner’s notice of termination, the
Owner may assume the work and prosecute the same at the expense of the
Contractor and its Surety. The Contractor and its Surety shall be liable to the
Owner for any excess cost occasioned by the Owner. In such event, the Owner
may take possession of and utilize, in completing the work, such materials,
appliances, and plant as may be on the site of the work and necessary. The
Owner may also terminate as set out in the bid documents.

57. **SEVERABILITY CLAUSE:** The phrases, clauses, sentences, paragraphs or
sections of these conditions are severable. If any phrase, clause, sentence,
paragraph, or section of these conditions should be declared invalid by the
final decree or judgment of any court of competent jurisdiction, such invalidity
shall not affect any of the remaining phrases, clauses, sentences, paragraphs
and sections of these conditions.

58. **ENTIRE AGREEMENT:** The contract between the parties includes these
General Conditions, No modifications of, or waiver of any right under, the contract will be effective unless it is evidenced in writing executed by an authorized representative of each Party to the contract.

59. The parties agree that if there is litigation concerning this Contract, jurisdiction shall be in Texas state courts, and venue shall be in Galveston, County. Texas state law shall apply.
SPECIAL CONDITIONS OF THE AGREEMENT

1. ABBREVIATIONS DEFINED: Abbreviations, wherever used in the various documents of the contract, are defined as follows:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
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<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
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<td>AIEE</td>
<td>American Institute of Electrical Engineers</td>
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<td>AISC</td>
<td>American Institute of Steel Construction</td>
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<td>API</td>
<td>American Petroleum Institute</td>
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<td>AREA</td>
<td>American Railway Engineers Association</td>
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<td>ASA</td>
<td>American Standards Association</td>
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<td>Asph.</td>
<td>Asphalt</td>
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<td>ASTM</td>
<td>American Society of Testing and Materials</td>
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<tr>
<td>AT&amp;SF</td>
<td>Atchinson, Topeka and Santa Fe Railroad</td>
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<td>Ave.</td>
<td>Avenue</td>
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<td>AWS</td>
<td>American Welding Society</td>
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<td>AWWA</td>
<td>American Waterworks Association</td>
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<td>Blvd.</td>
<td>Boulevard</td>
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<td>CI</td>
<td>Cast Iron</td>
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<td>CL</td>
<td>Center Line</td>
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<td>cm</td>
<td>Centimeter</td>
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<td>CO</td>
<td>Cleanout</td>
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<td>Conc.</td>
<td>Concrete</td>
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<td>CGMP</td>
<td>Corrugated Galvanized Metal Pipe</td>
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<td>Cu.</td>
<td>Cubic</td>
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<td>Culv.</td>
<td>Culvert</td>
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<td>CY</td>
<td>Cubic Yard</td>
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<td>Dia.</td>
<td>Diameter</td>
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<td>Dr.</td>
<td>Driveway</td>
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<td>Elev.</td>
<td>Elevation</td>
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<td>F</td>
<td>Fahrenheit</td>
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<td>FS</td>
<td>Federal Specifications</td>
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<td>Ft.</td>
<td>Foot or Feet</td>
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<td>'</td>
<td>Foot or Feet</td>
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<td>Gal.</td>
<td>Gallon</td>
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<td>HL&amp;P</td>
<td>Houston Lighting &amp; Power Co.</td>
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<td>HP</td>
<td>Horsepower</td>
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<td>Hr.</td>
<td>Hour</td>
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<td>ID</td>
<td>Inside Diameter</td>
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<td>In.</td>
<td>Inch or Inches</td>
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<td>&quot;</td>
<td>Inch or Inches</td>
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<td>IPCEA</td>
<td>Insulated Power Cable Engineers Association</td>
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<tr>
<td>Kg.</td>
<td>Kilogram</td>
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<td>Lb.</td>
<td>Pound</td>
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<td>LF</td>
<td>Linear Foot or feet</td>
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<td>M</td>
<td>Meter</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>Max.</td>
<td>Maximum</td>
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<td>MH</td>
<td>Manhole</td>
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<td>Min.</td>
<td>Minute</td>
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<td>mm</td>
<td>Millimeter</td>
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<td>No.</td>
<td>Number</td>
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<td>OD</td>
<td>Outside Diameter</td>
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<td>%</td>
<td>Percent</td>
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<td>PI</td>
<td>Plasticity Index</td>
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<td>psi</td>
<td>Pounds per Inch</td>
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<td>Sq In</td>
<td>Square Inch</td>
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<td>PVC</td>
<td>Polyvinyl Chloride</td>
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<td>R</td>
<td>Radius</td>
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<td>Reinf.</td>
<td>Reinforce or Reinforcing</td>
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<td>R/W</td>
<td>Right of Way</td>
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<td>R of W</td>
<td>Right of Way</td>
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<td>ROW</td>
<td>Right of Way</td>
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<td>San.</td>
<td>Sanitary</td>
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<td>Sec.</td>
<td>Second</td>
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<td>Sq.</td>
<td>Square</td>
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<td>St.</td>
<td>Street</td>
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<td>Std.</td>
<td>Standard</td>
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<tr>
<td>SWBT</td>
<td>Southwestern Bell Telephone Co.</td>
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<tr>
<td>SY</td>
<td>Square Yard</td>
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<tr>
<td>SUG</td>
<td>Southern Union Gas</td>
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<tr>
<td>TXDOT</td>
<td>Texas Department of Transportation</td>
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<td>Vert.</td>
<td>Vertical</td>
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<td>Vol.</td>
<td>Volume</td>
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<tr>
<td>WUT</td>
<td>Western Union Telegraph Company</td>
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<td>yd.</td>
<td>Yard</td>
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</table>

2. **MEASUREMENT:** Measurements required for construction or for determination of pay quantities shall be in accordance with the United States Standards Measurements and Weights.

3. **DATE OF SPECIFICATIONS:** All reference to standard specifications or manufacturer's installation directions shall mean the latest edition.

4. **FIGURED DIMENSIONS TO GOVERN:** Dimensions and elevations indicated on the drawings shall be accurately followed even though different from scaled measurements. No work indicated on the drawings, the dimensions of which are not indicated, shall be executed until dimensions have been obtained from the Engineer.

5. **CONTRACTOR TO CHECK DRAWINGS AND SCHEDULES:** The Contractor shall check all dimensions, elevations, and quantities indicated on the drawings and schedules furnished by the Engineer. The Contractor shall promptly notify the Engineer of any discrepancy between the drawings and the conditions on the ground, or any error or omission in drawings, or in the layouts as given by stakes, points, or instructions which the Contractor may discover in the course of the work. The Contractor will not be allowed to take advantage of any error or omission in the
drawings or contract documents.

Full instructions will be furnished by the Engineer should such an error or omission be discovered and the Contractor shall carry out such instructions as if originally specified.

6. **SHOP DRAWINGS, PRODUCT DATE AND SAMPLES:** Shop drawings are drawings, diagrams, schedules and other data specifically prepared for the work by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.

Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the work shall be judged.

The Contractor shall provide, review, approve, and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate Contractor, all shop drawings, product data and samples required by the contract documents.

By approving and submitting shop drawings, product data, and samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, or shall do so, and that the Contractor has checked and coordinated the information contained within such submittal with the requirements of the work and of the contract documents.

As the Engineer's review is only for general conformance with the requirements of the contract documents, the Contractor shall not be relieved of responsibility for any deviation from the requirements of the contract documents by the Engineer's approval of shop drawings, product data or samples, unless the Contractor has specifically informed the Engineer, in writing, of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Engineer's approval. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data or samples, to revisions other than those requested by the Engineer on previous submittal.

The Contractor shall be responsible for delays caused by rejection of the submittal of inadequate or incorrect shop drawings, product data or samples. The Contractor shall be responsible for ensuring that any "approved" copies of shop drawings bearing the approval of the Engineer are on the job site. The Contractor shall be responsible for providing all copies of approved shop drawings necessary for the construction operation.

The Contractor shall keep adequate records of submittal and approvals so that an accurate up-to-date record file is maintained at the job site at all times.
No portion of the work requiring submission of a shop drawing, product data, or sample shall be commenced until the submittal has been approved by the Engineer. All such portions of the work shall be in accordance with approved submittal.

7. PRODUCTION OF WORK: Before beginning construction operations, the Contractor shall submit to the Engineer for approval a chart or brief outlining the manner of prosecution of the work that the Contractor intends to follow in order to complete the contract within the allotted time.

8. NOTIFICATION OF ENGINEER PRIOR TO START OF WORK: The Contractor shall notify the Engineer at least twenty-four (24) hours before beginning work at any point. The Contractor shall not open up new work to the detriment of work already begun. The beginning, sequence, and prosecuting of the work shall be governed by the approval of the Engineer.

9. MATERIALS AND EQUIPMENT: Unless specifically provided in each case, all materials and equipment furnished for permanent installation in the work shall conform to applicable standard specifications and shall be new, unused and undamaged, when installed or otherwise incorporated in the work. No such material or equipment shall be used by the Contractor for any purpose other than that intended or specified, unless such use is specifically authorized by the Owner.

10. EQUIVALENT MATERIALS AND EQUIPMENT: Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specific item mentioned shall be understood as establishing the type, function, and quality desired. Other manufacturer's products will be accepted provided sufficient information is submitted to allow the Engineer to determine that the products proposed are equivalent to those named. Such items shall be submitted for review by the procedure set forth above. Contractor shall not use such items unless written approval by the Engineer is obtained.

Request for review of equivalency will not be accepted from anyone except the Contractor and such request will not be considered until after the contract has been awarded.

11. UTILITY SERVICE FOR CONSTRUCTION: Contractor shall contract for all utility service required for the construction of this project. Contractor shall pay all charges for same directly to the utility company involved. Contractor shall not operate any fire hydrants without first having a meter from the City of Galveston and having placed this meter on the hydrant. The Contractor shall operate fire hydrant(s) only with an approved hydrant wrench.

12. RIGHTS OF WAY AND EASEMENTS: The Owner will furnish all right-of-way easements required for the proposed work.

13. LOCATION OF AND DAMAGE TO EXISTING UTILITIES: The Contractor shall exercise caution to prevent damage to existing utilities during the progress of the construction work, taking care to locate same, where possible, in advance of the actual work. Upon written request by the Contractor, the Engineer will render assistance to
the Contractor in determining the location of existing utilities by making such maps, records and other information as may be accessible to the Engineer. The accuracy of such information will not be guaranteed. The Contractor shall make good all damage to existing utilities resulting from Contractor’s operations.

Where a pipe, duct or other structure of a utility is exposed, which in the opinion of the Engineer requires strengthening, altering or moving, the Contractor shall perform such work as the Owner may order, which may be paid for as extra work in accordance with the terms of the contract relating to extra work.

Should the Contractor, in the laying out of the work, encounter any pipe, underground utility, or structure, the location of which has not been furnished to him by the Engineer, the Contractor shall bring such conditions to the attention of the Engineer for a determination of the method to be used to remove or bypass obstructions.

14. PROTECTION AND REPLACEMENT OF PROPERTY: Where necessary, Contractor shall remove signs or other obstructions, and replace all signs in their original condition and restore damaged property or make satisfactory restitution to the Owner.

15. SIGNS AND BARRICADES: All signs, barricades and other warning devices used to guide, warn or protect traffic in, around and through the construction area shall be provided and maintained by the Contractor in a manner suitable to and/or as directed by the Engineer. All such signs, barricades and warning devices shall conform to the Texas Manual on Uniform Traffic Control Devices, Part VI.

16. USE OF STREETS:
   (a) The Contractor will be permitted to erect such barricades as the Contractor deems necessary to prohibit the encroachment of vehicular or pedestrian travel within the work area or storage area. However, no barricades shall be erected to obstruct the free passage of traffic in any highway, alley or street without the approval of the Director of Traffic and Transportation.
   (b) Contractor shall not block ditches, inlets, fire hydrants, driveways, etc., without obtaining advance approval from the appropriate authorities. Where necessary, Contractor shall provide temporary drainage.

17. CONTRACTOR WARRANTY: The Contractor warrants that materials and equipment furnished under the contract will be of good quality and new, unless otherwise required or permitted by the contract documents. The Contractor warrants the work will be free from defects not inherent in the quality required or permitted, and the work will conform with the requirements of the contract documents. Work not conforming to the contract documents, including substitutions not properly authorized and approved, may be considered defective. Upon demand, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty shall apply to any extra work and corrective work, as well as the original work specified in the contract documents.

18. LIQUIDATED DAMAGES: Contractor shall be liable for liquidated damages in the amount specified in the Invitation to Bid for this project should the work not be
completed within the period specified for completion of the project. Additionally, Contractor may be liable for the loss of any grant moneys associated with this project due to Contractor’s delay.

19. **GENERAL PREVAILING WAGE RATES:** The City of Galveston has adopted the following schedule of general prevailing rate of per diem wages which establish the minimum wages which may be paid for labor on this contract. That schedule is shown in the General Decision Number provided within these documents.

The bidder's attention is directed to the provisions of Ch. 2258 of the Texas Government Code, and the requirements concerning such wage scales and payments by the Contractor of the prevailing rates of wages as established by the City of Galveston.

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 (29 CFR 5.5 (a) (1) (ii)).

These prevailing wage rates are subject to change by the City prior to bid opening date. Any changes shall be issued by addenda.

20. **COMPLIANCE WITH AIR AND WATER ACTS:**
   (a) In compliance with the Clean Air Act, as amended, 41 U.S.C. Sec. 7401 et. seq., and the regulations of the Environmental Protection Agency with respect thereto, the Contractor agrees that:
   1) Any facility to be utilized in the performance of this contract or any subcontract shall not be a facility listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20.
   2) Contractor shall comply with all requirements of Section 114 of the Clean Air Act, as amended.
   (b) Materials utilized in the project shall be free of any hazardous materials, except as may be specifically provided for in the specifications.

If the Contractor encounters existing material on sites owned or controlled by the Owner or in material sources that are suspected by visual observation or smell to contain hazardous materials, the Contractor shall immediately notify the Engineer and the Owner. The Owner will be responsible for testing for and removal or disposition of hazardous materials on sites owned or controlled by the Owner. The Owner may suspend the work, wholly or in part during the testing, removal or disposition of hazardous materials on sites owned or controlled by the Owner.

21. **EQUAL EMPLOYMENT OPPORTUNITY**
   (a) The Contractor will not discriminate against any employee or the applicant for employment because of race, color, religion, sex, gender, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, gender, or national origin. Such action shall include, but not be limited to the following: employment, promotion, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training,
including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the owner.

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

(c) The Contractor will cause the foregoing provisions to be inserted in all subcontracts for any work covered by this project so that such provisions will be binding upon each subcontractor, provided that the foregoing provisions shall not apply to contracts or subcontracts for standard commercial supplies or raw materials.

(d) The Contractor shall take affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions.

(e) The Contractor and all subcontractors are encouraged to participate in voluntary associations which assist in fulfilling their affirmative action obligations.

(f) The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority.

(g) The Contractor shall not use the affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(h) The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts.

(i) Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents.

22. **AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES:**
The Contractor will not discriminate against any employee or applicant for employment because of disability in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with disabilities without discrimination based upon their disability in all employment practices such as the following: employment, promotion, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

23. **DUTIES IMPOSED BY SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974:** Contractor shall comply with Section 109 of the Housing and Community Development Act of 1974, as amended, which provides that:
No person in the United States shall on the ground of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under this program or activity which is funded in whole or in part with funds made available under this act.
24. THE PROVISION OF LOCAL TRAINING, EMPLOYMENT, AND BUSINESS OPPORTUNITIES:
   (a) To the greatest extent feasible opportunities for training and employment shall be given by Contractor (and its subcontractors) to lower income residents of the project area, and contracts for work in connection with the project shall to the greatest extent feasible be awarded to business concerns that are located in, or owned in substantial part by persons residing in the area of the project.
   (b) The Contractor shall include this section in every subcontract for work in connection with the project.

25. NON SEGREGATED FACILITIES: By entering this Contract, the Contractor certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees any segregated facilities at any of his establishments, or permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. As used in this paragraph the term "segregated facilities" means any waiting rooms, work areas, rest rooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise.

26. JOB OFFICES:
   (a) The Contractor and his subcontractors may maintain such office and storage facilities on the site as are necessary for the proper conduct of the work. These shall be located so as to cause no interference to any work to be performed on the site. The Owner shall be consulted with regard to locations.
   (b) Upon completion of the improvements, or as directed by the Owner, the Contractors shall remove all such temporary structures and facilities from the site, and leave the site of the work in the condition required by the Contract.
SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Summary of the Work including work by Owner, Owner furnished products, Work sequence, future Work, Contractor use of Premises, and Owner occupancy.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of the contract is for 2017 Neighborhood Projects for Miscellaneous Work detailed on the Plans and Bid Forms.

1.03 ALTERNATES

A. Alternate bids quoted on Bid Forms will be reviewed and accepted or rejected at Owner’s option.

B. Volunteer Alternates, any Alternate not specified in this Section, will not be considered.

C. Accepted Alternates will be identified in the Agreement Between the Owner and Contractor.

D. Bids will be evaluated on base bid price. After determination of lowest bidder, consideration will be given to Alternates and Bid Price adjustments and award will be made on the basis of the most advantageous bid as determined by the City.

1.04 WORK BY OWNER (NOT APPLICABLE)

1.05 OWNER FURNISHED PRODUCTS

A. Contractor’s Responsibilities:

1. Arrange and pay for product delivery to site.

2. Receive and unload products at site; jointly with Owner’s Representative, inspect for completeness or damage.

3. Handle, store, install, and finish products.
4. Repair or replace damaged items.

1.06 WORK SEQUENCE

A. Provide Work Sequence and Schedule prior to construction.

1.07 FUTURE WORK (NOT APPLICABLE)

1.08 UTILITY OUTAGE AND SHUTDOWN (NOT APPLICABLE)

1.09 OWNER OCCUPANCY

A. The Owner intends to occupy the entire portion of the Project by Final Completion Date on the Contract. Cooperate with the Owner to minimize conflict, and to facilitate the Owner’s operations. Coordinate Contractor's activities with Owner’s Representative.

B. Schedule work to accommodate this requirement.

C. If owner occupies any or all parts of the premises, this action does not signify substantial completion or any limits on the contractor’s liability or contractual responsibility of premises.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01015

CONTRACTOR’S USE OF PREMISES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Section includes general use of the site including properties inside and outside of rights-of-way, work affecting road, ramps, streets and driveways and notification to adjacent occupants.

1.02  RIGHTS-OF-WAY

A. Confine access and operations and storage areas to rights-of-way provided by Owner as stipulated in General Conditions of Agreement; trespassing on abutting lands or other lands in the area is not allowed.

B. Contractor may make arrangements, at Contractor's cost, for temporary use of private properties, in which case Contractor and Contractor's surety shall indemnify and hold harmless the Owner against claims or demands arising from such use of properties outside of rights-of-way. Any use of private property shall have a written agreement between the contractor and the property owner. Notify the City in writing of any agreements and provide written agreement with the landowner to the City. The Use of said site shall comply with all City ordinances and restrictions.

C. Restrict total length which materials may be distributed along the route of the construction at any one time to 1,000 linear feet unless otherwise approved by Owner’s Representative.

1.03  PROPERTIES OUTSIDE OF RIGHTS-OF-WAY

A. Altering the condition of properties adjacent to and along rights-of-way will not be permitted unless authorized by the Owner’s Representative, Owner and property owner.

B. Ways, means, methods, techniques, sequences, or procedures which will result in damage to properties or improvements in the vicinity outside of rights-of-way will not be permitted.

C. Any damage to properties outside of rights-of-ways shall be repaired or replaced to the satisfaction of the Owner’s Representative, Owner and property owner at no cost to the Owner or property owner.
1.04 USE OF SITE

A. Obtain approvals of governing authorities prior to impeding or closing public roads or streets. Do not close more than two consecutive intersections at one time unless approved by the Owner.

B. Notify the Owner’s Representative and the Owner a minimum of 72 hours prior to closing a street or a street crossing. Permits for street closures are required in advance and are the responsibility of the Contractor.

C. Maintain access for emergency vehicles including access to fire hydrants.

D. Avoid obstructing drainage ditches or inlets; when obstruction is unavoidable due to requirements of the Work, provide grading and temporary drainage structures to maintain unimpeded flow.

E. Locate and protect private lawn sprinkler systems which may exist on rights-of-ways within the site. Repair or replace damaged systems to condition equal to or better than that existing at start of Work.

F. Perform daily clean up of dirt outside the construction zone, and debris, scrap materials, and other disposable items. Keep streets, driveways, and sidewalks clean of dirt, debris and scrap materials. Do not leave buildings, roads, streets or other construction areas unclean overnight.

1.05 NOTIFICATION TO ADJACENT OCCUPANTS

A. Notify individual occupants in areas to be affected by the Work of the proposed construction and time schedule. Notification shall be not less than 72 hours or more than 2 weeks prior to work being performed within 200 feet, or as specified by the Owner, of the homes or businesses.

B. Include in notification names and telephone numbers of two company representatives for resident contact, who will be available on 24-hour call. Include precautions which will be taken to protect private property and identify potential access or utility inconvenience or disruption.

C. Submit proposed notification to Owner’s Representative for approval. Consideration shall be given to the ethnicity of the neighborhood where English is not the dominant language. Notice shall be provided in understandable language when required by Owner.

1.06 PUBLIC, TEMPORARY, AND CONSTRUCTION ROADS AND RAMPS
A. Construct and maintain temporary detours, ramps, and roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of the Work.

B. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment or exceptionally large or heavy trucks or equipment.

C. Construct and maintain access roads and parking areas as specified in Section 01500 - Temporary Facilities and Controls.

1.07 EXCAVATION IN STREETS AND DRIVEWAYS

A. Avoid hindering or needlessly inconveniencing public travel on a street or any intersecting alley or street for more than two blocks at any one time, except by permission of the Owner’s Representative.

B. Obtain the Owner’s Representative and Owner’s approval when the nature of the Work requires closing of any portion or an entire street. Permits required for street closure are the Contractor's responsibility. Avoid unnecessary inconvenience to abutting property owners.

C. Remove surplus materials and debris and open each block for public use as work in that block is complete.

D. Acceptance of any portion of the Work will not be based on return of street to public use.

E. Avoid obstructing driveways or entrances to private property.

F. Provide temporary crossing or complete the excavation and backfill in one continuous operation to minimize the duration of obstruction when excavation is required across drives or entrances. Closure of driveways overnight shall not be allowed unless approved by the Owner.

G. Provide barricades and signs in accordance with Section VI of the State of Texas Manual on Uniform Traffic Control Devices latest edition.

1.08 SURFACE RESTORATION

A. Restore site to condition existing before construction to satisfaction of the Owner and Owner’s Representative.

B. Repair paved area per the requirements of the plans and specifications.
C. Repair turf areas which become damaged per the requirements of the plans and specifications.

PART 2  P R O D U C T S - NOT USED

PART 3  E X E C U T I O N - NOT USED

END OF SECTION
SECTION 01025

MEASUREMENT AND PAYMENT

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Procedures for measurement and payment plus conditions for nonconformance assessment and nonpayment for rejected products.

1.02 AUTHORITY

A. Measurement methods delineated in Specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the Specification section shall govern.

B. Measurements and quantities submitted by the Contractor will be verified by the Owner’s Representative.

C. Contractor shall provide necessary equipment, workers, and survey personnel as required by Owner’s Representative to verify quantities.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantity and measurement estimates stated in the Agreement are for contract purposes only. Quantities and measurements supplied or placed in the Work and verified by Owner’s Representative shall determine payment as stated in the General Conditions.

B. If the actual Work requires greater or lesser quantities than those quantities indicated in the Bid Form, provide the required quantities at the unit prices contracted, except as otherwise stated in the General Conditions.

1.04 MEASUREMENT OF QUANTITIES

A. Measurement by Weight: Measured by unit of weight as submitted on certified load tickets.

B. Measurement by Volume:

1. Stockpiles: Measured by cubic dimension using mean length, width, and height or thickness.

2. Excavation and Embankment Materials: Measured by cubic dimension using cross-sections measured every 100-feet unless otherwise specified by the owner.
C. Measurement by Area: Measured by square dimension using mean length and width or radius.

D. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

E. Stipulated Price Measurement: By unit designated in the agreement.

F. Other: Items measured by weight, volume, area, or lineal means or combination, as appropriate, as a completed item or unit of the Work.

1.05 PAYMENT

A. Payment Includes: Full compensation for all required supervision, labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application or installation of an item of the Work; and Contractor's overhead and profit.

B. Total compensation for required Unit Price Work shall be included in Unit Price bid in Bid schedule. Claims for payment as Unit Price Work, but not specifically covered in the list of unit prices contained in Bid Schedule, will not be accepted.

C. No payment for stored material will be made unless stipulated or approved by owner.

D. Progress payments will be based on the Owner’s Representative’s observations and evaluations of quantities incorporated in the Work multiplied by the unit price.

E. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities determined by Owner & Owner’s Representative multiplied by the unit price for Work which is incorporated in or made necessary by the Work.

1.06 NONCONFORMANCE ASSESSMENT

A. Remove and replace the Work, or portions of the Work, not conforming to the Contract Documents.

B. If, in the opinion of Owner & Owner’s Representative, it is not practical to remove and replace the Work, the Owner & Owner’s Representative will direct one of the following remedies:

1. The nonconforming Work will remain as is, but the unit price will be adjusted to a lower price at the discretion of Owner & Owner’s Representative.

2. The nonconforming Work will be modified as authorized by the Owner & Owner’s Representative, and the unit price will be adjusted to a lower price at the discretion of Owner & Owner’s Representative, if the modified work is deemed to be less suitable than originally specified.
C. Specification sections may modify these options or may identify a specific formula or percentage price reduction.

D. The Owner’s Representative shall make a recommendation to the City on the assessment of nonconformance and adjustment of payment based on the nonconformance if such condition of nonconformance is not specifically resolved within the contract documents. The Owner will have final approval of the assessment and adjustment of payment.”

1.07 NONPAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable to Owner’s Representative.

2. Products determined as nonconforming before or after placement.

3. Products not completely unloaded from transporting vehicle.

4. Products placed beyond the lines and levels of the required Work.

5. Products remaining on hand after completion of the Work, unless specified otherwise.


PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01040
COORDINATION AND MEETINGS

PART 1   GENERAL

1.01 SECTION INCLUDES
   A. Section includes general coordination including preconstruction conference, and progress meetings.

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

1.03 ENGINEER AND REPRESENTATIVES
   A. The Owner’s Representative may act directly and is identified by name at the preconstruction conference.

1.04 CONTRACTOR COORDINATION
   A. Coordinate scheduling, submittals, and Work of the various Specifications sections to assure efficient and orderly sequence of installation of interdependent construction elements.
   
   B. Coordinate completion and clean up of Work for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
   
   C. Coordinate access to site for correction of nonconforming Work to minimize disruption of Owner's activities where Owner is in partial occupancy.

1.05 PRECONSTRUCTION CONFERENCE
   A. Owner’s Representative will schedule a preconstruction conference.
   
   B. Attendance Required: Owner’s Representatives, Consultants, Contractor, and major Subcontractors.
   
   C. Agenda:
      1. Distribution of Contract Documents
2. Designation of personnel representing the parties in Contract, and the Consultant.

3. Review of insurance

4. Discussion of formats proposed by the Contractor for schedule of values, and construction schedule

5. Procedures and processing of shop drawings and other submittals, substitutions, pay estimates or applications for payment, Requests for Information, Request for Proposal, Change Orders, and Contract closeout

6. Scheduling of the Work and coordination with other contractors

7. Review of Subcontractors and Suppliers

8. Procedures for testing

9. Procedures for maintaining record documents

10. Owner’s requirements

11. Construction Schedule

12. Storm Water Pollution Prevention Plan

13. Submittals and TPDES Requirements

14. Use of premises by Owner and Contractor

15. Safety and first aid procedures

16. Construction controls provided by Owner

17. Temporary utilities

18. Survey and layout

19. Security and housekeeping procedures

1.06 PROGRESS MEETINGS

A. Project meetings shall be held at Project field office or other location as designated by the Owner’s Representative. Meeting shall be held at monthly intervals, or more frequent intervals if directed by Owner’s Representative.
B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner’s representatives, and Consultants as appropriate to agenda topics for each meeting.

C. Owner or his representative will make arrangements for meetings, and recording minutes.

D. Owner or his representative will prepare the agenda and preside at meetings.

E. Contractor shall provide required information and be prepared to discuss each agenda item.

F. Agenda:

1. Review minutes of previous meetings
2. Review of Work progress schedule submittal, and pay estimates, payroll and compliance submittals
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 Request for Information and Request for Proposal status
7. Change order status
8. Review of off-site fabrication and delivery schedules
9. Maintenance of progress schedule
10. Corrective measures to regain projected schedules
11. Planned progress during succeeding work period
12. Coordination of projected progress
13. Maintenance of quality and work standards
14. Effect of proposed changes on progress schedule and coordination
15. Other items relating to Work
PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01045
CUTTING AND PATCHING

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Cutting, patching and fitting of Work to existing facilities, or to accommodate installation or connection of Work with existing facilities, or to uncover work for access, inspection or testing.

1.02 CUTTING AND PATCHING

A. Perform activities to avoid interference with facility operations and the Work of others in accordance with all provisions and sections of these specifications.

B. Execute cutting and patching, including excavation, backfill and fitting to:

1. Remove and replace defective Work or Work not conforming to the Drawings and Specifications.

2. Take samples of installed Work as required for testing.

3. Remove construction required to provide for specified alteration or addition to existing work.

4. Uncover Work to provide for inspection or reinspection of covered Work by the Owner Representative or regulatory agencies having jurisdiction.

5. Connect any Work that was not accomplished in the proper sequence to completed Work.

6. Remove or relocate existing utilities and pipes which obstruct Work to which connections must be made.

7. Make connections or alterations to existing or new facilities.

8. Provide openings, channels, chases and flues, if any, and do cutting, patching and finishing.

C. Restore existing work to a state equal to or better than that prior to cutting and patching. Restore new Work to standards of these Specifications.

D. Support, anchor, attach, match, trim and seal materials to the Work of others. Unless otherwise specified, furnish and install sleeves, inserts, hangers, required for the execution of the Work.
E. Provide shoring, bracing and support as required to maintain structural integrity and protect adjacent Work from damage during cutting and patching. Before cutting beams or other structural members, anchors, lintels or other supports, request written instructions from the Owner Representative. Follow such instructions, as applicable.

1.03 SUBMITTALS

A. Submit written notice to the Owner Representative requesting consent to proceed prior to cutting which may affect structural integrity or design function, Owner operations, or work of another contractor.

B. Include the following in submittal:
   1. Identification of project.
   2. Description of affected Work.
   4. Effect on other work and on structural integrity.
   5. Include description of proposed Work:
      a. Scope of cutting and patching.
      b. Contractor, subcontractor or trade to execute Work.
      c. Products proposed to be used.
      d. Extent of refinishing.
      e. Schedule of operations.
   6. Alternatives to cutting and patching, if any.

C. Should conditions of Work or schedule indicate change of materials or methods, submit a written recommendation to the Owner Representative including:
   1. Conditions indicating change.
   2. Recommendations for alternative materials or methods.

D. Submit written notice to the Owner Representative designating time Work will be uncovered for observation. Do not begin cutting or patching operations until authorized by the Owner Representative.

1.04 CONNECTIONS TO EXISTING FACILITIES
A. Perform construction necessary to complete connections and tie-ins to existing facilities. Keep all existing facilities in continuous operation unless otherwise specifically permitted in these Specifications or approved by the Owner Representative.

B. Coordinate with the Owner Representative, interruption of service requiring connection into existing facilities. Bypassing of wastewater or sludge to waterways is not permitted. Provide temporary pumping facilities to handle wastewater if necessary. Use temporary bulkheads (e.g., inflatable plugs) to minimize disruption. Provide temporary power supply and piping to facilitate construction where necessary.

C. Submit a detailed schedule of proposed connections, including shut-downs and tie-ins. Include in the submittal the proposed time and date as well as the anticipated duration of the Work. Submit the detailed schedule coordinated with the construction schedule.

1. Provide specific time and date information to the Owner Representative 48 hours in advance of proposed Work.

D. Procedures and Operations:

1. Only city personnel shall operate any valve, gate or other item of equipment without authorization of the Owner.

2. Insofar as possible, equipment shall be tested and in operating condition before final tie-ins are made to connect equipment to the existing facility.

3. Carefully coordinate Work and schedules. Provide written notice to the Owner Representative at least 48 hours before shut-downs or by-passes are required.

PART 2  P R O D U C T S - NOT USED.

PART 3  E X E C U T I O N - NOT USED.

END OF SECTION
SECTION 01050

FIELD SURVEYING

PART 1  GENERAL

1.01 QUALITY CONTROL
   A. Conform to State of Texas laws for surveys requiring licensed surveyors. Employ a Land Surveyor acceptable to Owner Representative, if required by Owner.

1.02 SUBMITTALS
   A. Submit to Owner Representative the name, address, and telephone number of Surveyor before starting survey work.
   B. Submit documentation verifying accuracy of survey work on request.

1.03 PROJECT RECORD DOCUMENTS
   A. Maintain a complete and accurate log of control and survey work as it progresses.
   B. Submit Record Documents under provisions of Section 01720 - Project Record Documents.

1.04 EXAMINATION
   A. Verify locations of survey control points prior to starting Work. Contractor shall utilize bench mark as basis for field verification of all temporary benchmark elevation prior to commencement of work. Contractor shall provide letter to Owner Representative once he is in agreement with all provided temporary benchmark elevations.
   B. Notify Owner Representative immediately of any discrepancies discovered.

1.05 SURVEY REFERENCE POINTS
   A. Control datum for survey is that established by Owner-provided survey and indicated on Drawings.
   B. Locate and protect survey control points, including property corners, prior to starting site work; preserve permanent reference points during construction.
   C. Notify Owner Representative 48 hours in advance of need for relocation of reference points due to changes in grades or other reasons.
   D. Report promptly to Owner Representative the loss or destruction of any reference point.
E. Contractor shall reimburse Owner for cost of reestablishment of permanent reference points and temporary benchmarks disturbed by Contractor's operations.

1.06 SURVEY REQUIREMENTS

A. Utilize recognized engineering survey practices.

B. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on Project Record Documents.

C. Establish elevations, lines and levels to provide quantities required for measurement and payment and to provide appropriate controls for the Work. Locate and lay out by instrumentation and similar appropriate means:

   1. Site improvements including pavements; stakes for grading; fill and topsoil placement; utility locations, slopes, and invert elevations.

   2. Grid or axis for structures.

D. Verify periodically layouts by same means.

PART 2    P R O D U C T S - NOT USED

PART 3    E X E C U T I O N - NOT USED

END OF SECTION
SECTION 01090
REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section includes general quality assurance as related to Reference Standards and a list of references.

1.02 QUALITY ASSURANCE

A. For Products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on the date as stated in the General Conditions.

C. Request clarification from Owner’s Representative before proceeding should specified reference standards conflict with Contract Documents.

1.03 SCHEDULE OF REFERENCES

<table>
<thead>
<tr>
<th>Standard</th>
<th>Name</th>
<th>Address</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
<td>444 North Capitol Street, N.W, Ste. 249 Washington, DC 20001 <a href="http://www.transportation.org">www.transportation.org</a></td>
<td></td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
<td>P.O. Box 9094 Farmington Hills, MI 48333-9094 <a href="http://www.concrete.org">www.concrete.org</a></td>
<td></td>
</tr>
<tr>
<td>AGC</td>
<td>Associated General Contractors of America</td>
<td>2300 Wilson Blvd., Ste. 400 Arlington, VA 22201 <a href="http://www.agc.org">www.agc.org</a></td>
<td></td>
</tr>
<tr>
<td>AI</td>
<td>Asphalt Institute</td>
<td>2696 Research Park Drive, P.O. Box 14052 Lexington, KY 40511-8480 <a href="http://www.asphaltinstitute.org">www.asphaltinstitute.org</a></td>
<td></td>
</tr>
<tr>
<td>AITC</td>
<td>American Institute of timber Construction</td>
<td>7012 S. Revere Parkway, Suite 140 Centennial, CO 80112 <a href="http://www.aite-glulam.org">www.aite-glulam.org</a></td>
<td></td>
</tr>
<tr>
<td>Reference Standards</td>
<td>Name</td>
<td>Address</td>
<td>Website</td>
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<tr>
<td>AISC</td>
<td>American Institute of Steel Construction</td>
<td>One East Wacker Dr., Ste. 700</td>
<td><a href="http://www.aisc.org">www.aisc.org</a></td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute</td>
<td>1140 Connecticut Ave. NW, Ste. 705</td>
<td><a href="http://www.aisi.com">www.aisi.com</a></td>
</tr>
<tr>
<td>ASME</td>
<td>American Society of Mechanical Engineers</td>
<td>Three Park Avenue</td>
<td><a href="http://www.asme.org">www.asme.org</a></td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
<td>1899 L Street NW, Eleventh Floor</td>
<td><a href="http://www.ansi.org">www.ansi.org</a></td>
</tr>
<tr>
<td>APA</td>
<td>American Plywood Association</td>
<td>Box 11700</td>
<td><a href="http://www.apawood.org">www.apawood.org</a></td>
</tr>
<tr>
<td>API</td>
<td>American Petroleum Institute</td>
<td>1220 L Street, N.W.</td>
<td><a href="http://www.api.org">www.api.org</a></td>
</tr>
<tr>
<td>AREMA</td>
<td>American Railway Engineering and</td>
<td>10003 Derekwood Lane, Ste. 210</td>
<td><a href="http://www.arema.org">www.arema.org</a></td>
</tr>
<tr>
<td></td>
<td>Maintenance-of-way Association</td>
<td>Lanham, Maryland 20706</td>
<td></td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
<td>100 Barr Harbor Drive</td>
<td><a href="http://www.astm.org">www.astm.org</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>West Conshohocken, PA 19428</td>
<td></td>
</tr>
<tr>
<td>AWPA</td>
<td>American Wood-Preservers’ Association</td>
<td>P.O. Box 5690</td>
<td><a href="http://www.awpa.com">www.awpa.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Granbury, TX 76049</td>
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</tr>
<tr>
<td>AWS</td>
<td>American Welding Society</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
550 NW LeJeune Rd.
Miami, FL 33126
www.aws.org

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235
www.awwa.org

CLFMI Chain Link Fence Manufactures Institute
10015 Old Colombia Rd., Ste. B-215
Columbia, MD 21046
www.clfmi.net

CRSI Concrete Reinforcing Steel Institute
933 North Plum Grove Road
Schaumburg, IL 60173-4758
www.crsi.org

EJMA Expansion Joint Manufacturers Association
25 North Broadway
Tarrytown, NY 10591
www.ejma.org

FS Federal Standardization Documents
General Services Administration, Specifications Unit (WFSIS)
7th and D Streets, S.W.
Washington, DC 20406
www.gsa.gov

ICEA Insulated Cable Engineer Association
P.O. Box 1568
Carrolton, Ga. 30112
www.icea.net

IEEE Institute of Electrical and Electronics Engineers
445 Hoes Lane
Piscataway, NJ 08854-4141
www.ieee.org

MIL Military Specifications
General Services Administration, Specifications Unit (WFSIS)
7th and D Streets, S.W.
Washington, DC 20406
www.gsa.gov

NACE National Association of Corrosion Engineers
1440 South Creek Drive
THE CITY OF GALVESTON

REFERENCE STANDARDS

Houston, TX 77084-4906
www.nace.org

NEMA
National Electrical Manufacturers’ Association
1300 North 17th Street, Suite 1752
Rosslyn, VA 22209
www.nema.org

NFPA
National Fire Protection Association
1 Batterymarch Park, P.O. Box 9101
Quincy, MA 02169-7471
www.nfpa.org

OSHA
Occupational Safety Health Administration
U.S. Department of Labor, Office of Public Affairs
200 Constitution Ave.
Washington, DC 20210
www.osha.gov

PCA
Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077-1083
www.cement.org

PCI
Prestressed Concrete Institute
200 W. Adams St., Ste. 2100
Chicago, IL 60606
www pci.org

SDI
Steel Deck Institute
P.O. Box 25
Fox River Grove, IL 60021
www.sdi.org

SSPC
Society for Protective Coatings (Steel Structures Painting Council)
40 24th Street, Sixth Floor
Pittsburgh, PA 15222
www.sspc.org

TAC
Texas Administrative Code
Texas Water Resources Conservation Commission
P.O. Box 13087
Library MC-196
Austin, TX 78711-3087

TCEQ
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087
www.tceq.state.tx.us

TxDOT  Texas Department of Transportation
       125 E. 11th Street
       Austin, TX 78701-2483
       www.txdot.gov

UL    Underwriters’ Laboratories, Inc.
      2600 N.W. Lake Road
      Camas, Wa. 98607-8542
      www.ul.com

UNI-BELL  UNI-BELL Pipe Association
       2711 LBJ Freeway, Ste. 1000
       Dallas, TX 75234
       www.uni-bell.org

PART 2  PRODUCTS - NOT USED
PART 3  EXECUTION - NOT USED

END OF SECTION
SECTION 01292

SCHEDULE OF VALUES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Preparation and submittal of Schedule of Values for stipulated price contracts or for major unit price work on unit price contracts.

1.02  DEFINITION

A. The Schedule of Values is an itemized list that establishes the value of each part of the Work for a stipulated price contract and for major unit price work on a unit price contract. The Schedule of Values is used as the basis for preparing applications for payments. Quantities and unit prices shall be included in the schedule of values.

B. Major Unit Price Work is an individual unit price item:

   1. Whose value is greater than five percent of original contract price,

   2. Whose value becomes greater than five percent of original contract price as the result of an increase in quantity, or

   3. Whose value is $100,000, whichever is least.

1.03  PREPARATION

A. For stipulated price contracts, subdivide the Schedule of Values into logical portions of the Work, such as major work items or work in contiguous construction areas. Use Section 01310 - Construction Schedule to guide the subdivision of work items. The items in the Schedule of Values will correlate directly with the tasks enumerated in the Construction Schedule. Organize each portion using the Table of Contents of this Project Manual as an outline for listing the value of work by Sections. A pro rata share of mobilization, bonds, and insurance may be listed as separate items for each portion of the work.

B. For unit price contracts, items shall use the bid items for the Schedule of Values.

C. For lump sum equipment items, where submittal of operation/maintenance data and testing are required, include a separate item for equipment operation and maintenance data where:

   1. Submittal of maintenance data shall be valued at five percent (5%) of the lump sum amount for each equipment item,

   2. Submittal for testing and adjusting shall be valued at five percent (5%) of the lump sum amount for each equipment item,
D. Round off figures for each listed item to the nearest $100.00. Set the value of one (1) item, when necessary, to make all values equal the contract price for stipulated price contract or lump sum amount for unit price work.

1.04 SUBMITTAL

A. Submit the Schedule of Values in accordance with the requirements of Section 01300 - Submittals. Submit initial schedule of values within fifteen (15) days after execution of contract or at the time of the pre-construction conference.

B. Revise the Schedule of Values and resubmit for items affected by contract modifications. After the changes are reviewed without exception by the Owner, make the submittal at least 10 days prior to submitting the next application for progress payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Schedule of Values
2. Construction Schedules
3. Shop Drawings, Product Data, and Samples
4. Operations and Maintenance Data
5. Manufacturer's Certificates
6. Construction Photographs
7. Project Record Documents
8. Design Mixes
9. Video Tapes or DVD’s
10. And all other submittals the owner deems necessary.

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling

1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal is approved.

2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Owner Representative will review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 30 days for initial review by the Owner Representative. This time for review shall in no way be justification for delays or additional compensation to the Contractor.
3. The Owner Representative’s review of submittals covers only general conformity to the Drawings, Specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. No quantities will be verified by the Owner Representative. The Contractor is responsible for any errors, omissions or deviations from the Contract requirements; review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Drawings and Specifications.

4. Submit 6 copies of documents unless otherwise specified in the following paragraphs or in the Specifications.

5. Revise and resubmit submittals as required. Identify all changes made since previous submittal.

6. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work or included in periodic progress payments until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering

1. Transmit each submittal to the Owner Representative with a transmittal form.

2. Sequentially number each transmittal form beginning with the number 1. Resubmittals shall use the original number with an alphabetic suffix (i.e., 2A for first resubmittal of Submittal 2 or 15C for third resubmittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.

3. Identify variations from requirements of Contract Documents and identify product or system limitations.

4. For submittal numbering of video tapes or DVD’s, coordinate with the Owner Representative.

C. Contractor's Certification

1. Each submittal shall contain a statement or stamp signed and dated by the Contractor, certifying that the items have been reviewed in detail and are correct and in accordance with Contract Documents, except as noted by any requested variance.

1.03 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop Drawings
1. Submit shop drawings for review as required by the Specifications.

2. Contractor's Certification, as described in paragraph 1.02C, shall be placed on each drawing.

3. The drawings shall accurately and distinctly present the following:
   a. Field and erection dimensions clearly identified as such
   b. Arrangement and section views
   c. Relation to adjacent materials or structure including complete information for making connections between work under this Contract and work under other contracts
   d. Kinds of materials and finishes
   e. Parts list and descriptions
   f. Assembly drawings of equipment components and accessories showing their respective positions and relationships to the complete equipment package
   g. Where necessary for clarity, identify details by reference to drawing sheet and detail numbers, schedule or room numbers as shown on the Contract Drawings.

4. Drawings shall be to scale, and shall be a true representation of the specific equipment or item to be furnished.

B. Product Data

1. Submit product data for review as required in Specification sections.

2. Contractor's Certification, as described in paragraph 1.02C, shall be placed on each data item submitted.

3. Mark each copy to identify applicable products, models, options to be used in this Project. Supplement manufacturers' standard data to provide information unique to this Project, where required by the Specifications.

4. For products specified only by reference standard, give manufacturers, trade name, model or catalog designation and applicable reference standard.

5. For products proposed as alternates to "approved" products, as described in Section 01630 - Product Options and Substitutions, provide all information
required to demonstrate the proposed products meet the level of quality and performance criteria of the "approved product".

C. Samples

1. Submit samples for review as required by the Specifications.

2. Contractor's Certification, as described in paragraph 1.02C, shall be placed on each sample or a firmly attached sheet of paper.

3. Submit the number of samples specified in Specifications; one of which will be retained by the Owner’s Representative.

4. Reviewed samples which may be used in the Work are identified in Specifications.

1.04 MANUFACTURER'S CERTIFICATES

A. When specified in Specification sections, submit manufacturers' certificate of compliance for review by Owner’s Representative.

B. Contractor's Certification, as described in paragraph 1.02C, shall be placed on front page of the certificate.

C. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product, but must be acceptable to Owner’s Representative.

1.05 DESIGN MIXES

A. When specified in Specifications, submit design mixes for review.

B. Contractor’s Certification as described in paragraph 1.02C, shall be placed on front page of each design mix.

C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.

D. Maintain a copy of approved design mixes at mixing plant.

PART 2  PRODUC T S - NOT USED

PART 3  EXECUTION - NOT USED
END OF SECTION
SECTION 01310
CONSTRUCTION SCHEDULE

PART 1  GENERAL

1.01 DESCRIPTION

A. Furnish projected construction schedule for entire work.
B. Revise monthly.

1.02 FORM OF SCHEDULE

A. Prepare by bar chart method.
B. Arrange by chronological order by beginning of each item of work.

1.03 CONTENT OF SCHEDULES

A. Include complete sequence of construction by activity:
   1. Shop drawings, product data and samples: Submittal dates and dates reviewed copies will be required.
   2. Decision dates.
   3. Product procurement and delivery dates.
   4. Dates for beginning, and completion of each element of construction.
   5. Tentative dates for progress meetings.
B. Show projected percentage of completion for each item of work as of first day of each month.
C. Furnish subschedules to define critical portions of entire schedule.
D. Show anticipated payment to complete work.
E. Anticipated completion date and one year post acceptance inspection date.

1.04 UPDATING

A. Show all changes occurring since previous month's submission of updated schedule.
B. Indicate progress of each activity.

C. Show completion dates.

D. If in opinion of the Owner, Contractor falls behind in scheduled progress, Contractor shall take steps required to regain lost progress without additional cost to Owner, and likewise revise schedule accordingly.

1.05 SUBMITTALS

A. Submit initial schedules within fifteen days after execution of Contract or at the time of the Pre-Construction conference.

B. Owner’s Representative will review schedules and return review copy within ten days after receipt.

C. If required, resubmit within seven days after return of review copy.

D. Submit periodically updated schedules accurately depicting progress to first day of each month.

E. Submit number of copies required by Contractor plus four copies to be retained by Owner’s Representative.

1.06 DISTRIBUTION

A. Distribute copies of reviewed schedules to:

1. Owner’s Representative.


3. Subcontractors.

4. Owner.

PART 2 PRODUC T S - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1  G E N E R A L

1.01 SECTION INCLUDES
A. Photographic requirements for construction photographs and submittals

1.02 UNIT PRICES
A. No separate payment will be made for work under this section. Include the cost in the unit price of related work.

1.03 SUBMITTALS
A. Construction Photographs shall be made and submitted according to the provisions of all sections of these specifications.

B. All photographs shall be taken digitally and submitted on a CD-ROM with Project Name, Contractor and Date Photographs were taken.

C. Prepare 2 copies of the CD-ROM’s of each view in digital format and submit 1 directly to the Owner’s Representative within 5 days of taking photographs.

PART 2  P R O D U C T S

2.01 PRECONSTRUCTION PHOTOGRAPHS
A. Prior to the commencement of any construction, take digital color photographs of the entire route of the project. Photographs shall be 5 megapixel quality.

B. Provide photographs recorded on a CD-ROM and a photo log shall be submitted with the CD’s providing the required details.

C. The photographs shall show:
   1. Date photographs were taken
   2. Location of the photograph, house number and street name.

   This information may be shown on a chalkboard in the photograph or by a label on the photo log.
D. Photographs should show the condition of the following:

1. Esplanades and boulevards
2. Yards (near side and far side of street)
3. House walk, sidewalk and driveway.
4. Curb.
5. Area between walk and curb.
6. Surface features (yard lights, fences, manholes, valve boxes, sprinkler heads, mail boxes, etc.)
7. Trees, shrubs and grass.
8. Any other items the contractor, Owner, and/or Owner’s Representative requests or requires.
9. Areas of damaged improvements that the Contractor desires to document preconstruction.

2.02 POST CONSTRUCTION PHOTOGRAPHS

A. On completion of construction, provide photographs of any public or private property which has been repaired or restored and any damage which is the subject of complaints. Damaged areas that cannot be documented by photographs preconstruction will be the Contractor’s responsibility for repair.

B. Submit in same quantity and format as the preconstruction photographs.
SECTION 01410

TESTING LABORATORY SERVICES

1.0 GENERAL

1.1 CONDITIONS

A. Testing, inspection, and control of materials required by these specifications shall be performed by a commercial testing laboratory meeting the specified requirements.

B. Owner will select and pay for services of commercial testing laboratory to perform density tests for field control and to perform the various laboratory testing services necessary for field control of the work as specified in respective specification sections, except Contractor shall pay for services of commercial testing laboratory approved by Owner to perform the following:

1. Pipe diameter deflection tests on all flexible and semi-rigid sanitary sewer collection system pipe installation.

2. Testing of systems or partially completed systems, such as testing of water and sewer systems, water supply and drainage systems, air systems, electrical systems and grounding systems.

3. Laboratory services required to establish mix design proposed for use for Portland cement concrete, asphaltic concrete mixtures, and other material mixes requiring control by testing laboratory.

4. Analysis of aggregates, fixing gradations, and the preparation and testing of design cylinders, beams, or specimens, and other services required to establish design or redesign of material mixes requiring control by testing laboratory when required because of change in source of materials or other conditions not caused by Owner.

5. Tests required to establish optimum moisture of earth and base materials and to determine required compactive effort to meet density requirements (Contractor shall pay for all proctor curves to establish optimum moisture and Owner shall pay for all density tests).

6. Cores to test for thickness of paving that are performed at Contractor’s election.
7. Testing and inspection performed for the Contractor's convenience.

8. Retesting and repetitions of laboratory services when initial tests indicate work does not comply with requirements of Contract Documents.

C. Specified testing frequencies are recommended standards, and may be increased or decreased by the Owner or Owner’s Representative as deemed necessary for quality control of materials and the work.

D. Reports and commentaries by testing laboratory shall in no way relieve Contractor of his obligation to perform work in full compliance with standards and provisions of the Contract Documents.

E. The Contractor shall not be relieved of his obligation to perform work in full compliance with the standards and provisions of the Contract Documents by reason of the Owner's performance in testing or refraining from testing the work.

F. Owner reserves right to take samples and specimens, and conduct tests on material and work provided by Contractor to assure quality control.

1.2 REQUIREMENTS OF LABORATORY

A. Meet basic requirements of ASTM E329, latest edition.

B. Testing Equipment: Calibrated at maximum twelve month intervals by devises of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

C. Testing laboratory is only required to have testing facilities for work included in this project.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection.

E. Submit memorandum of remedies of any deficiencies reported by inspection.

1.3 LABORATORY DUTIES AND LIMITATIONS OF AUTHORITY

A. Cooperate with Owner’s Representative, Owner and Contractor.

1. Unless directed by Owner or Owner’s Representative, types and frequencies of tests as specified in specifications sections for field quality control shall not be exceeded.
2. Owner may not accept charges for tests in excess of types and frequencies specified in specifications sections unless authorized by the Owner’s Representative or Owner.

3. Charges for tests to be paid for by Owner shall be submitted promptly to Owner’s Representative to allow adequate time for his review before time for payment by Owner.

4. Unless otherwise directed or stipulated, samples, specimens, and field test locations shall be selected under the control of the Owner’s Representative.

B. Provide qualified personnel promptly on notice.

C. Perform required inspections, sampling, and testing of materials and methods of construction, including making and curing concrete test specimens.

D. Ascertain Contractor’s compliance with specifically named standards of the Contract Documents.

E. Comply with specified testing and sampling standards, or recognized authoritative testing and sampling standards when none are specifically named in the Specifications.

F. Immediately notify Owner’s Representative, Owner and Contractor of irregularities or deficiencies of work which are observed during performance of services. Immediately is defined as the same day that the irregularity or deficiency is determined and shall be in person, by telephone or by e-mail.

G. Promptly distribute copies of reports of inspections and tests:
   1. Owner: One copy.
   2. Owner’s Representative: One copy.
   3. Contractor: Two copies.

H. Perform additional services as required by Owner.

I. Laboratory is not authorized to:
   1. Revoke, alter, enlarge on, or waive requirements of Contract Documents.
   2. Approve or accept any portion of work.
3. Reject or stop work, but only shall notify Owner’s Representative or his representative of any failure, deficiencies, or irregularities immediately.

4. Perform any duties of Contractor.

1.4 CONTRACTOR’S RESPONSIBILITIES

A. Before starting to use proposed design mix and mix materials in construction, arrange for testing of design mixes and mix materials for Portland cement concrete, asphaltic concrete, and other material mixes requiring control by testing laboratory.

B. Cooperate with laboratory personnel, provide access to work, and to construction and fabrication operations.

C. Provide samples of materials to be tested in required quantities.

D. Provide adequate on-site storage area for testing laboratory.

E. Furnish copies of mill test reports for the materials being used on the job when requested by Owner’s Representative.

   1. Mill certificates will be acceptable when it is definite that certified mill test sheets apply to the material being supplied.

F. Furnish labor to provide access to work to be tested, to obtain and handle samples at site, and to facilitate inspections and tests.

G. Notify laboratory and Owner’s Representative 48 hrs. minimum in advance of operations requiring control by testing laboratory, to allow for assignment of personnel and scheduling of tests.

H. Contractor shall notify the Laboratory and Owner’s Representative immediately upon discovery of conditions or circumstances requiring cancellation of work.

I. Arrange with laboratory and pay for:

   1. Retesting required for failed tests.

   2. Retesting for nonconforming Work.

   3. Additional sampling and tests requested by Contractor beyond specified requirements.
4. Insufficient notification of cancellation of tests for work scheduled but not performed.

1.5 SPECIFIC TESTS, INSPECTIONS AND METHODS REQUIRED

A. Certification of Products: As required by respective specification sections.

B. Test, Adjust and Balance of Equipment: As required by respective specification sections.

C. Sampling and Laboratory Tests: As required by respective specification sections.

END OF SECTION
SECTION 01420

CONSTRUCTION INSPECTION SERVICES

1.0 GENERAL

1.1 SECTION INCLUDES

A. Inspection services and references

1.2 CONDITIONS

A. Owner reserves right to observe and inspect samples and specimens to be tested, and observe tests on material and work provided by Contractor to assure quality control.

B. Inspection level of service may be increased or decreased by the Owner or Owner’s Representative as deemed necessary for quality control of materials and work.

C. Owner’s Representative will appoint an Inspector as a representative of the Owner. Alternately, Owner’s Representative may appoint, employ, and pay an independent firm to provide and/or supplement inspection services.

D. Reports and commentaries by Inspector shall in no way relieve Contractor of his obligation to perform work in full compliance with standards and provisions of the Contract Documents.

E. The Contractor shall not be relieved of his obligation to perform work in full compliance with the standards and provisions of the Contract Documents by reason of the Owner’s performance in inspection or refraining from inspecting the work.

F. The Contractor shall not be relieved of his obligation to perform the work safely and with all safety requirements by reason of the owner’s performance of inspection or refraining from inspections of the work.

1.3 INSPECTORS DUTIES AND LIMITATIONS OF AUTHORITY
A. Perform inspections, observe tests, and provide other services specified in individual Technical Specifications.

B. Ascertain Contractor’s compliance with specifically named standards of the Contract Documents.

C. Produce reports to be submitted to Owner, Owner’s Representative, and Contractor, indicating observations and compliance or non-compliance with Contract Documents and quantities installed.

D. Perform additional services as required by Owner.

E. Inspector is not authorized, without approval of Owner’s Representative, to:
   1. Revoke, alter, enlarge, or waive requirements of the Contract Documents.
   2. Approve or accept any portion of work.
   3. Perform any duties of Contractor.

F. Inspector has the authority to stop work when work is being performed in an unsafe manner or if other issues arise that he deems necessitate stopping work.

1.4 CONTRACTOR’S RESPONSIBILITIES

A. Cooperate with Inspector, provide access to work and to construction and fabrication operations.

B. Furnish copies of mill test reports for the materials being used on the job when requested by Owner’s Representative or Inspector.
   1. Mill certificates will be acceptable when it is definite that certified mill test sheets apply to the material being supplied.

C. Furnish labor to provide access to work to be inspected, to obtain and handle samples at site, and to facilitate inspections and tests.

D. Contractor shall sign and acknowledge reports for Inspector.

E. Notify Owner’s Representative 24 hrs. prior to expected time for operations requiring services. Notify independent firm when noted.
F. Arrange with Inspector and pay for:
   1. Re-inspecting nonconforming Work.
   2. Insufficient notification of cancelation of work scheduled but not performed if such work required increase inspection services.
   3. Inspection services for work on weekends, City Holidays and after hours that has been approved at the request of the contractor.

END OF SECTION
SECTION 01430
CONTRACTOR’S QUALITY CONTROL

PART 1   GENERAL

1.01 SECTION INCLUDES

A. Quality assurance and control of installation and manufacturer’s field services and reports.

1.02 SUBMITTALS

A. Make Submittals required by this section and in accordance with all provisions of these specifications.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce the Work of specified quality at no additional cost to the Owner.

B. Comply fully with manufacturers’ installation instructions, including each step in sequence.

C. Request clarification from the Owner’s Representative before proceeding should manufacturers’ instructions conflict with Contract Documents.

D. Comply with specified Standards as a minimum requirements for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce the specified level of workmanship.

F. Obtain copies of Standards and maintain at Project Site when required by individual Technical Specifications.

1.04 MANUFACTURERS’ FIELD SERVICES AND REPORTS

A. When specified in individual Technical Specifications, provide material or product suppliers’ or manufacturers’ technical representative to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, operator training, test, adjust, and balance of equipment as applicable, and to initiate operation, as required. Conform to minimum time requirements for start-up operations and operator training if defined in Technical Specifications.

B. At the Owner’s Representative’s request, submit qualifications of manufacturer’s representative to Owner’s Representative fifteen (15) days in advance of required
representative’s services. The representative shall be subject to approval of Owner’s Representative.

C. Manufacturer’s representative shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer’s written instructions. Submit report within one (1) day of observation to Owner’s Representative for review.
SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1       GENERAL

1.01 SECTION INCLUDES

A. Temporary facilities and the necessary controls for the project including utilities, telephone, sanitary facilities, field office, storage sheds and building, safety requirements, first aid equipment, fire protection, security measures, protection of the Work and property, access roads and parking, environmental controls, disposal of trash, debris, and excavated material, pest and rodent control, water runoff and erosion control.

1.02 UNIT PRICES

A. No separate payment for work under this section. Include the costs for performing the work in project costs.

1.03 CONTRACTOR’S RESPONSIBILITY

A. The facilities and controls specified in this section are considered minimum for the Project. The Contractor may provide additional facilities and controls for the proper execution of the Work and to meet Contractor’s responsibilities for protection of persons and property.

B. Comply with applicable requirements specified in other sections of the Specifications.
   1. Maintain and operate temporary facilities and systems to assure continuous service.
   2. Modify and extend systems as Work progress requires.
   3. Completely remove temporary materials and equipment when their use is no longer required.
   4. Restore existing facilities used for temporary services to specified or to original condition.

1.04 TEMPORARY UTILITIES

A. Obtaining Temporary Service.
   1. Make arrangements with utility service companies for temporary services.
   2. Abide by rules and regulations of the utility service companies or authorities having jurisdiction.

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3. Be responsible for utility service costs until the Work is substantially complete. Included are fuel, power, light, heat, and other utility services necessary for execution, completion, testing, and initial operation of the Work.

B. Water

1. Provide water required for and in connection with Work to be performed and for specified tests of piping, equipment, devices, or for other use as required for proper completion of the Work.

2. Contractor shall not operate any fire hydrants without first having a meter from the City of Galveston and having placed this meter on the hydrant. The Contractor shall operate fire hydrant(s) only with an approved hydrant wrench.

3. Provide and maintain an adequate supply of potable water for domestic consumption by Contractor personnel.

C. Electricity and Lighting.

1. Provide electric power service as required for the Work, including testing of Work. Provide power for lighting, operation of the Contractor’s equipment, or for any other use by Contractor.

2. Electric power service includes temporary power service or generator to maintain plant operations during any scheduled shutdown.

3. Minimum lighting level shall be 5 foot-candles for open areas; 10-foot-candles for stairs and shops.

D. Temporary Heat and Ventilation

1. Provide temporary heat as necessary for protection or completion of the Work.

2. Provide temporary heat and ventilation to assure safe working conditions; maintain enclosed areas at a minimum of 50°F.

E. Telephone

1. Provide emergency telephone service at the Contractor's field office, or by mobile telephone, for use by Contractor personnel and others performing work or furnishing services at the site.

F. Sanitary Facilities

1. Provide and maintain sanitary facilities for persons on the job site; comply with the regulations of State and local departments of health.
2. Enforce the use of sanitary facilities by construction personnel at the job site. Such facilities shall be enclosed. Pit-type toilets will not be permitted. No discharge will be allowed from these facilities. Collect and store sewage and waste so as not to cause a nuisance or health problem; have sewage and waste hauled off-site and properly disposed in accordance with local regulations.

3. Locate toilets near the Work site and secluded from view as far as possible. Keep toilets clean and supplied throughout the course of the Work.

1.05 FIELD OFFICE

A. Provision of a field office is not required unless specified in the conditions of this contract. If the Contractor chooses to provide one, locate it in a place approved by the Owner Representative.

1.06 STORAGE OF MATERIALS

A. Provide adequately ventilated, watertight storage facilities with floor above ground level for materials and equipment susceptible to weather damage.

B. Storage of materials not susceptible to weather damage may be on blocks off the ground.

C. Store materials in a neat and orderly manner. Place materials and equipment to permit easy access for identification, inspection and inventory.

D. Contractor is responsible for materials and equipment stored on and off site.

1.07 SAFETY REQUIREMENTS

A. Submit and follow a safety program. Include in the safety program documented response to trench safety requirements as specified in Section 01526 - Trench Safety System.

B. Conduct operations in strict accord with applicable Federal, State and local safety codes and statutes and with good construction practice. The Contractor is fully responsible and obligated to establish and maintain procedures for safety of all work, personnel and equipment involved in the Project.

C. Observe and comply with Texas Occupational Safety Act (Art. 5182a, V.C.S.) and with all safety and health standards promulgated by Secretary of Labor under Section 107 of Contract Work Hours and Standards Act, published in 29 CFR Part 1926 and adopted by Secretary of Labor as occupational safety and health standards under the Williams-Steiger Occupational Safety and Health Act of 1970, and to any other legislation enacted for safety and health of Contractor employees. Such safety and health standards apply to subcontractors and their employees as well as to the Contractor and its employees.

D. Observance of and compliance with the regulations shall be solely and without qualification the responsibility of the Contractor without reliance or superintendence of
or direction by the Owner Representative. Immediately advise the Owner Representative of investigation or inspection by Federal Safety and Health inspectors of the Contractor or subcontractor's work or place of work on the job site under this Contract, and after such investigation or inspection, advise the Owner Representative of the results. Submit one copy of accident reports to Owner Representative within 10 business days of occurrence.

E. Protect areas occupied by workmen using the best available devices for detection of lethal and combustible gases. Test such devices frequently to assure their functional capability. Constantly observe infiltration of liquids into the Work area for visual or odor evidences of contamination, immediate take appropriate steps to seal off entry of contaminated liquids to the Work area.

F. Safety measures, including but not limited to safety personnel, first-aid equipment, ventilating equipment and safety equipment, in the specifications and shown on the Drawings are obligations of the Contractor.

G. Maintain required coordination with the local Police and Fire Departments during the entire period covered by the Contract.

H. Include project safety analysis in safety plan. Itemize major tasks and potential safe hazards. Plan to eliminate hazards or protect workers and public from each hazard.

1.08 FIRST AID EQUIPMENT

A. Provide a first aid kit throughout the construction period. List telephone numbers for physicians, hospitals, and ambulance services in each first aid kit.

B. Have at least one person thoroughly trained in first aid procedures present on the site whenever Work is in progress. Contractor to conform to protocols and requirements for training and protection against “blood borne pathogens.”

1.09 FIRE PROTECTION

A. Fire Protection Standards.

1. Conform to specified fire protection and prevention requirements as well as those which may be established by Federal, State, or local governmental agencies.


3. Provide portable fire extinguishers, rated not less than 2A or 5B in accordance with NFPA Standard No. 10, Portable Fire Extinguishers, for each temporary building, and for every 3000 square feet of floor area of facilities under construction.
4. Locate portable fire extinguishers within 50 feet maximum from any point in the Project area in which work is performed.

B. Fire Prevention and Safety Measures.

1. Prohibit smoking in hazardous areas. Post suitable warning signs in areas which are continuously or intermittently hazardous.

2. Use metal safety containers for storage and handling of flammable and combustible liquids.

3. Do not store flammable or combustible liquids in or near stairways or exits.

4. Maintain clear exits from all points within a structure.

1.10 SECURITY MEASURES

A. Protect all Work materials, equipment, and property from loss, theft, damage, and vandalism. Contractor’s duty to protect property includes Owner’s property.

B. If existing fencing or barriers are breached or removed for purposes of construction. Provide and maintain temporary security fencing equal to existing.

1.11 PROTECTION OF PUBLIC UTILITIES

A. Prevent damage to existing public utilities during construction. These utilities are shown on the Drawings at their approximate locations, but all lines may not be shown. Pre-locate, by whatever means may be required (metal detection equipment, probes, excavation, survey), all underground utilities before excavating in area. All investigative work will be done and all repairs required after investigation will be accomplished by Contractor. Contractor is responsible for damages caused by failure to locate and preserve these underground utilities. Give owners of these utilities at least 48 hours notice before commencing Work in area, for locating utilities during construction and allow adequate time for making adjustments or relocation of the utilities when they conflict with proposed Work. Any temporary relocation of utilities if necessary to accommodate construction will not be paid for separately. Bypassing of sanitary waste to storm drainage facilities is not allowed. Utility service lines are not shown on Drawings. Anticipate that such service lines exist and repair them if damaged due to any construction activity. No separate payment will be made for this repair work.

B. Prior to abandonment of utility, make appropriate arrangements with City and owner of utility to terminate service, remove meters, transformers, and poles as may be required by site conditions.

C. When excavating near pipelines and prior to start of excavation, request a representative of pipeline company to come to construction site(s) to meet representatives of Contractor and Owner Representative to discuss actual procedures that will be used. Request
pipeline company’s representative to probe and locate the pipelines in at least three locations: one at each side of proposed excavation and one at centerline of proposed utility. The Contractor may be required to locate the pipeline as directed by the pipeline company at no cost to the project. Representative of pipeline company and Owner Representative must be present to observe activities of Contractor at all times when excavation is being conducted within 15 feet of pipeline company’s pipeline.

1.12 PROTECTION OF THE WORK AND PROPERTY

A. Preventive Actions.

1. Take precautions, provide programs, and take actions necessary to protect the Work and public and private property from damage.

2. Take action to prevent damage, injury or loss, including, but not limited to, the following:

   a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with progress of the Work or the Work of any other contractor, any utility service company, or the Owner's operations.

   b. Provide suitable storage for materials which are subject to damage by exposure to weather, theft, breakage, or otherwise.

   c. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.

   d. Frequently clean up refuse, rubbish, scrap materials, and debris caused by construction operations, keeping the Project site safe and orderly.

   e. Provide safe barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways, and other hazardous areas.

3. Obtain written consent from proper parties before entering or occupying with workers, tools, materials or equipment, privately-owned land except on easements provided for construction.

4. Assume full responsibility for the preservation of public and private property on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect, or misconduct in execution of the Work by the Contractor, it shall be restored by the Contractor to a condition equal to or better than that existing before the damage was done.

B. Barricades and Warning Signals.
THE CITY OF GALVESTON

TEMPORARY FACILITIES AND CONTROLS

1. Where work is performed on or adjacent to any roadway, right-of-way, or public place; furnish and erect barricades, fences, lights, warning signs, and danger signals; provide watchmen; and take other precautionary measures for the protection of persons or property and protection of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, furnish and maintain at least one light at each barricade. Erect sufficient barricades to keep vehicles from being driven and pedestrians from walking on or into Work under construction. Furnish watchmen in sufficient numbers to protect the Work. Responsibility of maintenance of barricades, signs, lights and for providing watchmen shall continue until the Project is accepted by the Owner. Comply with Section -1570 – Traffic Control and Regulation

C. Tree and Plant Protection. Comply with requirements of Section 01535 – Tree and Plant Protection.

D. Protection of Existing Structures

1. Underground Structures:
   a. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels, and other existing subsurface installations located within or adjacent to the limits of the Work.
   b. Known underground structures, including water, sewer, electric, and telephone services are shown on the Drawings in accordance with the best information available, but is not guaranteed to be correct or complete.
   c. Explore ahead of trenching and excavation work and uncover obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption of utility services. Restore to original condition damages to underground structure at no additional cost to the Owner.
   d. Necessary changes in location of the Work may be made by the Owner Representative to avoid unanticipated underground structures.
   e. If permanent relocation of an underground structure or other subsurface installations is required and not otherwise provided for in the Contract Documents, the Owner Representative will direct Contractor in writing to perform the Work, which shall be paid for under the provisions for changes in the Contract Price as described in the General Conditions.

2. Surface Structures:
   a. Surface structures are defined as existing buildings, structures and other constructed installations above the ground surface. Included with such
structures are their foundations or any extension below the surface. Surface structures include, but are not limited to buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks, guard cables, fencing, and other facilities that are visible above the ground surface.

3. Protection of Underground and Surface Structures:
   a. Support in place and protect from direct or indirect injury to underground and surface structures located within or adjacent to the limits of the Work. Install such supports carefully and as required by the party owning or controlling such structure. Before installing structure supports, Contractor shall satisfy the Owner Representative that the methods and procedures to be used have been approved by the owner of the structure.
   b. Avoid moving or in any way changing the property of public utilities or private service corporations without prior written consent of a responsible official of that service or public utility. Representatives of these utilities reserve the right to enter within the limits of this project for the purpose of maintaining their properties, or of making such changes or repairs to their property that may be considered necessary by performance of this Contract.
   c. Notify the owners and/or operators of utilities and pipelines of the nature of construction operations to be performed and the date or dates on which those operations will be performed. When construction operations are required in the immediate vicinity of existing structures, pipelines, or utilities, give a minimum of 5 working days advance notice. Probe and flag the location of underground utilities prior to commencement of excavation. Keep flags in place until construction operation reach and uncover the utility.
   d. Assume risks attending the presence or proximity of underground and surface structures within or adjacent to the limits to the Work including but not limited to damage and expense for direct or indirect injury caused by the Work to any structure. Immediately repair damage caused, to the satisfaction of the owner of the damaged structure.
   E. Employ a structural engineer to ensure protection measures are adequate for the safety and integrity of structures and facilities.
   F. Protection of Installed Products.
      1. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.
THE CITY OF GALVESTON

TEMPORARY FACILITIES AND CONTROLS

2. Control traffic to prevent damage to equipment, materials, and surfaces.

1.13 ROADS AND PARKING

A. Prevent interference with traffic and Owner operations on existing roads.

B. Designate temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking. Locate as approved by Owner.

C. Minimize use by construction traffic of existing residential streets and driveways.

D. Do not allow heavy vehicles or construction equipment in existing parking areas.

1.14 ENVIRONMENTAL CONTROLS

A. Provide and maintain methods, equipment, and temporary construction as necessary for controls over environmental conditions at the construction site and adjacent areas.

B. Comply with statutes, regulations, and ordinances which relate to the proposed Work for the prevention of environmental pollution and preservation of natural resources, including but not limited to the National Environmental Policy Act of 1969, PL 91-190, Executive Order 11514.

C. Recognize and adhere to the environmental requirements of the Project. Disturbed areas shall be strictly limited to boundaries established by the Contract Documents. Particularly avoid pollution of "on-site" streams, sewers, wells, or other water sources. The City recognizes that the project area has considerable natural value and that construction of projects should be completed with a minimum of impact to the surrounding environment. Attention is directed to this concept. Adopt construction procedures that do not cause unnecessary excavation and filling of the terrain, indiscriminate destruction of vegetation, air or stream pollution, nor the harassment or destruction of wildlife.

D. Burning of rubbish, debris or waste materials is not permitted.

1.15 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious substances from construction operations.

B. Provide equipment and personnel to perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-site in accordance with laws and regulations, and replace with suitable compacted fill and topsoil.
C. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants.
   1. Prevent toxic concentrations of chemicals.
   2. Prevent harmful dispersal of pollutants into the environment.

E. Use equipment during construction that conforms to current Federal, State, and local laws and regulations.

1.16 PEST AND RODENT CONTROL

A. Provide rodent and pest control as necessary to prevent infestation of construction or storage areas.

B. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

1.17 NOISE CONTROL

A. Provide vehicles, equipment, and construction activities that minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and City Ordinances and in no case will noise levels be permitted which create a nuisance in the surrounding neighborhoods.

B. Conduct construction operations during daylight hours except as approved by Owner Representative.

1.18 DUST CONTROL

A. Control objectionable dust caused by operation of vehicles and equipment. Apply water or use other methods, subject to approval of the Owner Representative, which will control the amount of dust generated.

1.19 WATER RUNOFF AND EROSION CONTROL

A. Provide methods to control surface water, runoff, subsurface water, and water pumped from excavations and structures to prevent damage to the Work, the site, or adjoining properties.

B. Control fill, grading and ditching to direct water away from excavations, pits, and other construction areas; and to direct drainage to proper runoff courses so as to prevent any erosion, sedimentation or damage.
C. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

D. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with environmental requirements.

E. Retain existing drainage patterns external to the construction site by constructing temporary earth berms, sedimentation basins, retaining areas, and temporary ground cover as needed to control conditions.

F. Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.

1. Keep to a minimum the area of bare soil exposed at one time.

2. Provide temporary control measures, such as berms, dikes, and drains.

G. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode.

H. Inspect earthwork periodically to detect any evidence of the start of erosion. Apply corrective measures as required to control erosion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01505

MOBILIZATION

PART 1    GENERAL

1.01  SECTION INCLUDES

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

1.02  UNIT PRICES

A. Measurement for mobilization is on a lump sum basis.

B. Mobilization payments will be included in monthly payment estimates upon written application by Contractor subject to the following provisions:

1. Authorization for payment of 50 percent of the contract price for mobilization will be made upon receipt and approval by Owner’s Representative of the following items, as applicable:
   a. Schedule of values, if required
   b. Trench safety program
   c. Construction schedule
   d. Pre-construction Photographs, if required

2. Authorization for payment of the remaining 50 percent of the Contract Price for mobilization will be made upon completion of Work amounting to 5 percent of the Contract Price less the mobilization unit price.

C. Mobilization payments will be subject to retainage amounts stipulated in the General Conditions.

D. De-mobilization costs are incidental and the Contractor is responsible for de-mobilization from the site in conformance with the requirements of these contract documents.

PART 2    PRODUCTS - NOT USED

PART 3    EXECUTION - NOT USED

END OF SECTION
SECTION 01526  
TRENCH SAFETY SYSTEMS

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A. Trench safety system for the construction of trench excavations.

B. Trench safety system for structural excavations which fall under provisions of State and Federal trench safety laws.

1.02  UNIT PRICES

A. Measurement for trench safety systems used on trench excavations is on a linear foot basis, when listed as a separate unit price within the bid proposal, measured along the centerline of the trench, including manholes and other line structures. If no trench safety unit price is listed within the bid proposal, any trench safety required for the work will be considered incidental to the work performed. No separate measurement will be made of shoring systems used by the Contractor for protection unless identified as Special Shoring on the Drawings. Shoring, other than Special shoring, will be included in the trench safety system measurements.

B. Measurement for Special Shoring system installations shown on the Drawings and included in the bid schedule for trench excavations, is on a square foot basis, or lump sum basis, as specified in the bid proposal.

C. No payment will be made for trench safety systems for structural excavations under this section. Include payment for trench safety system in applicable structure installation sections.

1.03  DEFINITIONS

A. A trench is defined as a narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.

B. The trench safety system requirements apply to larger open excavations if the erection of structures or other installations limits the space between the excavation slope and the installation to dimensions equivalent to a trench as defined.

C. Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measure to eliminate them.

D. Trench Safety Systems include both Protective Systems and Shoring Systems but are not limited to sloping, sheeting, trench boxes or trench shields, slide rail systems,
sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.

1. Protective Systems: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of an adjacent structure.

2. Shoring System: A structure that supports the sides of an excavation and which is designed to prevent cave-ins, or to prevent movements of the ground affecting adjacent installations or improvements.

3. Special Shoring: A shoring system meeting Special Shoring Requirements for locations identified on the Drawings.

1.04 SUBMITTALS

A. Submittals shall conform to requirements of sections and provisions of these specifications.

B. Submit a safety program specifically for the construction of trench excavation. Design the trench safety program to be in accordance with OSHA 29CFR standards governing the presence and activities of individuals working in and around trench excavations, and in accordance with any Special Shoring requirements at locations shown on the Drawings.

C. Have construction and shop drawings for trench safety systems sealed as required by OSHA by a licensed Professional Engineer retained and paid by the Contractor.

D. Review of the safety program by the Owner Representative will only be in regard to compliance with the Contract Documents and will not constitute approval by the Owner or the Owner Representative nor relieve Contractor of obligations under State and Federal trench safety laws.

1.05 REGULATORY REQUIREMENTS

A. Install and maintain trench safety systems in accordance with the provision of Excavations, Trenching, and Shoring, Federal Occupation Safety and Health Administration (OSHA) Standards, 29CFR, Part 1926, Subpart P, as amended, including Final Rule, published in the Federal Register Vol. 54, No. 209 on Tuesday, October 31, 1989 and subsequent updates. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-652 and additional sections that may be adopted subsequent to the adoption of this specification.

B. The Contractor can locate a copy of the OSHA standards included in "Subpart P - Excavations" from the Federal Register Vol. 54, No. 209 is available upon request to Contractors bidding on Owner’s projects. The Owner assumes no responsibility for the accuracy of the reproduction. The Contractor is responsible for obtaining a copy of this section of the Federal Register.
C. The Contractor must comply with any legislation that has been enacted by the Texas Legislature with regard to Trench Safety Systems, is hereby incorporated, by reference, into these specifications. Refer to Texas Health and Safety Code Ann., §756.021 (Vernon 1991).

D. Reference materials, if developed for a specific project, will be issued with the Bid Documents, including the following:

1. Geotechnical information obtained for use in design of the trench safety system.

2. Special Shoring Requirements, if applicable.

1.06 INDEMNIFICATION

A. Contractor shall indemnify and hold harmless the Owner, its employees, and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgments or claims by anyone for injury or death of persons resulting from the collapse or failure of trenches constructed under this Contract.

B. Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to safety program and design reviews, inspections, failures to issue stop work orders, and the hiring of the Contractor.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INSTALLATION

A. Install and maintain trench safety systems in accordance with provisions of OSHA 29CFR.

B. Install specially designed trench safety systems shall be installed in accordance with the Contractor’s trench excavation safety program for the locations and conditions identified in the program. Install Special Shoring at the locations shown on the Drawings.

C. Obtain verification from a competent person, as identified in the Contractor’s trench excavation safety program, that trench boxes and other pre-manufactured systems are certified for the actual installation conditions.

3.02 INSPECTION

A. Conduct daily inspections by Contractor or Contractor's independently retained consultant, of the trench safety systems to ensure that the installed systems and
operations meet OSHA 29CFR and other personnel protection regulations requirements.

B. If evidence of possible cave-ins or slides is apparent, Contractor shall immediately stop work in the trench and move personnel to safe locations until necessary precautions have been taken to safeguard personnel.

C. Contractor shall maintain a permanent record of daily inspections. Upon request, the Contractor shall supply to Owner a copy of these records.

3.03 FIELD QUALITY CONTROL

A. Verify specific applicability of the selected or specially designed trench safety systems to each field condition encountered on the project.

END OF SECTION
SECTION 01535

TREE AND PLANT PROTECTION

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A. Tree and plant protection.

1.02  PROJECT CONDITIONS

A. Preserve and protect existing trees and plants to remain from foliage, branch, trunk, or root damage that could result from construction operations.

B. Prevent following types of damage:

1. Compaction of root zone by foot or vehicular traffic, or material storage.

2. Trunk damage from equipment operations, material storage, or from nailing or bolting.

3. Trunk and branch damage caused by ropes or guy wires.

4. Root poisoning from spilled solvents, gasoline, paint, and other noxious materials.

5. Branch damage due to improper pruning or trimming.

6. Damage from lack of water due to:
   a. Cutting or altering natural water migration patterns near root zones.
   b. Failure to provide adequate watering.

7. Damage from alteration of soil PH factor caused by depositing lime, concrete, plaster, or other base materials near roots.

8. Cutting of roots larger than one inch in diameter.

1.03  DAMAGE ASSESSMENT

A. When trees other than those designated for removal are destroyed or badly damaged as a result of construction operations, remove and replace with same size, species, and variety up to and including 8 inches in trunk diameter. Tree larger than 8 inches in diameter shall be replaced with an 8-inch diameter tree of the same species and variety and total contract amount will be reduced by an amount determined from the following formula: 0.7854 x D^2 x $10.00 where D is diameter in inches of tree or
shrub trunk measured 12 inches above grade. Contractor shall contact Owner prior to removing any tree. Owner must approve removal of any trees.

PART 2  

PRODUCTS

2.01 MATERIALS

A. Asphalt paint: Emulsified asphalt or other adhesive, elastic, antiseptic coating formulated for horticultural use on cut or injured plant tissue, free from kerosene and coal creosote.

B. Burlap: Suitable for use as tree wrapping.

C. Fertilizer: Liquid containing 20 percent nitrogen, 10 percent phosphorus, and 5 percent potash.

D. All necessary tree replacements shall be as approved by Owner Representative.

PART 3  

EXECUTION

3.01 PROTECTION AND MAINTENANCE OF EXISTING TREES AND SHRUBS

A. Except for trees and shrubs shown on Drawings to be removed, all trees and shrubs within the project area are to remain and be protected from damage.

B. For trees to be removed, as designated on the Drawings, perform the following:

1. Stake right-of-way limits and identify any tree of diameter greater than 4 inches which is to be removed. Mark trees prior to felling with an X in orange paint, clearly visible, on the trunk, and at eye level.

2. After marking trees give a minimum of 48-hours notice in writing to the Owner Representative of intent to begin felling operations.

3. Trees whose trunks are only partially in the right-of-way shall be protected and preserved as described in 3.01(C) below.

4. Trees scheduled for removal shall be sawed down and debris hauled from the site the same day. The stump shall be ground to 6” below grade and excess grindings shall be hauled from the site the same day, so that a pile of grindings is not left where the stump was ground. Enough grindings should be left so that an open hole does not remain.

5. Only those trees called out for removal in the drawings shall be removed. Should it be determined that any additional trees must be removed, a permit must be applied for and approved from the City.

6. Trees designated for removal shall be hauled off and removed at Contractors expense. Disposal methods are to be approved by Owner. Owner reserves the right to take possession of the removed trees.
C. For trees or shrubs to remain, perform the following:

1. Trim trees and shrubs only as necessary and in accordance with the recommendations of a licensed arborist employed by the Contractor.
   a. Trees and shrubs requiring pruning for construction should also be pruned for balance as well as to maintain proper form and branching habit.
   b. Cut limbs at branch collar. No stubs should remain on trees. Branch cuts should not gouge outer layer of tree structure or trunk.

2. Use extreme care to prevent excessive damage to root systems.
   a. A licensed arborist shall be employed by the Contractor before any root damage occurs. Should root damage be unavoidable, with licensed arborist approval, the following should be followed:
      (1). Roots in construction areas will be cut smoothly with a trencher before excavation begins. Do not allow ripping of roots with a backhoe or other equipment.
      (2). Temporarily cover exposed roots with wet burlap to prevent roots from drying out.
      (3). Cover exposed roots with soil as soon as possible.

3. Prevent damage or compaction of root zone (area below dripline) by construction activities.
   a. Do not allow scarring of trunks or limbs by equipment or other means.
   b. Do not store construction materials, vehicles, or excavated material under dripline of trees.
   c. Do not pour liquid materials under dripline.

4. Water and fertilize trees and shrubs that will remain to maintain their health during construction period.
   a. Supplemental watering of landscaping during construction should be done once every 7 days in cold months and once every 4 days in hotter months.
   b. This watering shall consist of saturating soils at least 6 to 8 inches beneath surface.

5. Water areas currently being served by private sprinkler systems while systems are temporarily taken out of service to maintain health of existing landscapes.
6. At option of the Contractor and with the Owner Representative’s permission, trees and shrubs to remain may be temporarily transplanted and returned to original positions under supervision of a licensed arborist.

3.02 PROTECTION

A. Protection of Trees or Shrubs in Open Area:
   1. Install steel drive-in fence posts in protective circle, approximately 8 feet on center, not closer than 4 feet to trunk of trees or stems of shrubs.
   2. Drive steel drive-in fence posts 3 feet minimum into ground, leaving 5 feet minimum above ground.
   4. For trees or shrubs in paved areas, mount concrete-filled steel pipe 2-1/2 inches in diameter minimum in rubber auto tires filled with concrete (movable posts).

B. Timber Wrap Protection for Trees in Close Proximity of Moving or Mechanical Equipment and Construction Work:
   1. Wrap trunk with layer of burlap.
   2. Install 2 x 4's or 2 x 6's (5-foot to 6-foot lengths) vertically, spaced 3 inches to 5 inches apart around circumference of tree trunk.
   3. Tie in place with 12 to 9 gage steel wire.

3.03 MAINTENANCE OF NEWLY PLANTED TREES

A. Water trees during dry periods.

B. The Contractor guarantees that trees planted for this Project shall remain alive and healthy at least until the end of a one-year warranty period.
   1. Within four weeks of notice from Owner, Contractor shall replace, at his expense, any dead trees or any trees that in the opinion of Owner, have become unhealthy or unsightly or have lost their natural shape as a result of additional growth, improper pruning or maintenance, or weather conditions.
   2. When tree must be replaced, the guarantee period for that tree shall begin on date of replacement of tree, subject to the Owner’s inspection, for no less than one year.
   3. Straighten leaning trees and bear entire cost.
   4. Dispose of trees rejected at any time by Owner Representative at Contractor’s expense.
SECTION 01563

CONTROL OF GROUND WATER AND SURFACE WATER

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A. Dewatering, depressurizing, draining, and maintaining trench and structure excavations and foundation beds in dry and stable condition.

B. Protecting work against surface runoff and rising flood waters.

C. Disposing of removed water.

1.02  METHOD OF PAYMENT

A. Subsurface investigation and groundwater control plan preparation and monitoring shall be incidental to the project and shall include subsurface investigation to identify groundwater conditions, design, install, operate, maintain, and monitor ground water control systems.

B. No separate payment will be made for control of ground water and surface water except for well pointing and piezometer. Include the cost to control ground water and surface water in unit price for work requiring such controls. Dewatering required for the removal of standing water, surface drainage seepage, or to protect against rising waters or floods shall be considered incidental to work.

C. Well pointing shall be paid by the linear foot and measured along the centerline of the utility installed regardless if well pointing is required on one or both sides of the trench.

D. Pizometers and environmental monitoring wells, if required, shall be paid for by the unit of each.

1.03  DEFINITIONS

A. Ground water control includes both dewatering and depressurization of water-bearing soil layers.

1. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations and disposing of removed water. The intent of dewatering is to increase stability of excavated slopes; prevent dislocation of material from slopes or bottoms of
excavations; reduce lateral loads on sheeting and bracing; improve excavating and hauling characteristics of excavated material; prevent failure or heaving of the bottom of excavations; and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.

2. Depressurization includes reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottom.

B. Excavation drainage includes keeping excavations free of surface and seepage water.

C. Surface drainage includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect the Work from any source of surface water.

D. Equipment and instrumentation for monitoring and control of the ground water control system includes piezometers and monitoring wells, and devices, such as flow meters, for observing and recording flow rates.

1.04 PERFORMANCE REQUIREMENTS

A. Conduct subsurface investigations to identify groundwater conditions and to provide parameters for design, installation, and operation of groundwater control systems.

B. Design a ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926 and Section 01526 - Trench Safety Systems, to produce the following results:

1. Effectively reduce the hydrostatic pressure affecting excavations.

2. Develop a substantially dry and stable subgrade for subsequent construction operations.

3. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities, and other work.

4. Prevent the loss of fines, seepage, boils, quick condition, or softening of the foundation strata.

5. Maintain stability of sides and bottom of excavations.

C. Ground water control systems may include single-stage or multiple-stage well point systems, eductor and ejector-type systems, deep wells, or combinations of these equipment types.
D. 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.

E. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.

F. 

G. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.

H. Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the ground water control operations. 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, or affect potentially contaminated areas. Repair damage caused by ground water control systems or resulting from failure of the system to protect property as required.

I. Provide an adequate number of piezometers installed at the proper locations and depths as required to provide meaningful observations of the conditions affecting the excavation, adjacent structures, and water wells.

J. Provide environmental monitoring wells installed at the proper locations and depths as required to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into the work area or into the ground water control system.

K. Decommission piezometers and monitoring wells installed during design phase studies and left for Contractors monitoring and use.

L. Contractor is responsible for determining the path for the flow of the diverted water. Further, Contractor shall obtain any easements and permits required for the path and follow all local, state and federal requirements, including requirements for erosion control. Path shall direct water to the bay if possible instead of ocean side of the island.

1.05 SUBMITTALS

A. Submittals shall conform to all sections and provisions of these contract documents.
B. Submit a Ground Water and Surface Water Control Plan for review by the Owner’s Representative prior to start of any field work. Submit a plan to include the following:

1. Results of subsurface investigation and description of the extent and characteristics of water bearing layers subject to ground water control.

2. Names of equipment suppliers and installation subcontractors.

3. A description of proposed ground water control systems indicating arrangement, location, depth and capacities of system components, installation details and criteria, and operation and maintenance procedures.

4. A description of proposed monitoring and control system indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics.

5. A description of proposed filters including types, sizes, capacities and manufacturer's application recommendations.

6. Design calculations demonstrating adequacy of proposed systems for intended applications. Define potential area of influence of ground water control operation near contaminated areas.

7. Operating requirements, including piezometric control elevations for dewatering and depressurization.

8. Excavation drainage methods including typical drainage layers, sump pump application and other necessary means.

9. Surface water control and drainage installations.

10. Proposed methods and locations for disposing of removed water.

C. Submit the following records upon completed initial installation:

1. Installation and development reports for well points, eductors, and deep wells.

2. Installation reports and baseline readings for piezometers and monitoring wells.

3. Baseline analytical test data of water from monitoring wells.

4. Initial flow rates.
D. Submit the following records on a weekly basis during operations:
   1. Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization. Refer to Paragraph 3.02, Requirements for Eductor, Well Points, or Deep Wells.
   2. Maintenance records for ground water control installations, piezometers, and monitoring wells.

E. Submit the following records at end of work. Decommissioning (abandonment) reports for monitoring wells and piezometers installed by other during the design phase and left for Contractor's monitoring and use.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of agencies having jurisdiction.

B. Comply with Texas Commission on Environmental Quality regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.

C. Obtain permit from EPA under the Texas Pollutant Discharge Elimination System (TPDES), for storm water discharge from construction sites. Refer to Section 01565 TPDES Permit Requirements.

D. Obtain all necessary permits from agencies with control over the use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, take early action to pursue and submit for the required approvals.

E. Monitor ground water discharge for contamination while performing pumping in the vicinity of potentially contaminated sites.

F. Discharge with high levels of salinity shall be discharge directly to salt water body and shall not be conveyed by surface drainage or open ditch that may kill vegetation.

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 dewatering. Selected equipment and materials are subject to review of the Owner’s Representative through submittals.
B. Ejectors, well points, or deep wells, where used, must be furnished, installed and operated by an experienced contractor regularly engaged in ground water control system design, installation, and operation.

C. All equipment must be in good repair and operating order.

D. Sufficient standby equipment and materials shall be kept available to ensure continuous operation, where required.

E. When well-pointing in residential areas, utilize noise reducing pumps and said pumps must be approved by the Owner.

PART 3  EXECUTION

3.01 GROUND WATER CONTROL

A. Perform a subsurface investigation by borings as necessary to identify water bearing layers, piezometric pressures, and soil parameters for design and installation of ground water control systems. Perform pump tests, if necessary to determine the drawdown characteristics of the water bearing layers. The results shall be presented in the Ground Water and Surface Water Control Plan (See Paragraph 1.05B.1).

B. Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in a manner compatible with construction methods and site conditions. Monitor effectiveness of the installed system and its effect on adjacent property.

C. Install, operate, and maintain ground water control systems in accordance with the Ground Water and Surface Water Control Plan. Notify Owner’s Representative in writing of any changes made to accommodate field conditions and changes to the Work. Provide revised drawings and calculations with such notification.

D. Provide for continuous system operation, including nights, weekends, and holidays. Arrange for appropriate backup if electrical power is primary energy source for dewatering system.

E. Monitor operations to verify that the system lowers ground water piezometric levels at a rate required to maintain a dry excavation resulting in a stable subgrade for prosecution of subsequent operations.

F. Where hydrostatic pressures in confined water bearing layers exist below excavation, depressurize those zones to eliminate risk of uplift or other instability of excavation or installed works. Allowable piezometric elevations shall be defined in the Ground Water and Surface Water Control Plan.
G. Maintain water level below subgrade elevation. Do not allow levels to rise until foundation concrete has achieved design strength.

H. 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. Do not allow water levels to rise into cement stabilized sand until at least 48 hours after placement.

I. Provide a uniform diameter for each pipe drain run constructed for dewatering.

J. Extent of construction ground water control for structures with a permanent perforated underground drainage system may be reduced, such as for units designed to withstand hydrostatic uplift pressure. Provide a means of draining the affected portion of underground system, including standby equipment. Maintain drainage system during operations and remove it when no longer required.

K. Remove system upon completion of construction or when dewatering and control of surface or ground water is no longer required.

L. Backfill all well-pointed holes.

M. Compact backfill to not less than 95 percent of the maximum dry density in accordance with ASTM D698.

3.02 REQUIREMENTS FOR EDUCTOR, WELL POINTS, OR DEEP WELLS

A. For aboveground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between every eductor well or well point and discharge header so that discharge from each installation can be visually monitored.

B. Install sufficient piezometers or monitoring wells to show that all trench or shaft excavations in water bearing materials are predrained prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install piezometers and monitoring wells for tunneling as appropriate for Contractor's selected method of work.

C. Install piezometers or monitoring wells not less than one week in advance of beginning the associated excavation as required in Contractor’s best judgment.

D. Dewatering may be omitted for portions of underdrains or other excavations, but only where auger borings and piezometers or monitoring wells show that soil is predrained by an existing system such that the criteria of the ground water control plan are satisfied.
E. Replace installations that produce noticeable amounts of sediments after development.

F. Provide additional ground water control installations, or change the methods, in the event that the installations according to the ground water control plan does not provide satisfactory results based on the performance criteria defined by the plan and by the specification. Submit a revised plan. No separate pay for the additional plan.

3.03 MAINTENANCE AND OBSERVATION

A. Conduct daily maintenance and observation of piezometers or monitoring wells while the ground water control installations or excavation drainage are operating in an area. Keep system in good condition.

B. Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedule.

C. Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make observations, as specified.

D. Remove and grout piezometers inside or outside the excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by the Owner’s Representative.

3.04 MONITORING AND RECORDING

A. Monitor and record average flow rate of operation for each deep well, or for each wellpoint or eductor header used in dewatering system. Also monitor and record water level and ground water recovery. These records shall be obtained daily until steady conditions are achieved, and twice weekly thereafter.

B. Observe and record elevation of water level daily as long as ground water control system is in operation, and weekly thereafter until the Work is completed or piezometers or wells are removed, except when Owner’s Representative determines that more frequent monitoring and recording are required. Comply with Owner’s Representative’s direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended purpose.

3.05 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. The requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
B. Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by such agencies.

END OF SECTION
SECTION 01564
WASTE MATERIAL DISPOSAL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Disposal of waste material and salvageable material.

1.02 UNIT PRICES
A. No separate payment will be made for waste material disposal under this Section. Include payment in unit price for related work.

1.03 SUBMITTALS
A. Submittals shall conform to requirements of all Sections and provisions of these contract documents.

B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances. Disposed material placed as fill shall be approved by the Owner and shall be in accordance with all local, state and federal requirements.

C. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SALVAGEABLE MATERIAL
A. Excavated material: When indicated on Drawings, load, haul, and deposit excavated material at a location or locations shown on Drawings outside the limits of Project.

B. Base, surface, and bedding material: Deliver shell, gravel, bituminous, or other base and surfacing material designated for salvage to the location designated by the Owner’s Representative.

C. Pipe culvert: Deliver culverts designated for salvage to Owner’s storage area.

D. Other salvageable materials: Conform to requirements of individual Specification Sections.

E. Coordinate delivery of salvageable material with Owner’s Representative.
3.02 EXCESS MATERIAL

A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become the property of Contractor and shall be removed from the job site and legally disposed of at no cost to the Owner. Upon Owner’s request, Contractor to provide disposal site of material.

B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner and permits are obtained. See Paragraph 1.03 C above.

C. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

END OF SECTION
SECTION 01565

TPDES REQUIREMENTS

PART 1  GENERAL

1.01  SECTION INCLUDES

A.  Documentation to be prepared and signed by Contractor before conducting construction operations, in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000 issued February 15, 2008 (the Construction General Permit) or latest revision.

B.  Implementation, maintenance inspection, and termination of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Drawings or specified elsewhere in the Contract.

C.  Review implementation of the Storm Water Pollution Prevention Plan (SW3P or SWPPP) in a meeting with Project Manager prior to start of construction.

1.02  DEFINITIONS

A.  Commencement of Construction Activities: The exposure of soil resulting from activities such as clearing, grading, and excavating.

B.  Large Construction Activity: Project that:

1.  disturbs five acres or more, or

2.  disturbs less than five acres but is part of a larger common plan of development that will disturb five acres or more of land.

C.  Small Construction Activity: Project that:

1.  disturbs one or more acres but less than five acres, or

2.  disturbs less than one acre but is part of a larger common plan of development that will ultimately disturb one or more acres but less than five acres.

D.  TPDES Operator:

1.  Provide the name and contact information for the designated TPDES operator.

2.  The TPDES operator is the person or persons who have day-to-day operational control of the construction activities which are necessary to ensure compliance with the SW3P for the site or other Construction General Permit conditions.
PART 2  P R O D U C T S - Not Used

PART 3  E X E C U T I O N


A. Prepare a SW3P following Part III of the Construction General Permit, if required.

B. Update or revise the SW3P as needed during the construction following Part III, Section E of the Construction General Permit.

C. Submit the SW3P and any updates or revisions to Owner’s Representative for review and address comments prior to commencing, or continuing, construction activities.

3.02  N O T I C E O F I N T E N T F O R L A R G E C O N S T R U C T I O N A C T I V I T Y

A. Fill out, sign, and date TCEQ Form 20022 (03/05/2008) “Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under the TPDES Construction General Permit (TXR 150000)”, Attachment 1 of this section.

B. Transmit the signed Contractor’s copy of TCEQ Form 20022 (03/05/2008), along with a $325.00 check or required fee, made out to Texas Commission on Environmental Quality, and the completed Payment Submittal Form to the Owner’s Representative.

C. Owner’s Representative will complete a separate TCEQ Form 20022 (03/05/2008) for City’s Notice of Intent, and will submit both Notices, along with checks for application fees, to the TCEQ.

D. Submission of the Notice of Intent form by both the Contractor to TCEQ is required a minimum of two days before Commencement of Construction Activities.

E. Fill out, sign, and date the “Construction Site Notice”, Attachment 2A to TPDES General Permit TXR 150000, “Construction Site Notice”, Attachment 2A of this section.

F. Transmit the signed Construction Site Notice to at least seven days prior to Commencement of Construction Activity.

3.03  C O N S T R U C T I O N S I T E N O T I C E F O R S M A L L C O N S T R U C T I O N A C T I V I T Y

A. Fill out, sign, and date the “Construction Site Notice”, Attachment 2B to TPDES General Permit TXR 150000, “Construction Site Notice”, Attachment 2B of this section.

B. Transmit the signed Construction Site Notice to Owner’s Representative at least seven days prior to Commencement of Construction Activity.

3.04  C E R T I F I C A T I O N R E Q U I R E M E N T S

A. Fill out TPDES Operator’s Information form, Attachment 3 of this section, including Contractor’s name, address, and telephone number, and the names of persons or firms
responsible for maintenance and inspection of erosion and sediment control measures. Use multiple copies as required to document full information.

B. Contractor and Subcontractors shall sign and date the Contractor’s / Subcontractor’s Certification for TPDES Permitting, Attachment 4 of this section. Include this certification with other Project certification forms.

C. Submit properly completed certification forms to Owner’s Representative for review before beginning construction operations.

D. Conduct inspections in accordance with TCEQ requirements. Ensure persons or firms responsible for maintenance and inspection of erosion and sediment control measures read, fill out, sign, and date the Erosion Control Contractor’s Certification for Inspection and Maintenance. Use the EPA NPDES Construction Inspection Form, Attachment 5 of this section; and the Storm Water Pollution Prevention Plan Construction Site Inspection Report, Attachment 6 of this section to record maintenance inspections and repairs.

3.05 RETENTION OF RECORDS

A. Keep a copy of this document and the SW3P in a readily accessible location at the construction site from the Commencement of Construction Activity until submission of the Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under TPDES Construction General Permit (TXR 150000). Contractors with day-to-day operational control over SW3P implementation shall have a copy of the SW3P available at a central location, on-site, for the use of all operators and those identified as having responsibilities under the SW3P. Upon submission of the NOT, submit all required forms and a copy of the SW3P with all revisions to the Owner’s Representative.

3.06 REQUIRED NOTICES

A. Post the following notices from effective date of the SW3P until date of final site stabilization as defined in the Construction General Permit:

1. Post the TPDES permit number for Large Construction Activity, or a signed TCEQ Construction Site Notice for Small Construction Activity. Signed copies of the Contractor’s NOI must also be posted.

2. Post notices near the main entrance of the construction site in a prominent place for public viewing. Post name and telephone number of Contractor’s local contact person, brief project description and location of the SW3P.
   a. If posting near a main entrance is not feasible due to safety concerns, coordinate posting of notice with Owner’s Representative to conform to requirements of the Construction General Permit.
   b. If Project is a linear construction project (e.g.: road, utilities, etc.), post notice in a publicly accessible location near active construction. Move notice as necessary.

3. Post a notice to equipment and vehicles operators, instructing them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post at each
stabilized construction exit area.
4. Post a notice of waste disposal procedures in a readily visible location on site.

3.07 ON-SITE WASTE MATERIAL STORAGE

A. On-site waste material storage shall be self-contained and shall satisfy appropriate local, state, and federal rules and regulations.

B. Prepare list of waste material to be stored on-site. Update list as necessary to include up-to-date information. Keep a copy of updated list with the SW3P.

C. Prepare description of controls to reduce Pollutants generated from on-site storage. Include storage practices necessary to minimize exposure of materials to storm water, and spill prevention and response measures consistent with industrial program best management practices. Keep a copy of the description with the SW3Ps.

3.08 NOTICE OF TERMINATION

A. Submit a NOT, Attachment 7 of this section, to Owner’s Representative within 30 days after:

1. Final stabilization has been achieved on all portions of the site that are the responsibility of the Contractor; or
2. Another operator has assumed control over all areas of the site that have not been stabilized; and
3. All silt fences and other temporary erosion controls have either been removed, scheduled to be removed as defined in the SW3P, or transferred to a new operator in the new operator has sought permit coverage.

B. Contractor will complete NOT and submit Contractor and City’s notices to the TCEQ and MS4 entities.
Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under TPDES General Permit (TXR1500000)

Sign up now for ePermits NOI at https://www6.tceq.state.tx.us/steers/
Get Instant Permit Coverage and only pay a $225 application fee.

If filing a paper NOI you can pay the application fee online. Go to https://www6.tceq.state.tx.us/epay/

Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION

IMPORTANT:
• Use the INSTRUCTIONS to fill out each question in this form.
• Use the attached CUSTOMER CHECKLIST to make sure all you filled out all required information.
• Incomplete applications WILL delay approval or result in automatic Denial.

Renewal of General Permit
Is this NOI to renew an ACTIVE permit?
☐ Yes - What is your permit number? Permit No. TXR15
☐ No - a permit number will be issued.

Application Fee if mailing a paper NOI:
You must pay the $325 Application Fee to TCEQ for the application to be considered complete.
Payment and NOI must be mailed to separate addresses. See instructions for correct mailing addresses.

Provide your payment information below, for us to verify payment of the application fee:
☐ Mailed: Check/Money Order No.: Company Name on checking account:
☐ FPAY: Voucher No.: Is the Payment Voucher copy attached? ☐ Yes

A. OPERATOR (applicant)

1. If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity?
   CN (Search Central Registry)

2. What is the Legal Name of the entity (applicant) applying for this permit?
   (The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

3. What is the name and title of the person signing the application?
   (The person must be an official meeting signatory requirements in TAC 305.43(c).)

   Name: Job Title:

4. What is the Operator’s (applicant) mailing address as recognized by the US Postal Service? (verify at USPS.com)

   Address: Suite No./Bldg. No./Mail Code:
   City: State: Country Code: ZIP Code: Postal Code:

5. Phone No.: (     ) Extension:

6. Fax No.: (     ) E-mail Address:

7. Indicate the type of Customer:
   ☐ Individual ☐ Sole Proprietorship-D.B.A. ☐ Limited Partnership
   ☐ Corporation ☐ Federal Government ☐ General Partnership
   ☐ State Government ☐ County Government ☐ City Government
   ☐ Other Government ☐ Other (describe):
**ATTACHMENT 1**

<table>
<thead>
<tr>
<th>8. Independent Operator:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Number of Employees:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 0-20.</td>
<td>□ 21-100.</td>
<td>□ 101-250.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Customer Business Tax and Filing Numbers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>REQUIRED for Corporations and Limited Partnerships</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**B. APPLICATION CONTACT**

If TCEQ needs additional information regarding this application, who should be contacted?

| 1. Name: |   | Company: |
| 2. Phone No.: |   | Extension: |
| 3. Fax No.: |   | E-mail Address: |

**C. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

1. TCEQ Issued RE Reference Number (RN): RN

2. Name of Project or Site (the name as known by the community where this facility/project is located):

3. Does the site have a physical address?

   - If Yes, complete Section A for a physical address.
   - If No, complete Section B for site location information.

   **Section A:** Enter the physical address for the site.
   - Street Number: Street Name:
   - City: ZIP Code:

   **Section B:** Enter the site location information.
   - If no physical address (Street Number & Street Name), provide a written location access description to the site.
   - (Ex.: phase 1 of Woodland subdivision located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

   | City where the site is located or nearest city to site: | ZIP Code where site is located: |

4. Identify the county where the site is located:

5. Latitude: Longitude:

6. What is the primary business of this entity? In your own words, briefly describe the primary business of the Regulated Entity. (Do not repeat the SIC and NAICS code)

7. What is the mailing address for the regulated entity?

   - Is the RE mailing address the same as the Operator? □ Yes, address is the same as Operator □ No, provide the address

   | Street Number: | Street Name: |
   | City: | State: |

**D. GENERAL CHARACTERISTICS**

1. Is the site located on Indian Country Lands? □ No □ Yes – If Yes, do not submit this NOI. Contact EPA, Region VI

   If the site is on Indian country lands, you must obtain authorization through EPA, Region VI

2. What is the Standard Industrial Classification (SIC) code (see instructions for common codes)?

   | Primary: | Secondary: | (Search Osba.gov) |
THE CITY OF GALVESTON

TPDES REQUIREMENTS

ATTACHMENT 1

3(a) What is the total number of acres disturbed? 

3(b) Is the project site part of a larger common plan of development or sale? 

If Yes, the total number of acres disturbed can be less than 5 acres. 
If No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

4. Discharge Information (all information MUST be provided or the permit will be denied)

4(a) What is the name of the water body(s) to receive the storm water runoff or potential runoff from the site?

4(b) What is the segment number(s) of the classified water body(s) that the discharge or potential discharge will eventually reach?

4(c) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) list of impaired waters? 

If Yes, provide the name of the impaired water body(s).

4(d) Is the discharge into an MS4? 

If Yes, what is the name of the MS4 Operator?

Note: The general permit requires you to send a copy of the NOI to the MS4 Operator.

4(e) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer?

If the answer is Yes, please note that a copy of the agency approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) must be included or referenced in the Storm Water Pollution Prevention Plan.

E. CERTIFICATION

Check “Yes” to the certifications below. Failure to certify to all items will result in denial.

Yes

I certify that I have obtained a copy and understand the terms and conditions of the general permit (TXR150000).

Yes

I certify that the full legal name of the entity (Operator) applying for this permit has been provided and is legally authorized to do business in Texas.

Yes

I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed.

Yes

I certify that a storm water pollution prevention plan has been developed and implemented prior to construction, and that is compliant with any applicable local sediment and erosion control plans and prepared and implemented as required in the general permit TXR150000.

Operator Certification:

<table>
<thead>
<tr>
<th>Name</th>
<th>(Required &amp; must be legible)</th>
<th>Title</th>
<th>(Required &amp; legible)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: ___________________________ Date: ___________________________

(Use blue ink)
# TPDES REQUIREMENTS

## ATTACHMENT 1

### Did you complete everything? Use this checklist to be sure!

Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

<table>
<thead>
<tr>
<th>Customer GP Notice of Intent Checklist TXR150000</th>
<th>OPERATOR INFORMATION - Confirm each item is complete:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓ Customer Number (CN) issued by TCEQ Central Registry</td>
</tr>
<tr>
<td>□</td>
<td>✓ Legal Name as filed to do business in Texas (Call TX SOS 512/463-5555)</td>
</tr>
<tr>
<td>□</td>
<td>✓ Name and Title of person signing the application. This person must meet signatory requirements in 30 TAC Section 306.43</td>
</tr>
<tr>
<td>□</td>
<td>✓ Operator Mailing Address is complete &amp; verifiable with USPS <a href="http://www.usps.com">www.usps.com</a></td>
</tr>
<tr>
<td>□</td>
<td>✓ Phone Numbers/E-mail Address</td>
</tr>
<tr>
<td>□</td>
<td>✓ Type of Operator (Entity Type)</td>
</tr>
<tr>
<td>□</td>
<td>✓ Independent Operator</td>
</tr>
<tr>
<td>□</td>
<td>✓ Number of Employees</td>
</tr>
<tr>
<td>□</td>
<td>For Corporations or Limited Partnerships — Tax ID and SOS Filing numbers are REQUIRED</td>
</tr>
<tr>
<td>□</td>
<td>Application Contact person we can call for questions about this application</td>
</tr>
<tr>
<td>□</td>
<td>APPLICATION FEE OF $325.00 was mailed separately to TCEQ’s Cashier’s Office (separate from the NOI) or the EPAY payment voucher is attached.</td>
</tr>
<tr>
<td>□</td>
<td>GENERAL CHARACTERISTICS - Confirm each item is complete:</td>
</tr>
<tr>
<td>□</td>
<td>✓ Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)</td>
</tr>
<tr>
<td>□</td>
<td>✓ Site/Project Name/Regulated Entity</td>
</tr>
<tr>
<td>□</td>
<td>✓ Site/Project (RE) Physical Address Please do not use a rural route or post office box for a site location</td>
</tr>
<tr>
<td>□</td>
<td>Or if no physical address, the location information that includes description, zip code and city is listed.</td>
</tr>
<tr>
<td>□</td>
<td>✓ Latitude and Longitude <a href="http://www.earthview.usgs.gov">TCEQ USGS Topographic Map Viewer</a> or TerraServer-USA</td>
</tr>
<tr>
<td>□</td>
<td>✓ Business description</td>
</tr>
<tr>
<td>□</td>
<td>✓ Site Mailing Address (check same as operator or complete &amp; verifiable with USPS <a href="http://www.usps.com">www.usps.com</a>)</td>
</tr>
<tr>
<td>□</td>
<td>GENERAL CHARACTERISTICS - Confirm each item is complete:</td>
</tr>
<tr>
<td>□</td>
<td>✓ Indian Country Lands—the facility is not on Indian Country Lands</td>
</tr>
<tr>
<td>□</td>
<td>✓ Standard Industrial Classification (SIC) code <a href="http://www.osha.gov/industry.html">www.osha.gov/ｏｓｈｉｔｓ/industry.html</a></td>
</tr>
<tr>
<td>□</td>
<td>✓ Acres Disturbed is provided and qualifies for coverage through a NOI.</td>
</tr>
<tr>
<td>□</td>
<td>✓ Common plan of development or for sale?</td>
</tr>
<tr>
<td>□</td>
<td>✓ Discharge Information</td>
</tr>
<tr>
<td>□</td>
<td>✓ receiving water body segment number(s) is REQUIRED</td>
</tr>
<tr>
<td>□</td>
<td>✓ water body on the latest EPA-Approved Clean Water Act 303(d) list of impaired waters</td>
</tr>
<tr>
<td>□</td>
<td>✓ MS4 Operator</td>
</tr>
<tr>
<td>□</td>
<td>Edwards Aquifer Rule</td>
</tr>
<tr>
<td>□</td>
<td>CERTIFICATION Certification statements have been checked indicating “Yes”</td>
</tr>
<tr>
<td>□</td>
<td>Signature meets <a href="http://www.tceq.state.tx.us">30 Texas Administrative Code (TAC) 6305.44</a> and is original and has been provided for the Operator.</td>
</tr>
</tbody>
</table>
# Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## General Information

**Send the Notice of Intent (NOI) and other related forms:**

<table>
<thead>
<tr>
<th>By Regular U.S. Mail</th>
<th>By Overnight/Express Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas Commission on Environmental Quality</td>
<td>Texas Commission on Environmental Quality</td>
</tr>
<tr>
<td>Storm Water Processing Center (MC228)</td>
<td>Storm Water Processing Center (MC228)</td>
</tr>
<tr>
<td>P.O. Box 13087</td>
<td>12100 Park 35 Circle</td>
</tr>
<tr>
<td>Austin, TX 78711-3087</td>
<td>Austin, TX 78753</td>
</tr>
</tbody>
</table>

**TCEQ Contact:**

- Application Processing Questions relating to the status and form requirements: 512/239-3700, 512/245-0130 or sxpermit@tceq.state.tx.us
- Technical Questions relating to the general permit: 512/239-4671 or sspp@tceq.state.tx.us
- Environmental Law Division: 512/239-0600
- Records Management for obtaining copies of forms submitted to TCEQ: 512/239-0900
- Information Services for obtaining reports from program data bases (as available): 512/239-DATA (3282)
- Financial Administration's Cashier's office: 512/239-0357 or 512/239-0187

**Notice of Intent Process:**

1. **Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address on the form must be verified with the US Postal service as an address receiving regular mail delivery. Never give an overnight/express mailing address.

2. **Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.

3. **Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.

   **or:**

   **Denial of Coverage:** If the application is too incomplete to process, or the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

**General Permit (Your Permit)**

If filing the NOI through ePermits online application, coverage under the general permit begins the day the NOI is submitted to TCEQ through ePermits. [Sign up now for on line NOI at https://www6.tceq.state.tx.us/steers/](https://www6.tceq.state.tx.us/steers/)

If mailing a paper NOI, coverage under the general permit begins seven (7) days after a completed NOI is postmarked for delivery to the TCEQ. You should have a copy of your general permit when submitting your application.

You may view and print your permit for which you are seeking coverage, on the TCEQ web site [http://www.tceq.state.tx.us/permitting/water_quality/stormwater/TXR15_AIR.html](http://www.tceq.state.tx.us/permitting/water_quality/stormwater/TXR15_AIR.html)

**General Permit Forms**

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) #20391 with instructions are available in Adobe Acrobat PDF format on the TCEQ web site [http://www.tceq.state.tx.us/permitting/water_quality/stormwater/TXR15_AIR.html](http://www.tceq.state.tx.us/permitting/water_quality/stormwater/TXR15_AIR.html)

Sign up now for on line Notice of Termination application at [https://www6.tceq.state.tx.us/steers/](https://www6.tceq.state.tx.us/steers/)

**Change in Operator**

An authorization under the general permit is not transferable. If the operator or owner of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted not later than 10 days prior to the change in Operator status.
TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a core data form to TCEQ.

After final acknowledgment of coverage under the general permit, the program will assign a Customer Number (CN) and Regulated Entity Number (RN). For Construction Permits, a new RN will be assigned for each Notice of Intent filed with TCEQ, since construction project sites can overlap with other Customers. The RN assigned to your construction project will not be assigned to any other TCEQ authorization.

You can find the information on the Central Registry website at www.tceq.state.tx.us/cpub. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled “Additional ID”. Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

Application Fee:

$225.00 application fee if submitting the NOI through ePermits.
$325.00 application fee if submitting a paper NOI for processing.

The application fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delay in acknowledgment or denial of coverage under the general permit.

- Mailed Payments:
  DO NOT mail your check with the original Notice of Intent application.
  Use the attached Application Fee payment submittal form is mailing the payment. Do not include a copy of the NOI.

BY REGULAR U.S. MAIL
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

- ePAY Electronic Payment
Go to https://www6.tceq.state.tx.us/egap
Select Water Quality, then select the fee category “GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION”.
You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

The Annual Water Quality Fee has been consolidated into the Application Fee effective March 5, 2008. An annual fee will not be assessed and billed to operators on 9/1/2008. This does not relieve the operator of fees due for prior fiscal year assessments.

The operator will continue to receive an invoice for payment of any past due annual fee. A 5% penalty will be assessed if the payment is received by TCEQ after the due date. Annual fee assessments cannot be waived as long as the authorization under the general permit was active on September 1 of the FY billed.
THE CITY OF GALVESTON

TPDES REQUIREMENTS

ATTACHMENT 1

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

A. OPERATOR (As defined in the general permit)

1. TCEQ Issued Customer Number (CN)
   TCEQ's Central Registry will assign each customer a number that begins with "CN," followed by nine digits. This is not a permit number, registration number, or license number.
   • If this customer has not been assigned a Customer Reference Number, leave the space for the Customer Reference Number blank.
   • If this customer has already been assigned this number, enter the operator's Customer Reference Number in the space provided.

2. Legal Name
   Provide the legal name of the facility operator, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, or go to [http://www.sos.state.tx.us/corp/contact.shtml](http://www.sos.state.tx.us/corp/contact.shtml) for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

3. Name and Title of person signing the Notice of Intent application form. Signature meets 30 Texas Administrative Code (TAC) 6305.44

4. Operator Mailing Address
   Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable through the US Postal Service at [www.usps.com](http://www.usps.com), for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

5. Phone Number
   This number should correspond to this customer’s mailing address given earlier. Enter the area code and phone number here. Leave “Extension” blank if this customer’s phone system lacks this feature.

6. Fax Number and E-mail Address
   This number and E-mail address should correspond to the operator’s mailing address provided earlier. (Optional Information)

7. Type of Entity
   Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type:
   
   **Individual** is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.
   
   **Sole Proprietorship—D.B.A.** is a customer that is owned by only one person and has not been incorporated. This business may:
   • be under the person's name
   • have its own name ("Doing business as,...") or D.B.A.
   • have any number of employees
   
   **Partnership** is a customer that is established as a partnership as defined by the Texas Secretary of State's Office.
   
   **Corporation** is a customer that meets all of these conditions:
   • is a legally incorporated entity under the laws of any state or country
   • is recognized as a corporation by the Texas Secretary of State
   • has proper operating authority to operate in Texas
   
   **Government** - Federal, state, county, or city government (as appropriate)
   
   The customer is either an agency of one of these levels of government or the governmental body itself.
   
   **Other** is Estate, Trust, etc.
   
   The customer does not fit one of the above descriptions. Enter a short description of the type of customer in the blank provided.

8. Independent Operator
   Check “No” if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check “Yes.”

9. Number of Employees
   Check one box to show the number of employees for this customer’s entire company, at all locations. This is not necessarily the number of employees at the site named in the NOI.

10. State Franchise Tax ID Number
    Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

Federal Tax ID
All businesses, except for some sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a Federal TIN.

TX SOS Charter (filing) Number
Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555. [http://www.sos.state.tx.us/corp/contact.shtml](http://www.sos.state.tx.us/corp/contact.shtml)

---

TCEQ-20025 Instructions (03/05/2008)
# ATTACHMENT 1

## TPDES REQUIREMENTS

### THE CITY OF GALVESTON

<table>
<thead>
<tr>
<th>DUNS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.</td>
</tr>
</tbody>
</table>

### B. Application Contact

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application. If the application is missing information and there is no contact person to call, the application may be denied.

### C. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

1. **Regulated Entity, Reference Number (RN)**
   - This is a number issued by TCEQ’s Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number.
   - If this Regulated Entity has not been assigned a Regulated Entity Number, leave this space blank.
   - If this customer has been assigned this number, enter the operator’s Regulated Entity Number.

2. **Site/Project Name/Regulated Entity**
   - If the site is already regulated by TCEQ, use the same name as on the existing Regulated Entity Reference Number (RN).

   If new, provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity.

3. **Site/Project (RE) Physical Address**

   **Section A.** Enter the complete physical address of where the site is located. This must be a street number and street name for a complete physical address. This address must be validated through US Postal Service or your local police (911 service) as a valid address. Please confirm this to be a complete and valid address. In some rural areas, new addresses are being assigned to replace rural route addresses. Please do not use a rural route or post office box for a site location.

   **Section B.** If a site does not have an actual physical address that includes a street number and street name, then provide a complete written location description, access description, and the zip code and city where the site is located.

   For example: “The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 Southbound lane.” This includes authorizations for construction projects such as highways and subdivisions.

4. **Identify the County where the site is located.** If the site covers more than one county, provide the county that is most affected by the authorized activity and list the additional county(ies) as secondary.

5. **Latitude and Longitude**
   - Enter the latitude and longitude of the site in either degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to TCEQ USGS Topographic Map Viewer or TerraServer-USA.

6. **Description of Activity Regulated**
   - In your own words, briefly describe the primary business being conducted at the site. (A description specific to what you are doing that requires this authorization - Do not repeat the SIC Code(s)).

### SITE MAILING ADDRESS

Provide a complete mailing address to be used by TCEQ for receiving mail at the site. In most cases, the address is the same as the operator. If not, simply place a check mark in the box. If you provide a different address, please verify the address with USPS as instructed above for the operator address.

### D. GENERAL CHARACTERISTICS

1. **Indian Country Lands**
   - If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. If you obtain authorization through EPA, Region VI, Dallas. Do not submit this form to TCEQ.

   Indian Country means (1) all land within the limits of any American Indian reservation under the jurisdiction of the U.S. government, notwithstanding the issuance of any patent, and including rights-of-way running throughout the reservation; (2) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a State; and (3) all Indian allotments, the Indian titles of which have not been extinguished, including rights-of-way running through the same.

   Indian Tribe means any Indian Tribe, band, nation, or community recognized by the Secretary of the Interior and exercising substantial governmental duties and powers.

2. **Standard Industrial Classification (SIC) code**
   - Provide the SIC code that best describes the construction activity being conducted at the site.
ATTACHMENT 1

3. Estimated Area of Land Disturbed
3(a). Provide the approximate number of acres that the construction site will disturb.
3(b). Indicate if the site is part of a common plan of development or for sale.

Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage.

Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs five acres or more acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres.

“Disturb” means any clearing, grading, excavating, or other similar activities. If you have any questions about this item, please call the storm water technical staff at (512)239-4671.

4. Discharge Information
4(a). The storm water may be discharged directly to a receiving stream or through a MS4* from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

4(b). The classified segment number(s) is REQUIRED to get coverage. Go to the link to find the segment number of the classified water body where storm water will flow http://www.tceq.state.tx.us/compliance/monitoring/water_quality/data/query/viewer/viewer.html. Call Water Quality Assessments at 512/235-4671 for further assistance. Another source for segments is http://www.tceq.state.tx.us/compliance/monitoring/water_quality/data/query/viewer/viewer.html

4(c). If any surface water body(ies) receiving discharges from the construction site are on the latest EPA-approved CWA § 303(d) list of impaired waters, provide the name(s) of the water body(ies).

EPA approved CWA 303d list of impaired waters can be found at: Texas Water Quality Inventory and 303(d) List – Texas Commission on Environmental Quality - www.tceq.state.tx.us

4(d). Identify the MS4* Operator name if the storm water discharge is into an MS4.

*MS4 is an acronym for Municipal separate storm sewer system. MS4 is defined as a separate storm sewer system owned or operated by a state, city, town, county, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, that discharges to water in the state.

For assistance, you may call the technical staff of the Water Quality Assessment & Standards Section at 512/239-4671.

4(e). Edwards Aquifer Rule
See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at http://www.tceq.state.tx.us/compliance/field_ops/eapo/viewer.html.

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included as a part of the Storm Water Pollution Prevention Plan. The certification must be answered “Yes” for coverage under the general permit.

E. CERTIFICATIONS

Failure to indicate “Yes” to ALL of the certification items may result in denial of coverage under the general permit.

The certification must be an original signature of a person meeting the signatory requirements specified under 39 Texas Administrative Code §306.44

IF YOU ARE A CORPORATION:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §306.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §306.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or
similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality’s Environmental Law Division at 512/239-0600.

30 Texas Administrative Code
§305.44. Signatories to Applications.

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).
Texas Commission on Environmental Quality  
General Permit Payment Submittal Form  
5325 for a paper Construction NOI Application Fee  

Use this form to submit your Application Fee only if you are mailing your payment.  
* Complete items 1 through 5 below.  
* Staple your check in the space provided at the bottom of this document.  
* Do not mail this form with your NOI form.  
* Do not mail this form to the same address as your NOI.  

Mail this form and your check to:  

<table>
<thead>
<tr>
<th>BY REGULAR U.S. MAIL</th>
<th>BY OVERNIGHT/EXPRESS MAIL</th>
</tr>
</thead>
</table>
| Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
P.O. Box 13088  
Austin, TX 78711-3088  | Texas Commission on Environmental Quality  
Financial Administration Division  
Cashier's Office, MC-214  
12100 Park 35 Circle  
 Austin, TX 78753 |

Fee Code: GPA  
General Permit: TXR150069  

1. Check / Money Order No:  
2. Amount of Check/Money Order:  
3. Date of Check or Money Order:  
4. Name on Check or Money Order:  

5. NOI INFORMATION  

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.  
See Attached List of Sites (If more space is needed, you may attach a list.)  

Project/Site (RE) Name:  

Project/Site (RE) Physical Address:  

Staple Check In This Space
LARGE CONSTRUCTION SITE NOTICE
FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program
TPDES GENERAL PERMIT TXR150000

“PRIMARY OPERATOR” NOTICE

This notice applies to construction sites operating under Part I.I.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/sw_permits.html

<table>
<thead>
<tr>
<th>Site-Specific TPDES Authorization Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator Name:</td>
</tr>
<tr>
<td>Contact Name and Phone Number:</td>
</tr>
<tr>
<td>Project Description: Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</td>
</tr>
<tr>
<td>Location of Storm Water Pollution Prevention Plan:</td>
</tr>
</tbody>
</table>
SMALL CONSTRUCTION SITE NOTICE
FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program
TPDES GENERAL PERMIT TXR150000

The following information is posted in compliance with Part II.E.2. of the TCEQ General Permit Number TXR150000 for discharges of storm water runoff from small construction sites. Additional information regarding the TCEQ storm water permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/wq_construction.html

<table>
<thead>
<tr>
<th>Operator Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Name and Phone Number:</td>
<td></td>
</tr>
<tr>
<td>Project Description: Physical address or description of the site's location, estimated start date and projected end date, or date that disturbed soils will be stabilized</td>
<td></td>
</tr>
<tr>
<td>Location of Storm Water Pollution Prevention Plan:</td>
<td></td>
</tr>
</tbody>
</table>

For Small Construction Activities Authorized Under Part II.E.2. (Obtaining Authorization to Discharge) the following certification must be completed:

I ________________________________ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.2. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A storm water pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title__________________________ Date______________________

Date Notice Removed
___ MS4 operator notified per Part II.E.3.
**ATTACHMENT 3**

**TPDES OPERATOR’S INFORMATION**

Owner’s Name and Address: City of ________________

Mr. ______________________________________

(City Official)

___________________________________________

Address: ________________________________

___________________________________________

Phone: ________________________________

Contractors’ Names and Addresses:

General Contractor: ________________________________

___________________________________________

Telephone: ________________________________

Site Superintendent: ________________________________

___________________________________________

Telephone: ________________________________

Erosion Control and Maintenance Inspection:

___________________________________________

Telephone: ________________________________

Subcontractors’ Names and Addresses:

___________________________________________

___________________________________________

Phone: ________________________________

Phone: ________________________________

Note: Insert name, address, and telephone number of person or firms
ATTACHMENT 4

CONTRACTOR’S / SUBCONTRACTOR’S

CERTIFICATION FOR TPDES PERMITTING

I certify under penalty of law that I understand the terms and conditions of the general Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

| Signature:                                                                 |                                                                 |
| Name: (printed or typed)                                                   |                                                                 |
| Title:                                                                     |                                                                 |
| Company:                                                                   |                                                                 |
| Address:                                                                   |                                                                 |
| Date:                                                                      |                                                                 |

| Signature:                                                                 |                                                                 |
| Name: (printed or typed)                                                   |                                                                 |
| Title:                                                                     |                                                                 |
| Company:                                                                   |                                                                 |
| Address:                                                                   |                                                                 |
| Date:                                                                      |                                                                 |

| Signature:                                                                 |                                                                 |
| Name: (printed or typed)                                                   |                                                                 |
| Title:                                                                     |                                                                 |
| Company:                                                                   |                                                                 |
| Address:                                                                   |                                                                 |
| Date:                                                                      |                                                                 |
ATTACHMENT 5

EPA NPDES Construction Inspection Form

The following inspection is being performed in compliance with Part 3.10 of the NPDES Region 6 Storm Water Construction General Permit [68 FR 39087, July 7, 2003]. Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, placement and effectiveness of structural control measures, and locations where vehicles enter or exit the site. Inspections shall be performed either once every 7 days (this option not available in New Mexico per Part 9 C.1.c.) or once every 14 days and within 24 hours of the end of a storm event of 0.5 inches or greater. Where sites have been temporarily stabilized, runoff is unlikely due to winter conditions, or during seasonal periods in arid areas (0-10 inches of rainfall annually) and semi-arid areas (10-20 inches annually) such inspections shall be conducted at least once every month. This form is primarily intended for use with construction projects in New Mexico. Permittees on Indian Country lands in Texas, Oklahoma, Louisiana and Arkansas and some oil and gas facilities in Texas and Oklahoma may use this form if they are eligible for this permit and EPA is their NPDES permitting authority. Other facilities need to check with their NPDES authority before using this form.

If you do not know your NPDES Permit Number, contact the NOI Processing Center at 866-352-7755. This form was prepared as an example and it is not a required form for use with the permit. Alternative forms may be used if they contain all of the required information as set forth in the permit. This form and additional information regarding the NPDES Region 6 storm water program may be found on the Internet at www.epa.gov/region6/6en/w/formsw.htm. Any person with a complaint about the operation of this facility in regards to this permit should contact EPA Region 6 at (214)665-8080.

<table>
<thead>
<tr>
<th>Permit Number(s) covered by this inspection (e.g., owners, developers,general contractor, builders).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature and Certification in accordance with Appendix G, Section 11 of the permit.</td>
</tr>
</tbody>
</table>

You may want to use EPA Region 6 construction checklist to assure components of the SWPPP are complete. This form, the construction sign, and the checklist are available on the Region 6 NPDES Storm Water Forms and Documents web page which may be found on the internet at http://www.epa.gov/earth1/6/en/w/formsw.htm. In addition to the checklist, you should provide a narrative (see next page) on the existing Best Management Practices and Structural Controls found during each inspection. Any problems identified in an inspection should be corrected within 7 days. The inspection should cover all components of the SWPPP and all potential pollutants. While eroded soil is the primary pollutant of concern, do not forget to inspect for other pollutant sources such as fuel tanks, paint, solvents, stabilization materials, concrete hardsides, batch plants, and construction debris. The inspector will need to update the SWPPP to reflect findings of the inspection. The site map should be updated after an inspection to show controls that have been added or removed, to ensure the site map is kept current in accordance with Part 3.11.A. of the permit.

---

<table>
<thead>
<tr>
<th>Date of Inspection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspector Name.</td>
</tr>
</tbody>
</table>

- Is there a copy of the permit language with the SWPPP? [☐ Yes [☐ No]
- Is the inspector qualified and are the qualifications documented in the SWPPP? [☐ Yes [☐ No]
- Is an NPDES storm water construction sign posted at the entrance for all permittees? [☐ Yes [☐ No]

July 29, 2003

ATTACHMENT 5

01565-20
Narrative Findings of the inspection:

Observations should include any findings of Best Management Practices or controls that are not in accordance with the SWPPP. If a control is not in place or failed, observe the reason why. A control removed temporarily for work is not necessarily a violation if properly recorded in the SWPPP. If it has been removed, record why it was removed and, if applicable, when it will be reinstated. If the control has failed, observe the conditions so a conclusion may be made as to whether the control failed for improper maintenance or improper design. The qualified inspector will know when a failed control is inadequate and should be replaced by an improved control mechanism. Qualified inspectors are to have authority to make changes to the SWPPP to assure compliance. Controls that have not been installed should be given a reason why they are not installed and/or a scheduled date for installation if they are designed for a later phase of construction. After the inspection, the SWPPP and its site map should be updated to reflect current conditions of controls and Best Management Practices at the time of the inspection. This includes removing uninstalled controls from the site map or otherwise denoting on the site map if they are no longer installed if the controls have been removed because they are no longer necessary (e.g., stabilization has been achieved in that area).

Part 3.10.G. of the permit: For each inspection required above, you must complete an inspection report. At a minimum, the inspection report must include: 1. The inspection date; 2. Names, titles, and qualifications of personnel making the inspection; 3. Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred; 4. Weather information and a description of any discharges occurring at the time of the inspection; 5. Location(s) of discharges of sediment or other pollutants from the site; 6. Location(s) of BMPs that need to be maintained; 7. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; 8. Location(s) where additional BMPs are needed that did not exist at the time of inspection; and 9. Corrective action required including any changes to the SWPPP necessary and implementation dates.
EROSION CONTROL CONTRACTOR’S
CERTIFICATION FOR INSPECTION AND MAINTENANCE

I certify under penalty of law that I understand the terms and conditions of the general Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature: ________________________________
Name: (printed or typed) __________________________
Title: ________________________________
Company ________________________________
Address: ________________________________
Date: ________________________________
Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

TCEQ Office Use Only
Permit No.: 01565-23
RN: 
CN: 

Reset Form

ATTACHMENT 7

What is the permit number to be terminated?
Processing will be delayed without the permit number. TXR15

A. OPERATOR (applicant)
1. What is the Customer Number (CN) issued to this entity? CN
2. What is the full Legal Name of the current permittee?

This must be the current permittee of the permit to be terminated.

3. What is the applicant’s mailing address as recognized by the US Postal Service?
   Address: | Suite No./Bldg. No./Mail Code:
   City: | State: | ZIP Code: 
   Country Mailing Information (if outside USA): | Country Code: | Postal Code: 

4. Phone No.: ( ) | Extension: 
5. Fax No.: ( ) | E-mail Address: 

B. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE
1. What is the TCEQ Issued RE Reference Number (RN)? RN
2. Name of Project or Site as currently permitted:
   (example: phase and name of subdivision or name of project that’s unique to the site)

3. Physical Address of Project or Site as currently permitted: (enter in spaces below)
   Street Number: | Street Name:
   City: | ZIP Code: | County (Counties if >1): 

4. If no physical address (Street Number & Street Name), provide the written location access description to the site:

C. REASON FOR TERMINATION

Check the reason for termination:
- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have either been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been defined in the SWP3 have been transferred to the new Operator.
- The activity is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

D. CERTIFICATION

I, _____________________________
Typed or printed name _____________________________
Title _____________________________

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: _____________________________
(Use blue ink) _____________________________
Date: _____________________________
Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR1500000
General Information and Instructions

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL
Texas Commission on Environmental Quality
Storm Water Processing Center (MC228)
P.O. Box 13087
Austin, TX 78711-3087

BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality
12100 Park 39 Circle
Austin, TX 78753

TCEQ Contact list:

Application Processing Questions relating to the status and form requirements: 512/239-4671
Technical Questions relating to the general permit: 512/239-4671
Environmental Law Division: 512/239-0600
Records Management for obtaining copies of forms submitted to TCEQ: 512/239-0900
Information Services for obtaining reports from program data bases (as available): 512/239-DATA (3282)
Financial Administration's Cashier's office: 512/239-0357 or 512/239-0187

Notice of Termination Process:

A Notice of Termination is effective on the date postmarked for delivery to TCEQ. When your NOT is received by the program, the form will be processed as follows:

1. Administrative Review: The form will be reviewed to confirm the following:
   - the permit number is provided
   - the permit is active and has been approved
   - the entity terminating the permit is the current permittee
   - the site information matches the original permit record
   - the form has the required original signature with title and date

2. Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.

3. Confirmation of Termination: A Notice of Termination Confirmation letter will be mailed to the operator.

General Permit (Your Permit)

Coverage under the general permit begins 48 hours after a completed NOI is postmarked for delivery to the TCEQ. You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site www.tceq.state.tx.us.

General Permit Forms

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) with instructions are available in Adobe Acrobat PDF format on the TCEQ web site www.tceq.state.tx.us.

Change in Operator

An authorization under the general permit is not transferable. If the operator or owner of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted not later than 10 days prior to the change in Operator status.

TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a core data form to TCEQ.

After final acknowledgement of coverage under the general permit, the program will assign a Customer Number (CN) and Regulated Entity Number (RN). For Construction Permits, a new RN will be assigned for each Notice of Intent filed with TCEQ, since construction project sites can overlap with other Customers. The RN assigned to your construction project will not be assigned to any other TCEQ authorization.

You can find the information on the Central Registry web site at https://www6.tceq.state.tx.us/epaw/. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Additional ID". Capitalize all letters in the permit number.
ATTACHMENT 7

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

**Annual Water Quality Fee:** This fee is assessed to operators with an active authorization under the general permit on September 1 of each year. The operator will receive an invoice for payment of the annual fee in November of each year. The payment will be due 30 days from the invoice date. A 5% penalty will be assessed if the payment is received by TCEQ after the due date. Annual fee assessments cannot be waived as long as the authorization under the general permit is active on September 1.

It’s important for the operator to submit a **Notice of Termination (NOT)** when coverage under the general permit is no longer required. A NOT is effective on the postmarked date of mailing the form to TCEQ. It is recommended that the NOT be mailed using a method that documents the date mailed and received by TCEQ.

- **Mailed Payments:**
  You must return your payment with the billing coupon provided with the billing statement.

- **ePAY Electronic Payment:**
  Go to [https://www6.tceq.state.tx.us/epay/](https://www6.tceq.state.tx.us/epay/)
  You must enter your account number provided at the top portion of your billing statement. Payment methods include Mastercard, Visa, and electronic check payment (ACH). A transaction over $500 can only be made by ACH.

### INSTRUCTIONS FOR FILLING OUT THE NOT FORM

**A. OPERATOR (current permittee):**

1. TCEQ Issued Customer Number (CN)
2. Legal Name of Operator
   The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided.
3. Operator Mailing Address
   Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted in the Notice of Intent or Notice of Change.
4. Phone Number, Fax Number, and E-mail Address
   Provide updated contact information.

**B. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE**

1. Regulated Entity Reference Number (RN)
2. Site/Project Name/Regulated Entity
   Provide the name of the site as previously submitted in the Notice of Intent for the permit number provided.
3. Site/Project (RE) Physical Address
   Provide the physical address or location access description as previously submitted for the permit number provided.

**C. REASON FOR TERMINATION**

Indicate the reason for terminating the permit by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

**D. CERTIFICATIONS**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

**IF YOU ARE A CORPORATION:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

**IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:**

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to
§305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality’s Environmental Law Division at 512/239-6000.

30 Texas Administrative Code
§305.44. Signatories to Applications.

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).
SECTION 01566

SOURCE CONTROLS FOR EROSION AND SEDIMENTATION

PART 1  GENERAL

1.01  SECTION INCLUDES

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

1.02  UNIT PRICES

A.  No separate payment will be made for work performed under this Section. Include payment in unit price for related work.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION

3.01  PREPARATION AND INSTALLATION

A.  No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Owner’s Representative to allow soil testing and surveying.

B.  Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately by the Contractor.

C.  The Contractor shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, and waste materials as specified in this or other Specifications and in compliance with applicable federal, state, and local rules and regulations.

D.  Contractor shall conduct all construction operations under this Contract in conformance with the erosion control practices described in the Drawings and this Specification.

E.  The Contractor shall install, maintain, and inspect erosion and sediment control measures and practices as specified in the Drawings and in this or other Specifications.

3.02  TOPSOIL PLACEMENT FOR EROSION AND SEDIMENT CONTROL SYSTEMS

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

2. Maintain grades which have been previously established on areas to receive topsoil.

3. After the areas to receive topsoil have been brought to grade, and immediately prior to dumping and spreading the topsoil, loosen the subgrade by disk ing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil. The contractor is responsible for the grading plan and fill permit, if required.

3.03 DUST CONTROL

A. Implement dust control methods to control dust creation and movement on construction sites and roads and to prevent airborne sediment from reaching receiving streams or storm water conveyance systems, to reduce on-site and off-site damage, to prevent health hazards, and to improve traffic safety.

B. Control blowing dust by using one or more of the following methods:

1. Mulches bound with chemical binders.

2. Temporary vegetative cover.

3. Tillage to roughen surface and bring clods to the surface.

4. Irrigation by water sprinkling.

5. Barriers using solid board fences, burlap fences, crate walls, bales of hay, or similar materials.

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

3.04 KEEPING STREETS CLEAN

A. Keep streets clean of construction debris and mud carried by construction vehicles and equipment. If necessary to keep the streets clean, install stabilized construction exits at construction, staging, storage, and disposal areas. A vehicle/equipment wash area (stabilized with coarse aggregate) may be installed adjacent to the stabilized construction exit, as needed. Release wash water into a drainage swale or inlet protected by erosion and sediment control measures. Construction exit and wash areas are specified in Section 01569 - Stabilized Construction Exit.

B. In lieu of or in addition to stabilized construction exits, shovel or sweep the pavement to the extent necessary to keep the street clean. Water hosing or sweeping of debris and mud off of the street into adjacent areas is not allowed.
3.05 EQUIPMENT MAINTENANCE AND REPAIR

A. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose. Locate such areas so that oils, gasoline, grease, solvents, and other potential pollutants cannot be washed directly into receiving streams or storm water conveyance systems. Provide these areas with adequate waste disposal receptacles for liquid as well as solid waste. Clean and inspect maintenance areas daily.

B. On a construction site where designated equipment maintenance areas are not feasible, take precautions during each individual repair or maintenance operation to prevent potential pollutants from washing into streams or conveyance systems. Provide temporary waste disposal receptacles.

3.06 WASTE COLLECTION AND DISPOSAL

A. Contractor shall formulate and implement a plan for the collection and disposal of waste materials on the construction site. In plan, designate locations for trash and waste receptacles and establish a collection schedule. Methods for ultimate disposal of waste shall be specified and carried out in accordance with applicable local, state, and federal health and safety regulations. Make special provisions for the collection and disposal of liquid wastes and toxic or hazardous materials. Contractor is responsible for taking necessary precautions to prevent scattering of debris by winds.

B. Keep receptacles and waste collection areas neat and orderly to the extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they will least likely be affected by concentrated storm water runoff.

3.07 WASHING AREAS

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

3.08 STORAGE OF CONSTRUCTION MATERIALS AND CHEMICALS

A. Isolate sites where chemicals, cements, solvents, paints, or other potential water pollutants are stored in areas where they will not cause runoff pollution.

B. Store toxic chemicals and materials, such as pesticides, paints, and acids in accordance with manufacturers’ guidelines. Protect groundwater resources from leaching by placing a plastic mat, packed clay, tar paper, or other impervious materials on any areas where toxic liquids are to be opened and stored.
3.09 DEMOLITION AREAS

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

3.10 PESTICIDES

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

END OF SECTION
SECTION 01567
FILTER FABRIC FENCE

PART 1  GENERAL

1.01  SECTION INCLUDES

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

1.02  UNIT PRICES

A. Filter fabric fence will be measured by the linear foot, or lump sum as specified in the bid proposal for the project, of completed and accepted filter fabric fence between the limits of the beginning and ending of wooden stakes. Filter fabric fence, measured as stated, will be paid for at the unit price bid for Filter Fabric Fence, Complete in Place.

B. Payment for filter fabric fence will include and be full compensation for all labor, equipment, materials, supervision, and all incidental expenses for construction of these items, complete in place, including, but not limited to protection of trees, maintenance requirements, repair and replacement of damaged sections, removal of sediment deposits, and removal of erosion and sediment control systems at the end of construction.

1.03  SUBMITTALS

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

PART 2  PRODUCTS

2.01  FILTER FABRIC

A. Provide woven or nonwoven geotextile filter fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric shall have a grab strength of 100 psi in any principal direction (ASTM D-4632), Mullen burst strength exceeding 200 psi (ASTM D-3786), and the equivalent opening size between 50 and 140.

C. Filter fabric material shall contain ultraviolet inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 degrees F to 120 degrees F.
PART 3 EXECUTION

3.01 PREPARATION AND INSTALLATION

A. Provide erosion and sediment control systems at the locations shown on Drawings. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on the Drawings and specified in this Section.

B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Owner’s Representative to allow soil testing and surveying.

C. Regularly inspect and repair or replace damaged components of filter fabric fences as specified in this Section. Unless otherwise directed, maintain the erosion and sediment control systems until the project area stabilization is accepted by the Owner. Remove erosion and sediment control systems promptly when directed or approved by the Owner’s Representative. Discard removed materials off site.

D. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at a location not in or adjacent to a stream or floodplain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.

E. Conduct all construction operations under this Contract in conformance with the erosion control practices described in Section 01566 - Source Controls for Erosion and Sedimentation.

3.02 CONSTRUCTION METHODS

A. Provide filter fabric fence systems in accordance with the Drawing detail for Filter Fabric Fences. Filter fabric fences shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

B. Attach the filter fabric to 2-inch by 2-inch wooden stakes spaced a maximum of 3 feet apart and embedded a minimum of 8 inches. If filter fabric is factory preassembled with support netting, then maximum spacing allowable is 8 feet. Install wooden stakes at a slight angle toward the source of anticipated runoff.
C. Trench in the toe of the filter fabric fence with a spade or mechanical trencher as shown on the Drawings. Lay filter fabric along the edges of the trench. Backfill and compact trench.

D. Filter fabric fence shall have a minimum height of 18 inches and a maximum height of 36 inches above natural ground.

E. Provide the filter fabric in continuous rolls and cut to the length of the fence to minimize the use of joints. When joints are necessary, splice the fabric together only at a support post with a minimum 6-inch overlap and seal securely.

F. Inspect sediment filter barrier systems after each rainfall, daily during periods of prolonged rainfall, and at a minimum once each week. Repair or replace damaged sections immediately. Remove sediment deposits when silt reaches a depth one-third the height of the fence or 6 inches, whichever is less.

END OF SECTION
SECTION 01568

REINFORCED FILTER FABRIC BARRIER

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A. Installation of reinforced filter fabric barriers for erosion and sediment control used during construction and until the final development of the site. Reinforced filter fabric barriers are used to retain sedimentation in channelized flow areas.

1.02  UNIT PRICES

A. Filter fabric barrier will be measured by the linear foot of completed and accepted filter fabric barrier between the limits of the beginning and ending fence posts. Filter fabric barrier, measured as stated, will be paid for at the unit price bid for Reinforced Filter Fabric Barrier, Complete in Place.

B. Payment for filter fabric barrier will include and be full compensation for all labor, equipment, materials, supervision, and incidental expenses for construction of these items, complete in place, including, but not limited to protection of trees, maintenance requirements, repair and replacement of damaged sections, removal of sediment deposits, and removal of erosion and sediment control systems at the end of construction.

1.03  SUBMITTALS

A. Manufacturer’s catalog sheets and other product data on geotextile fabrics.

PART 2  P R O D U C T S

2.01  FILTER FABRIC

A. Provide woven or nonwoven geotextile filter fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric shall have a minimum grab strength of 100 psi in any principal direction (ASTM D-4632), Mullen burst strength exceeding 200 psi (ASTM D-3786), and the equivalent opening size between 50 and 140.

C. Filter fabric material shall contain ultraviolet inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 degrees F to 120 degrees F.

2.02  FENCING

A. Provide woven galvanized steel wire fence with minimum thickness of 14 gauge and a maximum mesh spacing of 6 inches.
PART 3  EXECUTION

3.01 PREPARATION AND INSTALLATION

A. Provide erosion and sediment control systems at the locations shown on the Drawings. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on the Drawings and specified in this Section.

B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than as specifically directed by the Owner’s Representative to allow soil testing and surveying.

C. Regularly inspect and repair or replace damaged components of the reinforced filter fabric barrier as specified in this Section. Unless otherwise directed, maintain the erosion and sediment control systems until the project area stabilization is accepted by the Owner. Remove erosion and sediment control systems promptly when directed by the Owner’s Representative. Discard removed materials off site.

D. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at a location not in or adjacent to a stream or floodplain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.

E. Conduct all construction operations under this Contract in conformance with the erosion control practices described in Section 01566 - Source Controls for Erosion and Sedimentation.

3.02 CONSTRUCTION METHODS

A. Provide filter fabric barriers in accordance with the Drawing detail for Reinforced Filter Fabric Barrier. Filter fabric barrier systems shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

B. Attach the woven wire support to 2-inch by 2-inch wooden stakes spaced a maximum of 6 feet apart and embedded a minimum of 8 inches. Install wooden stakes at a slight angle toward the source of the anticipated runoff.

C. Trench in the toe of the filter fabric barrier with a spade or mechanical trencher as shown on the Drawings. Lay filter fabric along the edges of the trench. Backfill and compact trench.

D. Securely fasten the filter fabric material to the woven wire with tie wires.
E. Reinforced filter fabric barrier shall have a height of 18 inches.

F. Provide the filter fabric in continuous rolls and cut to the length of the fence to minimize the use of joints. When joints are necessary, splice the fabric together only at a support post with a minimum 6-inch overlap and seal securely.

G. Inspect the reinforced filter fabric barrier systems after each rainfall, daily during periods of prolonged rainfall, and at a minimum once each week. Repair or replace damaged sections immediately. Remove sediment deposits when silt reaches a depth one-third the height of the barrier or 6 inches, whichever is less.

END OF SECTION
SECTION 01569

STABILIZED CONSTRUCTION EXIT

PART 1     GENERAL

1.01 SECTION INCLUDES

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

1.02 SUBMITTALS

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

B. Sieve analysis of aggregates conforming to requirements of this Specification.

1.03 UNIT PRICES

A. Unless indicated in the Unit Price Schedule as a pay item, no separate payment will be made for work performed under this Section. Include cost of work performed under this Section in pay items for which this work is a component.

PART 2     PRODUCTS

2.01 GEOTEXTILE FABRIC

A. Provide woven or nonwoven geotextile fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric shall have a minimum grab strength of 270 psi in any principal direction (ASTM D-4632), and the equivalent opening size between 50 and 140.

C. Both the geotextile and threads shall be resistant to chemical attack, mildew, and rot and shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable life at a temperature range of 0°F to 120°F.

D. Representative Manufacturers: Mirafi, Inc., or equal.

2.02 COARSE AGGREGATES

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

B. Coarse aggregates shall conform to the following gradation requirements.
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<th>Percent Retained (By Weight)</th>
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PART 3 EXECUTION

3.01 PREPARATION AND INSTALLATION

A. If necessary to keep the street clean of mud carried by construction vehicles and equipment, Contractor shall provide stabilized construction roads and exits at the construction, staging, parking, storage, and disposal areas. Such erosion and sediment controls shall be constructed in accordance with the requirements shown on the Drawings and specified in this Section.

B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than as specifically directed by the Owner’s Representative to allow soil testing and surveying.

C. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Owner’s Representative to remove and discard the existing system.

D. Regularly inspect and repair or replace components of stabilized construction exits. Unless otherwise directed, maintain the stabilized construction roads and exits until the project is accepted by the City. Remove stabilized construction roads and exits promptly when directed by the Owner’s Representative. Discard removed materials off site.

E. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at a permitted location not in or adjacent to a stream or floodplain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.

F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.
Conduct all construction operations under this Contract in conformance with the erosion control practices described in the relevant sections of these specifications.

3.02 CONSTRUCTION METHODS

A. Provide stabilized access roads, subdivision roads, parking areas, and other on-site vehicle transportation routes where shown on Drawings.

B. Provide stabilized construction exits, and truck washing areas when approved by Owner’s Representative, of the sizes and locations where shown on Drawings or as specified in this Section.

C. Vehicles leaving construction areas shall have their tires cleaned to remove sediment prior to entrance onto public right-of-way. When washing is needed to remove sediment, Contractor shall construct a truck washing area. Truck washing shall be done on stabilized areas which drain into a drainage system protected by erosion and sediment control measures.

D. Details for stabilized construction exit may be shown on the Drawings. Construction of all other stabilized areas shall be to the same requirements. Roadway width shall be at least 14 feet for one-way traffic and 20 feet for two-way traffic and shall be sufficient for all ingress and egress. Furnish and place geotextile fabric as a permeable separator to prevent mixing of coarse aggregate with underlying soil. Exposure of geotextile fabric to the elements between laydown and cover shall be a maximum of 14 days to minimize damage potential.

E. Roads and parking areas shall be graded to provide sufficient drainage away from stabilized areas. Use sandbags, gravel, boards, or similar methods to prevent sediment from entering public right-of-way, receiving stream or storm water conveyance system.

F. The stabilized areas shall be inspected and maintained daily. Provide periodic topping dressing with additional coarse aggregates to maintain the required depth. Repair and clean out damaged control measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto public right-of-way shall be removed immediately.

G. The length of the stabilized area may be as shown on the Drawings, but not less than 50 feet. The thickness shall not be less than 8 inches. The width shall not be less than full width of all points of ingress or egress.

H. Stabilization for other areas shall have the same coarse aggregate, thickness, and width requirements as the stabilized construction exit, except where shown otherwise on the Drawings.

I. Stabilized area may be widened or lengthened to accommodate truck washing area when authorized by Owner’s Representative.

J. Alternative methods of construction may be utilized when shown on Drawings, or when approved by the Owner’s Representative. These methods include the following:
1. Cement-Stabilized Soil - Compacted cement-stabilized soil or other fill material in an application thickness of at least 8 inches.

2. Wood Mats/Mud Mats - Oak or other hardwood timbers placed edge-to-edge and across support wooden beams which are placed on top of existing soil in an application thickness of at least 6 inches.

3. Steel Mats - Perforated mats placed across perpendicular support members.

END OF SECTION
SECTION 01570
TRAFFIC CONTROL AND REGULATION

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Requirements for signs, signals, control devices, flares, lights and traffic signals, as well as construction parking control, designated haul routes and bridging of trenches and excavations.

B. Qualifications and requirements for use of flagmen.

1.02  SUBMITTALS

A. Make submittals in accordance with Section 01300 - Submittals

1.03  UNIT PRICES

A. Measurement and payment is on a unit of time or lump sum basis for traffic control and regulation, including obtaining approvals by governing authorities, preparation and submittal of traffic control plan if different than shown on Drawings, and subsequent approval from Owner and any other entity prior to commencing work in their right-of-way, provision of traffic control devices, barrels, barricades, control panels, signage including arrow boards as necessary for the project, relocation of traffic signs and control devices as necessary, relocating and replacing existing signs and provision of equipment and personnel as necessary to protect the work and the public in accordance with the Texas Manual of Uniform Traffic Control Devices (TxMUTCD). The amount invoiced shall be determined based on the approved schedule of values for traffic control and regulation.

B. No separate measurement will be made for flaggers as required for the Project. Flaggers shall be considered incidental to the traffic control and regulation bid item.

1.04  FLAGMEN

A. Use only flagmen who are off-duty, regularly employed, uniformed peace officers when specified in the Special Conditions. The Contractor shall also utilize certified flagmen at locations approved by the Owner or Owner’s Representative.

B. Use flagmen to control, regulate and direct an even flow and movement of vehicular and pedestrian traffic, for periods of time as may be required to provide for public safety and convenience, where:
1. Where multi-lane vehicular traffic must be diverted into single-lane vehicular traffic.

2. Where vehicular traffic must change lanes abruptly.

3. Where construction equipment either enters or crosses vehicular traffic lanes and walks.

4. Where construction equipment may intermittently encroach on vehicular traffic lanes and unprotected walks and crosswalks.

5. Where traffic regulation is needed due to rerouting of vehicular traffic around the work site.


C. The use of flagmen is for the purpose of assisting in the regulation of traffic flow and movement, and does not in any way relieve the contractor of full responsibility for taking such other steps and provide such other flagmen or personnel as the Contractor may deem necessary to protect the work and the public, and does not in any way relieve the Contractor of his responsibility for any damage for which he would otherwise be liable.

Flagmen shall be used and maintained at such points for such periods of time as may be required to provide for the public safety and convenience of travel.

PART 2 PRODUCTS

2.01 SIGNS, SIGNALS, AND DEVICES

A. Comply with Texas State Manual on Uniform Traffic Control Devices (latest revision).

B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

PART 3 EXECUTION

3.01 PUBLIC ROADS

A. Abide by laws and regulations of governing authorities when using public roads. If the Contractor’s work requires that public roads be temporarily impeded or closed, approvals shall be obtained from governing authorities and permits paid for before starting any work. Coordinate activities with the Owner’s Representative.
B. Give Owner’s Representative one-week notice before implementing approved traffic control phases. Inform local businesses of impending traffic control activities.

C. Notify police department, fire department, and local schools, churches, and businesses in writing a minimum of five business days prior to beginning work.

D. Contractor shall maintain at all times a 10-foot-wide all-weather lane adjacent to work areas which shall be kept free of construction equipment and debris and shall be for the use of emergency vehicles, or as otherwise provided in the traffic control plan.

E. Contractor shall not obstruct the normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by the Owner’s Representative.

F. Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times unless approved. Use all-weather materials approved by Owner’s Representative to maintain temporary driveway access to commercial and residential driveways. The Contractor shall also give special consideration to maintain access by constructing temporary driveway pavement for schools, apartment complex, day care facilities, hospitals, clinics, retirement and assisted living facilities.

G. Cleanliness of Surrounding Streets:

1. Keep streets used for entering or leaving the job area free of excavated material, debris, and any foreign material resulting from construction operations in compliance with applicable ordinances.

H. Remove existing signage and striping that conflict with construction activities or that may cause driver confusion.

I. Provide safe access for pedestrians along major cross streets.

J. Alternate closures of cross streets so that two adjacent cross streets are not closed simultaneously.

K. Do not close more than two consecutive esplanade openings at a time without prior approval from Owner’s Representative.

3.02 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and the Owners’s operations.
B. Monitor parking of construction personnel’s vehicles in existing facilities. Maintain vehicular access to and through parking areas.

C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.03 FLARES AND LIGHTS

A. Provide lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.04 HAUL ROUTES

A. Utilize haul routes designated by owner, authorities or shown on the Drawings for construction traffic.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.05 TRAFFIC SIGNS AND SIGNALS

A. Construct all necessary traffic control devices including but not limited to loop detectors, traffic signal conduits, traffic signal wiring and cross walk signals as shown on the plan drawings.

B. Install traffic control devices at approaches to the site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

C. Relocate traffic signs and appurtenances as Work progresses to maintain effective traffic control.

D. Unless otherwise approved by Owner’s Representative, provide driveway signs with the name of business that can be accessed from the particular cross-over. Two signs will be required for each cross-over.

E. Replace existing traffic control devices in the project area.

F. Owner’s Representative may direct Contractor to make adjustments to traffic control signage to eliminate driver confusion and maintain orderly traffic flow during construction at no additional cost to the Owner.
G. Repair or replace signal control devices, detectors or cables where damage occurred due to Contractors construction efforts or operation of equipment related to paving repairs or removal.

3.06 BRIDGING TRENCHES AND EXCAVATIONS

A. Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic. Provide steel plates that can be laid across construction areas and major drives of commercial businesses.

B. Secure bridging against displacement by using adjustable cleats, angles, bolts or other devices whenever bridge is installed:

1. On an existing bus route;
2. When more than five percent of daily traffic is comprised of commercial or truck traffic;
3. When more than two separate plates are used for the bridge; or
4. When bridge is to be used for more than five consecutive days.

C. Install bridging to operate with minimum noise.

D. Adequately shore the trench or excavation to support bridge and traffic.

E. Extend steel plates used for bridging a minimum of one foot beyond edges of trench or excavation. Use temporary paving materials (premix) to feather edges of plates to minimize wheel impact on secured bridging.

F. Use steel plates of sufficient thickness to support H-20 loading, truck or lane, that produces maximum stress.

3.07 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

C. Remove post settings to a depth of 2 feet.

3.08 MAINTENANCE OF EQUIPMENT AND MATERIAL

A. Designate individual to be responsible for maintenance of traffic handling around construction area. This individual must be accessible at all times to immediately correct any deficiencies in equipment and materials used to handle traffic, such as
missing, damaged, or obscured signs, drums, barricades, or pavement markings. Give name, address and telephone number of designated individual to the Owner’s Representative.

B. Make daily inspections of signs, barricades, drums, lamps and temporary pavement markings to verify that these are visible, and in good working order, and in conformance with TxDOT or any other entity. When not in conformance immediately bring equipment and materials into conformance by replacement, repair, cleaning, relocation, and/or realignment.

C. Keep all equipment and materials, especially signs and pavement markings, clean and free of dust, dirt, grime, oil, mud or debris.

END OF SECTION
SECTION 01580

PROJECT IDENTIFICATION SIGNS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project identification sign description.
B. Installation.
C. Maintenance and removal.

1.02 UNIT PRICES

A. Unless indicated in the Unit Price Schedule as a pay item, no separate payment will be made for work performed under this Section. Include cost of work performed under this Section in pay items for which this work is a component.
B. If changes to project identification signs are requested by the Owner’s Representative to keep them current, payment will be made by change order.
C. Skid-mounted signs shall be relocated as directed by the Owner’s Representative at no additional cost to the Owner. Post-mounted signs shall be relocated, if directed in writing by the Owner’s Representative, at no additional cost to the Owner.

1.03 SYSTEM DESCRIPTION

A. Sign Construction: Project identification signs shall be constructed of new materials and painted new for the project. Construct post-mounted signs as shown on Construction Sign Details.
B. Appearance: Project identification signs shall be maintained to present a clean and neat look throughout the project duration.
C. Sign manufacturer/Maker: Experienced as a professional sign company.
D. Sign Placement: Place signs at locations as directed by the Owner’s Representative. The Owner’s Representative will provide sign placement instructions at the Pre-construction Meeting.

1. A linear project is one involving paving, overlay, sewer lines, storm drainage, or water mains that run in the right-of-way over a distance. A linear project requires a project identification sign at each end of the construction site.
2. Single Site or Building Projects: Provide one project identification sign.
3. Multiple Sites: Provide one project identification sign at each site.

4. Sign Relocation: As work progresses at each site, it may be necessary to move and relocate project identification signs. Relocate signs as directed in writing by the Owner’s Representative.

E. Alternate Skid-mounted Sign Construction: Post-mounted signs are preferred, but skid-mounted signs are allowed, especially for projects with noncontiguous locations where work progresses from one location to another. The skid structure shall be designed to that the sign will withstand a 60-mile-per-hour wind directly to the face or back of the sign. Use stakes, straps, or ballast. Approval of the use of skid-mounted signs shall not release the Contractor from responsibility of maintaining a project identification sign on the project site and shall not make the Owner responsible for the security of such signs.

1.04 SUBMITTALS

A. Submit shop drawings under provisions of relevant Sections of these specifications.

B. Show content, layout, lettering style, lettering size, and colors. Make sign and lettering to scale, clearly indicating condensed lettering, if used.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: All sign materials shall be new.

1. Sign Posts: Use 4-inch by 4-inch treated wood posts, sized to fix top of sign at 6 FEET ABOVE GROUND.

2. Sign Supports and Skid Bracing: 2-inch by 4-inch wood framing material.

3. Skid Members: 2-inch by 6-inch wood framing material.

4. Fasteners:
   a. Use galvanized steel fasteners.
   b. Use 3/8-inch by 5-1/2-inch button head carriage bolts to attach sign to posts. Secure with nuts and flat head washers at locations as recommended by Sign Manufacturer.
   c. Cover button heads with white reflective film or paint to match sign background.

B. Sign and Sign Header: Use medium density overlaid marine plywood, minimum ½-inch thick. Use full-size 4-foot by 8-foot sheets for sign and a single piece for header to minimize joints; do not piece wood to fabricate a sign face.
C. Paint and Primers: White paint used to prime surfaces and to resist weathering shall be an industrial grade, fast-dying, oil-based paint with gloss finish. Paint structural and framing members white on all sides and edges to resist weathering. Paint sign and sign header material white on all sides and edges to resist weathering. Paint all sign surfaces with this weather-protective paint prior to adding any sign paint or adhesive applications.

D. Colors:
   1. Follow criteria established by attached Exhibit.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install Project identification signs within 10 calendar days after Date of Commencement.

B. Erect signs where designated by the Owner’s Representative at the Pre-construction Meeting or as described in part 1.03 of this Section. Position the sign in such a manner as to be fully visible and readable to the general public.

C. Erect sign level and plumb.

D. If mounted on post, sink posts a minimum of 30-inches below grade in 10-inch diameter posthole. Stabilize posts with sharp sand or concrete to minimize lateral motion. Leave a minimum of 8-feet of post above existing grade for mounting of the sign and header.

E. Erect sign so that the top edge of the sign, is no higher tan 6-feet above existing grade.

3.02 MAINTENANCE AND REMOVAL

A. Keep signs and support clean. Repair deterioration and damage.

B. Remove signs, framing, supports, and foundations to a depth of 2-feet upon completion of Project. Restore the area to a condition equal to or better tan before construction.

END OF SECTION
SECTION 01600

MATERIAL & EQUIPMENT

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Requirements for transportation, delivery, handling, and storage of materials and equipment.

1.02  MEASUREMENT AND PAYMENT
A. Unless indicated as a Bid Item, no separate payment will be made for Work performed under this Section. Include cost in Bid Items for which this work is a component.
B. No payment for stored material will be made unless stipulated or approved by owner.

1.03  PRODUCTS
A. Products: Means material, equipment, or systems forming the Work. Does not include machinery and equipment used for preparation fabrication, conveying and erection of the Work. Products may also include existing materials or components designated for reuse.
B. Do not reuse materials and equipment, designated to be removed, except as specified by the Contract Documents.
C. Provide equipment and components from the fewest number of manufacturers as is practical, in order to simplify spare parts inventory and to allow for maximum interchangeability of components. For multiple components of the same size, type or application, use the same make and model of component throughout the Work.

1.04  TRANSPORTATION
A. Make arrangements for transportation, delivery, and handling of equipment and materials required for timely completion of the Work.
B. Transport and handle products in accordance with instructions.
C. Consign and address shipping documents to the proper party giving name of Project, street number, and City. Shipments shall be delivered to the Contractor.

1.05  DELIVERY
A. Arrange deliveries of products to accommodate the Construction Schedule and in ample time to facilitate inspection prior to installation. Avoid deliveries that cause lengthy delays or overburden of limited storage space.
B. Coordinate deliveries to avoid conflict with Work and conditions at the Project Site and to accommodate the following:
   1. Work of other contractors or the Owner.
   2. Limitations of storage space.
   3. Availability of equipment and personnel for handling products.
   4. Owner’s use of premises.

C. Have products delivered to the Project Site in manufacturer’s original, unopened, labeled containers.

D. Immediately upon delivery, inspect shipment to assure:
   1. Product complies with requirements of Contract Documents.
   2. Quantities are correct.
   3. Containers and packages are intact; labels are legible.
   4. Products are properly protected and undamaged.
   5. Insure provisions on material safety data sheets (MSDS) are followed.

1.06 PRODUCT HANDLING

A. Coordinate the off-loading of materials and equipment delivered to the Project Site. If necessary to move stored materials and equipment during construction, Contractor shall relocate materials and equipment at no additional cost to the Owner.

B. Provide equipment and personnel necessary to handle products, including those provided by the Owner, by methods to prevent damage to products or packaging.

C. Provide additional protection during handling as necessary to prevent breaking, scraping, marring, or otherwise damaging products or surrounding areas.

D. Handle products by methods to prevent over bending or overstressing.

E. Lift heavy components only at designated lifting points.

F. Handle materials and equipment in accordance with Manufacturer’s recommendations.

G. Do not drop, roll, or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

1.07 STORAGE OR MATERIAL
A. Store and protect materials in accordance with manufacturer’s recommendations and requirements of these Technical Specifications. Control storage of potential water pollutants in compliance with all applicable provisions of all Sections of these specifications.

B. Make necessary provisions for safe storage of materials and equipment. Place loose soil materials, and materials to be incorporated into the Work to prevent damage to any part of the Work or existing facilities and to maintain free access at all times to all parts of the Work and to utility service company installations in the vicinity of the Work.

C. Keep materials and equipment neatly and compactly stored in locations that will cause a minimum of inconvenience to other contractors, public travel, adjoining owners, tenants, and occupants. Arrange storage in a manner to provide easy access to inspection.

D. Provide adequately ventilated, watertight storage facilities with floor above ground level for materials and equipment susceptible to weather damage.

E. Restrict storage to areas available on the construction site for storage of material and equipment as shown on Plans or approved by the Owner’s Representative.

F. Provide off-site storage and protection when on-site storage is not adequate.

G. Do not use lawns, grass plots, or other private property for storage purposes without written permission of the owner. Damage to lawns, sidewalks, streets or other improvements shall be repaired or replaced to the satisfaction of the Owner’s Representative.

H. Protect stored materials and equipment against loss or damage. Contractor is fully responsible for loss and/or damage of stored material.

I. Store materials in manufacturers’ unopened containers.

J. Materials delivered and stored along the line of the Work shall be not closer than 3 feet to any fire hydrant. Public and private drives and street crossings shall be kept open.

K. The total length which materials may be distributed along the route of construction at any one time is specified in Section 01015 – Contractor’s Use of Premises.

PART 2   P R O D U C T S - NOT USED

PART 3   E X E C U T I O N - NOT USED

END OF SECTION
SECTION 01630

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1   GENERAL

1.01 SECTION INCLUDES

A. Options for making product or process selections.

B. Procedures for proposing equivalent construction products or processes, including preapproved, and approved products or processes.

1.02 DEFINITIONS

A. Product: Means, materials, equipment, or systems incorporated into the Project. Product does not include machinery and equipment used for production, fabrication, conveying, and erection of the Work. Products may also include existing materials or components designated for re-use.

B. Process: Any proprietary system or method for installing system components resulting in an integral, functioning part of the Work. For this Section, the word Product includes Processes.

1.03 SELECTION OPTIONS

A. Preapproved Products: Construction products of certain manufacturers or suppliers are designated in the Specifications as “preapproved.” Products of other manufacturers or suppliers will not be acceptable for this Project and will not be considered under the submittal process for approving alternate products.

B. Approved Products: Construction products or processes of certain manufacturers or suppliers designated in the Specifications followed by the words "or approved equal." Approval of alternate products or processes not listed in the Specifications may be obtained through provisions in the Special Conditions, and by following the submittal procedures specified in Section 01300 - Submittals. The procedure for approval of alternate products is not applicable to preapproved products.

C. Product Compatibility: To the maximum extent possible, provide products that are of the same type or function from a single manufacturer, make, or source. Where more than one choice is available as a Contractor's option, select a product which is compatible with other products already selected, specified, or in use by the Owner.

1.04 CONTRACTOR'S RESPONSIBILITY
A. The Contractor's responsibility related to product options and substitutions is defined in the Special Conditions.

B. Furnish information the Owner’s Representative deems necessary to judge equivalency of the alternate product.

C. Pay for laboratory testing, as well as any other review or examination costs, needed to establish the equivalency between products in order to obtain information upon which the Owner’s Representative can base a decision.

D. If the Owner's Representative determines that an alternate product is not equal to that named in the Specifications, the Contractor shall furnish one of the specified products.

1.05 OWNER’S REVIEW

A. Alternate products or processes may be used only if approved in writing by the Owner’s Representative. The Owner’s Representative's determination regarding acceptance of a proposed alternate product is final.

B. Alternate products will be accepted if the product is judged by the Owner’s Representative to be equivalent to the specified product or to offer substantial benefit to the Owner.

C. The Owner retains the right to accept any product or process deemed advantageous to the Owner, and similarly, to reject any product or process deemed not beneficial to the Owner.

1.06 SUBSTITUTION PROCEDURE

A. Collect and assemble technical information applicable to the proposed product to aid in determining equivalency as related to the approved product specified.

B. Submit a written request for a construction product to be considered as an alternate product.

C. Submit the product information after the effective date of the Agreement and within two weeks of that date. After the submittal period has expired, requests for alternate products will be considered only when a specified product becomes unavailable because of conditions beyond the Contractor's control.

D. Submit 5 copies of each request for alternate product approval. Include the following information:

1. Complete data substantiating compliance of proposed substitution with Contract Documents
2. For products:
   a. Product identification, including manufacturer's name and address
   b. Manufacturer's literature with product description, performance and test data, and reference standards
   c. Samples, as applicable
   d. Name and address of similar projects on which product was used and date of installation. Include the name of the Owner, Owner’s Representative, and installing contractor.

3. For construction methods:
   a. Detailed description of proposed method
   b. Drawings illustrating methods

4. Itemized comparison of proposed substitution with product or method specified

5. Data relating to changes in construction schedule

6. Relation to separate contracts, if any

7. Accurate cost data on proposed substitution in comparison with product or method specified.

8. Other information requested by the Owner’s Representative.

E. Approved alternate products will be subject to the same review process as the specified product would have been for shop drawings, product data, and samples.

F. The Owner desires to have the products and processes as specified in the contract. The consideration and approval of the alternative product or process is at the sole discretion of the owner.

PART 2  P R O D U C T S  -  NOT USED

PART 3  E X E C U T I O N  -  NOT USED

END OF SECTION
SECTION 01655

STARTING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting and balancing.

1.02 MEASUREMENT AND PAYMENT

A. Unless indicated as a bid item, no separate payment will be made for work performed under this Section. Include cost in Bid Items for which this work is a component.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate Schedule for start-up of various equipment and systems.

B. Notify the Owner Representative seven (7) days prior to startup of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other damage-causing conditions.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision in accordance with manufacturer’s instructions.

G. When specified in individual Technical Specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit written report indicating that equipment or system has been properly installed and is functioning correctly.

3.02 DEMONSTRATION AND INSTRUCTIONS
A. Demonstrate operation and maintenance of Products to the Owner Representative two (2) weeks prior to date of substantial completion.

B. Utilize O&M manuals as the basis for instruction. Review contents of manual with the Owner Representative in detail to explain aspects of operation and maintenance.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at the equipment location.

D. Prepare and insert additional data in O&M manuals when the need for additional data becomes apparent during instruction.

E. At a minimum, the Contractor will demonstrate the following:
   1. Products and procedures to be used in maintaining various surfaces, e.g., counter tops, toilet partitions, tile floors and carpeting;
   2. Procedures to set and maintain landscape irrigation system;
   3. Procedures to set and maintain security and fire alarm systems; and
   4. Procedures to set and maintain HVAC systems.

3.03 TESTING, ADJUSTING AND BALANCING

A. Contractor shall start, test, adjust, balance, and provide reports on all installed equipment as provided for in this section.

B. Owner may also appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.

C. Reports will be submitted by both the Contractor and the independent firm (if utilized) to the Owner indicating observations and results of the tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

D. Owner’s employment of an independent firm shall not relieve the Contractor’s responsibility under this section.

END OF SECTION
SECTION 01700

CONTRACT CLOSEOUT

PART 1  G E N E R A L

1.01 SECTION INCLUDES

A. Closeout procedures including final submittals such as operation and maintenance data, warranties, and spare parts and maintenance materials.

1.02 CLOSEOUT PROCEDURES

A. Comply with the General Conditions of Agreement regarding Final Completion and Final Payment when Work is complete and ready for Owner Representative’s final inspection.

B. Provide Project Record Documents prior to request for final closeout.

C. Complete or correct items on punch list, with no new items added to said punch list.

D. Any new items not on the original punch list that are discovered or arise after the punch list is a warranty item and will be addressed within no more than 30 days of notification by the City (or sooner if required by specific circumstances) during warranty period.

E. The Owner will occupy portions of the Work as specified in other Sections.

F. Provide submittals as required by governing authorities.

G. Any punch list items will be completed to the Owner’s satisfaction prior to final payment.

1.03 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean debris from drainage systems.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and temporary construction facilities from the site following the final test of utilities and completion of the work.

1.04 OPERATION AND MAINTENANCE DATA
A. Submit operations and maintenance data in accordance with the sections and provisions of the specifications.

1.05 WARRANTIES

A. Provide one original of each warranty from Subcontractors, suppliers, and manufacturers.

B. Provide Table of Contents and assemble warranties in 3-ring/D binder with durable plastic cover.

C. Submit warranties prior to final Application for Payment.

D. Warranties shall commence in accordance with the requirements in the Special Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01710
CLEANING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Execution of cleaning during progress of daily work, and at completion of work.

B. Maintaining premises and public properties (including storage yards) free from accumulations of waste, debris and rubbish caused by operations.

C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials:
   1. Clean all surfaces exposed to sight.
   2. Leave project clean and ready for occupancy or use.

1.02 UNIT PRICES

A. No separate payment will be made for cleaning under this section. Include payment in unit price for related work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

C. See each specification section for specific products if applicable.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

A. Execute cleaning to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to settle dust and prevent blowing dust.

C. At daily intervals during progress of work, clean site and public properties.
D. Legally and properly dispose of waste materials, debris, and rubbish.

E. Provide on-site containers for collection of waste materials, debris and rubbish.

F. Provide wire fence or equivalent around debris piles to prevent blowing of debris from project site.

G. Remove waste material, debris, and rubbish from site.

H. Legally dispose of debris at public or private dumping areas off Owner's property.

I. Handle materials in a controlled manner with as few handlings as possible.

J. Owner may dictate cleaning equipment and methodology.

3.02 SAFETY REQUIREMENTS

A. Hazards Control:

1. Store volatile wastes in covered metal containers.

2. Remove containers from premises daily.

3. Prevent accumulation of wastes which create hazardous conditions.

4. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:

1. Do not burn or bury rubbish and waste materials on project site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Do not dispose of wastes into stream or waterways.

4. Cleanup after haul trucks.

END OF SECTION
SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1  G E N E R A L

1.01 SECTION INCLUDES

A. Maintenance and Submittal of Record Documents and Samples.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain one record copy of documents at the site in accordance with the General Conditions.

B. Store Record Documents and samples in field office if a field office is required by Contract Documents, or in a secure location. Provide files, racks, and secure storage for Record Documents and samples.

C. Label each document "PROJECT RECORD" in neat, large, printed letters.

D. Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.

E. Keep Record Documents and Samples available for inspection by Owner’s Representative.

1.03 RECORDING

A. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

B. Contract Drawings and Shop Drawings: Legibly mark each item to record all actual construction, or "as built" conditions, including:

1. Measured horizontal locations and elevations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Elevations of underground utilities referenced to bench mark utilized for project.

3. Field changes of dimension and detail.

4. Changes made by modifications.

5. Details not on original contract drawings.
6. References to related shop drawings and Modifications.

C. Record information with a red pen on a set of full size original construction drawings.

1.04 SUBMITTALS

A. At contract closeout, deliver Project Record Documents to Owner’s Representative.

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

END OF SECTION
SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Submittal requirements for manufacturers’ operation and maintenance (O&M) data.
B. Submittal requirements for O&M data notebooks.

1.02 UNIT PRICES

A. The value and payment of approved equipment operation and maintenance manuals is incidental to the amount bid for equipment and installation. Project retainage will not be released until O&M manuals have been delivered and accepted by Owner.

1.03 REQUIREMENTS

A. Furnish manufacturers’ operation and maintenance data notebooks for equipment and components as required by the individual technical specifications in accordance with all sections and provisions of these specifications.

B. Furnish O&M data notebooks in accordance with the requirements of this Section.

1.04 SUBMITTALS

A. Submit O&M data for manufacturers’ equipment and components, as required.

B. For projects which include multiple facilities, provide separate O&M data submittals noted accordingly.

C. Manufacturers’ O&M data submittals shall have been reviewed and accepted by the Owner’s Representative prior to requesting operational testing.

D. Submit three (3) copies of complete O&M data notebooks and electronic copies on disks meeting the requirements of this Section to the Owner’s Representative 14 days prior to the scheduled demonstration testing and facility start-up.

E. Compile the O&M data notebook of all approved manufacturer O&M data submittals previously reviewed and accepted by the Owner’s Representative and organize in accordance with the requirements of this Section.
F. Incorporate revisions or additional data required for the O&M data notebook, due to system start-up and demonstration testing, and resubmit as a condition of final payment.

1.05 O&M DATA

A. For each product or system list names, addresses, e-mail addresses and telephone numbers of suppliers and service representatives, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

D. Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer’s instructions.

E. Warranties, Guarantees and Bonds: Bind in a copy of each.

1.06 O&M REQUIREMENTS

A. For each item of equipment and each system include a description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include function, normal operating characteristics, and limiting conditions. Include performance curves where applicable, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

B. Data submitted on equipment shall include complete maintenance instructions (including preventive and corrective maintenance) and parts lists in sufficient detail to facilitate ordering replacements.

C. Operating Procedures: Include start-up, and normal operating instructions and sequence. Include regulation, control, stopping, shut-down, and emergency instructions.

D. Provide servicing and lubrication schedule, and list of lubricants required. Cross-reference lubricants to products offered by at least three major lubricant suppliers. Note lubrication points on Drawings.

E. Include manufacturer’s printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

G. Provide original manufacturer’s parts list, illustrations, assembly drawings, and diagrams, and diagrams required for maintenance.
H. Troubleshooting guides.

I. Complete spare parts list with predicted life of parts subject to wear, list of spare parts recommended on hand for both initial start-up and for normal operating inventory, and local or nearest source of spare parts availability.

1.07 O&M DATA NOTEBOOKS

A. The Contractor shall compile O&M data notebooks for each facility consisting of the assembled manufacturer’s O&M data submittals which were previously reviewed and accepted by the Owner’s Representative The O&M data notebooks are required before demonstration testing or start-up activities.

B. Submit O&M data notebooks, bound in 8½ x 11 inch text pages, 3-ring/D binder notebooks with durable plastic covers as well as electronic media containing the O&M manuals in acceptable electronic format.

C. Provide binder covers and spines with computer printed title “OPERATION AND MAINTENANCE DATA”, title of project, facility name and address.

D. For projects with multiple facilities, provide separate O&M data notebooks specific to each facility.

E. Provide separate binder notebooks based on category of equipment or components submitted. Note as either “Mechanical”, “Electrical”, or “Instrumentation” on the cover and spine. DO NOT combine these into one binder.

F. All binder notebooks shall be provided with labeled, tabbed, dividers logically arranged, and shall include a Table of Contents noting all sections, drawings, diagrams, vendor data, and other documents.
SECTION 02050

DEMOLITION

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Demolishing and removing existing structures, equipment and materials only to the extent as required in the execution work detailed in the contract documents.

B. Disposing of demolished materials and equipment.

1.02 UNIT PRICES

A. Measurement for demolition is on a lump sum basis for each contiguous area, including submittal of proposed demolition and removal schedule.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all provisions and sections within these specifications.

B. Submit proposed methods, equipment, materials and sequence of operations for demolition of structures. Describe coordination for shutting off, capping, and removing utilities. Plan operations to minimize temporary disruption of utilities to existing facilities or adjacent property.

C. Submit proposed demolition and removal schedule for approval. Notify Owner’s Representative in writing at least 72 hours before starting demolition.

D. Submit an approved copy of demolition schedule to Fire Department prior to commencement of demolition operations.

E. Obtain a permit for building demolition, as required.

1.04 OWNERSHIP OF MATERIAL AND EQUIPMENT

A. Materials and equipment designated for reuse or salvage are listed in Section 01010 - Summary of Work. Protect items designated for reuse or salvage from damage during demolition, handling and storage. Restore damaged items to satisfactory condition.

B. Materials and equipment not designated for reuse or salvage become the property of the Contractor.

1.05 STORAGE AND HANDLING
THE CITY OF GALVESTON

DEMOLITION

A. Store and protect materials and equipment designated for reuse until time of installation.

B. Deliver and unload items to be salvaged to storage areas indicated on Drawings.

C. Remove equipment and materials not designated for reuse or salvage and all waste and debris resulting from demolition from site. Remove material as work progresses to avoid clutter.

1.06 ENVIRONMENTAL CONTROLS

A. Minimize spread of dust and flying particles. If required by governing regulations, use temporary enclosures and other suitable methods to prevent the spread of dust, dirt and debris.

B. Use appropriate controls to limit noise from demolition to levels designated in local ordinances.

C. Do not use water where it can create dangerous or objectionable conditions, such as localized flooding, erosion, or sedimentation of nearby ditches or streams.

D. Stop demolition and notify Owner’s Representative if underground fuel storage tanks, asbestos, PCB’s, contaminated soils, or other hazardous materials are encountered.

E. Dispose of removed equipment, materials, waste and debris in a manner conforming to applicable laws and regulations.

PART 2 PRODUCTS

2.01 EQUIPMENT AND MATERIALS FOR DEMOLITION

A. Use equipment and materials approved under Paragraph 1.03, Submittals.

B. Fires are not permitted.

C. Do not use a "drop hammer" where the potential exists for damage to underground utilities, structures, or adjacent improvements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to demolition, make an inspection with Owner’s Representative to determine the condition of existing structures and features adjacent to items designated for demolition. Provide photographs of adjacent properties prior to demolition.

B. Owner’s Representative will mark or list existing equipment to remain the property of the Owner.
C. Do not proceed with demolition or removal operations until after the joint inspection and subsequent authorization by Owner’s Representative.

3.02 PROTECTION OF PERSONS AND PROPERTY

A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to the work.

C. Perform demolition in a manner to prevent damage to adjacent property. Repair damage to City property, public right of way or adjacent property and facilities at no cost to the owner.

D. The Contractor shall be responsible for safety and integrity of adjacent structures and shall be liable for any damage due to movement or settlement. Provide proper framing and shoring necessary for support. Cease operations if an adjacent structure appears to be endangered. Resume demolition only after proper protective measures have been taken.

E. Erect and maintain enclosures, barriers, warning lights, and other required protective devices.

3.03 UTILITY SERVICES

A. Follow rules and regulations of authorities or companies having jurisdiction over communications, pipelines, and electrical distribution services.

B. Notify and coordinate with utility company and adjacent building occupants when temporary interruption of utility service is necessary.

3.04 DISPOSAL

A. Remove from the site all items contained in or upon the structure not designated for reuse or salvage. Conform to requirements of Section 01500 - Temporary Facilities and Controls or Section 01564 - Waste Material Disposal.

B. Follow method of disposal as required by regulatory agencies.

3.05 MECHANICAL WORK ITEMS

A. Mechanical removals consist of dismantling and removing existing piping, pumps, motors, water tanks, equipment and other appurtenances. It includes cutting, capping, and plugging required to restore use of existing utilities.

B. Remove existing process, water, chemical, gas, fuel oil and other piping not required for new work. Take out piping to the limits shown or to a point where it will not interfere with the new work. Piping not indicated to be removed or which does not
interfere with new work shall be removed to the nearest solid support, capped, and the remainder left in place. Purge chemical and fuel lines and tanks. Verify that such lines are safe prior to removal or capping.

C. Where piping that is to be removed passes through existing walls, cut and cap piping on each side of the wall. Use cap appropriate for pipe material to be capped. Provide fire-rated sealant for walls classified as fire-rated.

D. When underground piping, which is not located in the public right-of-way, is to be altered or removed, cap the remaining piping. Abandoned underground piping may be left in place unless it interferes with new work or is shown or specified to be removed. For piping to be abandoned, fill with sand, pressure grout or other approved method and plug with concrete or brick masonry bulkhead unless otherwise approved by the Owner.

E. Remove waste and vent piping to points shown. Plug pipe and cleanouts and plugs. Where vent stacks pass through an existing roof that is to remain, remove the stack and patch the hole in the roof, making it watertight. Comply with requirements of existing roof installer so as to maintain roof warranty.

F. Conform to applicable codes when making any changes to plumbing and heating systems.

3.06 ELECTRICAL WORK ITEMS

A. Electrical removals consist of disconnecting and removing existing switchgear, distribution switchboards, control panels, bus duct, conduits and wires, panelboards, lighting fixtures, and miscellaneous electrical equipment.

B. Remove existing electrical equipment and fixtures to prevent damage to allow continued operation of existing systems and to maintain the integrity of the grounding systems.

C. Remove poles and metering equipment, if designated for removal on the Drawings. Coordinate electrical removals with the power company, as necessary. Verify that power is properly de-energized and disconnected.

D. Where shown or otherwise required, remove wiring in underground duct systems. Verify function of wiring before disconnecting and removing. Plug ducts which are not to be reused at entry to buildings.

E. Changes to electrical systems shall conform to applicable codes.

END OF SECTION
SECTION 02076

REMOVE EXISTING PAVEMENTS AND STRUCTURES

PART 1   G E N E R A L

1.01   SECTION INCLUDES

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

1.02   UNIT PRICES

A. No separate payment will be made for removing existing pavements and structures under this Section unless included in bid documents. Include payment in unit price for work in appropriate sections.
B. Measurement, when included in bid documents, will be as follows:

1. Measurement for removing and disposing of concrete base and surfacing, and removing asphaltic surfacing, is on a square yard basis measured between lips of gutters.
2. Measurement for removing and disposing of cement stabilized shell base course, with or without asphalt surfacing, is on a square yard basis.
3. Measurement for removing and disposing of concrete base and surfacing with curbs is on a square yard basis measured from back to back of curbs. Payment includes removal of all base, asphaltic surfacing, concrete pavement, esplanade curbs, curb and gutters, and paving headers.
4. Measurement for removing and disposing of concrete pavement is on a square yard basis measured from back to back of curbs.
5. Measurement for removing and disposing of monolithic curb and gutter, removing monolithic concrete curb, and removing concrete curb is on a linear foot basis measured along the face of the curb.
6. Measurement for removing and disposing of concrete sidewalk and driveway is on a square yard basis.
7. Measurement for removing and disposing of miscellaneous concrete and masonry items is on a cubic yard basis of the structure in place.
8. Measurement for removing and disposing of pipe culverts and sewers is on a linear foot basis for each diameter of type of pipe removed.

C. No payment will be made for work outside maximum payment limits indicated on Drawings, or in areas removed for Contractor's convenience.

1.03 REGULATORY REQUIREMENTS

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION

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

3.02 PROTECTION

A. Protect utilities that remain from damage.
B. Protect trees, other plant growth, and features designated to remain.
C. Protect adjacent public and private property from damage.
D. Protect bench marks, monuments, and existing structures designated to remain from damage or displacement.

3.03 REMOVALS

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

A. Inlet frames, grates, and plates; and manhole frames and covers, may remain Owner property. Disposal shall be in accordance with requirements of Section 01564 - Waste Material Disposal.

B. Remove debris resulting from Work under this section from site in accordance with requirements of Section 01564 - Waste Material Disposal.

END OF SECTION
SECTION 02100

RIGHT OF WAY PREPARATION

PART 1   GENERAL

1.01 SECTION INCLUDES

A. Clearing and grubbing.
B. Removal of topsoil, stripping and stockpiling.
C. Removal of debris and trash.
D. Removal of obstructions.
E. Removal and replacement of fence section.
F. Temporary Fencing.
G. Excavation and fill.
H. Disposal of waste materials.
I. Disposal of excess materials.
J. Salvaging of designated items.

1.02 UNIT PRICES

A. No separate payment will be made for work performed under this section. Include payment in unit price for related work unless stated otherwise in the Bid Proposal.

B. Side streets and utility easements involving any work in this contract will not be measured separately and are considered incidental to the project.

PART 2   PRODUCTS

2.01 MATERIALS

A. Imported fill

1. Sand, gravel, earth or combination, which can be compacted to form stable embankments and fills conforming to select borrow standards:

   a. Liquid limit: 45 maximum, ASTM D 4318.
   b. Plasticity index: 12 minimum, 20 maximum, ASTM D 4318.
c. Free from trash, vegetation, organic matter, large stones, hard lumps of earth and frozen, corrosive or perishable material.

d. Well broken up, free of clods of hard earth, rocks, and stones greater than 2-inch dimension.

PART 3 EXECUTION

3.01 PRESERVATION OF STAKING
A. Use caution to preserve survey staking, monuments and property corners.
B. Employ a Registered Public Surveyor to reset any missing, disturbed, or damaged monumentation.

3.02 SITE CLEARING
A. Protect trees and shrubs designated to remain in accordance with Section 01535 – Tree and Plant Protection.
B. Protect utilities to remain free from damage.
C. Topsoil Removal:
   1. Remove grass from areas before stripping.
   2. Topsoil is defined as surface soil found of depth of not less than 4 inches.
   3. Strip topsoil to depths encountered.
   4. Perform stripping in a manner to prevent intermingling of topsoil with underlying sterile subsoil and remove objectionable materials, including clay lumps, stones over 2 inches in diameter, weeds, roots, leave and debris.
   5. Where trees are designated by Owner to be left standing, stop topsoil stripping at extreme limits of tree drip line to prevent damage to main root system.
   6. Construct storage piles to freely drain surface water.
   7. Cover storage piles, if required, to prevent wind-blown dust.
   8. At completion, transport topsoil from stockpiles to work site for spreading and final fine grading.
D. Clearing and Grubbing.
   1. Clear project site of trees, shrubs, and other vegetation, except for those designated by Owner to be left standing.
2. Completely remove stumps, roots, and other debris protruding through ground surface.

3. Use only hand methods for grubbing inside drip line of trees.

4. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

5. Place fill material in horizontal layers not exceeding 6 inches loose depth and thoroughly compact to density equal to adjacent original ground.

6. On areas required for roadway, channel, or structural excavation, remove stumps and roots to depth of 2 feet below lower elevation of excavation.

7. On areas required for embankment construction, remove stumps and roots to depth of 2 feet below ground surface.

8. Blade entire area to prevent ponding of water and to provide drainage, except in areas to be immediately excavated.

9. Trees and stumps may be cut off as close to natural ground as practicable on areas which are to be covered by at least 3 feet of embankment.

10. Complete operations by bulldozing, blading, and grading so that prepared area is free of holes, unplanned ditches, abrupt changes in elevations and irregular contours, and preserve drainage of area.

3.03 UNSUITABLE MATERIAL

A. Undercut and replace material which Owner’s Representative designates as unsuitable for subsequent construction.

B. Material used to replace unsuitable material shall be suitable material from site excavation or “Imported Fill” specified in this section.

3.04 EXCAVATION AND FILL

A. Depressed site areas shall be filled using material from high areas, insofar as practicable.

B. Fill to indicated rough grade elevations with “Imported Fill” material, when fill obtained from high areas is exhausted.

C. Place and compact fill in accordance with Section 02221 – Embankment.

3.05 SALVAGEABLE ITEMS AND MATERIALS

A. Items designated by the Owner’s Representative to be salvaged are to be carefully removed, so as to cause no damage to the salvaged items and delivered to Owner’s storage yard.
3.06 DISPOSAL

A. Removal and dispose of excess material and debris resulting from work under this Section in accordance with requirements of Section 01564 – Waste Material Disposal.

END OF SECTION
SECTION 02105
SITE PREPARATIONS

PART 1  GENERAL

1.01  SECTION INCLUDES

A.  Clearing and grubbing.
B.  Removal of topsoil, stripping and stockpiling.
C.  Removal of debris and trash.
D.  Removal of obstructions.
E.  Cutting and filling.
F.  Rough grading.
G.  Disposal of waste materials.
H.  Disposal of excess materials.
I.  Salvaging of designated items.

1.02  UNIT PRICES

A.  All items within this section shall be considered incidental to the cost of the project.

1.03  PROTECTION

A.  Refer to article entitled "Protection" in General Requirements.

PART 2  PRODUCTS

2.01  MATERIALS

A.  Asphalthic Horticultural Coating:
   1.  Emulsified asphalt or other coating especially formulated for horticultural use on cut or injured plant tissue.
   2.  Waterproof, adhesive, elastic, antiseptic tree wound compound free from kerosene and coal tar creosote.

B.  Liquid Fertilizer:  Appropriate to the season and application.
PART 3  EXECUTION

3.01 PRESERVATION OF STAKING

A. Site preparation operations shall preserve survey staking.

B. At own expense, without charge to Owner, employ surveyor to check staking, and reset any missing, disturbed, or damaged staking upon completion of site preparation.

C. Use staking to check that obstructions have been removed within designated construction areas, rights-of-way, or easements.

3.02 SITE CLEARING

A. Trees and shrubs designated to remain that sustain cutting or injury to roots, trunk, or limbs shall be pruned by a tree surgeon and cut or injury painted with asphaltic horticultural coating without cost to Owner.

3.03 DISPOSAL OF WASTE MATERIALS

A. Objectionable materials such as trash, debris, cleared and grubbed materials, and unsuitable, unusable, and undesirable materials necessary and designated by Owner to be removed from construction area shall be classified as follows:

1. Combustible waste materials: Materials feasible, practical and non-toxic to dispose of by burning, including cleared and grubbed materials.

2. Incombustible waste materials: Materials not burnable, not feasible, and not practical to dispose of by burning.

B. Burning

1. Burning of combustible waste materials and cleared and grubbed materials will not be permitted.

C. Waste materials shall become property of Contractor and shall be legally disposed of by contractor outside the limits of Owner's controlled property.

3.04 EXCESS MATERIAL

A. Excess material designated by the Owner to be removed shall become the property of the contractor and he shall remove excess material from Owner's controlled property and legally dispose of it. Excess material excavated cannot leave Galveston Island.

3.05 ROUGH GRADING
A. The site shall be rough-graded to eliminate holes and sharp breaks in grade and to fit into area drainage pattern.

B. The site shall drain readily.

END OF SECTION
SECTION 02226
EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1  GENERAL

1.01 SECTION INCLUDES

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

1.02 UNIT PRICES

A. No payment will be made for structural excavation and backfill under this Section. Include payment in unit price or lump sum for applicable bid item.

1.03 DEFINITIONS

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

1. Materials that are classified as ML, CL-ML, MH, PT, OH and OL according to ASTM D 2487.

2. Materials that cannot be compacted to the required density due to either gradation, plasticity, or moisture content.

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

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

B. Suitable Material: Suitable soil materials are those meeting specification requirements. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement shall be considered suitable, unless otherwise indicated.

C. Select Material: Material as defined in Section 02229 - Utility Backfill Materials.

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

E. Foundation Backfill Materials: Natural soil or manufactured aggregate meeting Class I requirements and geotextile filter fabrics, as required, to control drainage and material separation. Foundation backfill material is placed and compacted as backfill where needed to provide stable support for the structure foundation base. Foundation backfill materials may include concrete fill and seal slabs.
F. Foundation Base: For foundation base material, use crushed aggregate with filter fabric, as required, cement stabilized sand, or concrete seal slab. The foundation base provides a smooth, level working surface for the construction of the concrete foundation.

G. Foundation Subgrade: Foundation subgrade is the surface of the natural soil which has been excavated and prepared to support the foundation base or foundation backfill, where needed.

H. Ground Water Control Systems: Installations external to the excavation such as well points, eductors, or deep wells. Ground water control includes dewatering to lower the ground water, intercepting seepage which would otherwise emerge from the side or bottom of the excavation, and depressurization to prevent failure or heaving of the excavation bottom. Refer to Section 01563 - Control of Ground Water and Surface Water.

I. Surface Water Control: Diversion and drainage of surface water runoff and rain water away from the excavation. Remove rain water and surface water which accidentally enters the excavation as a part of excavation drainage.

J. Excavation Drainage: Removal of surface and seepage water in the excavation by sump pumping and using French drains surrounding the foundation to intercept the water.

K. Over-Excavation and Backfill: Excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials below the foundation as shown on Drawings, and backfilled with foundation backfill material.

L. Shoring System: A structure that supports the sides of an excavation to maintain stable soil conditions and prevent cave-ins.

1.04 SUBMITTALS

A. Submittals shall conform to requirements of all sections and provisions of these regulations.

B. Submit a work plan for excavation and backfill for each structure with complete written description which identifies details of the proposed method of construction and the sequence of operations for construction relative to excavation and backfill activities. The descriptions, with supporting illustrations, shall be sufficiently detailed to demonstrate to the Owner’s Representative that the procedures meet the requirements of the Specifications and Drawings.

C. Submit excavation safety system plan.
1. The excavation safety system plan shall be in accordance with applicable OSHA requirements for all excavations.

2. The excavation safety system plan shall be in accordance with the requirements of Section 01526 - Trench Safety System, for all excavations that fall under State and Federal trench safety laws.

D. Submit a ground and surface water control plan in accordance with requirements in this Section and Section 01563 - Control of Ground Water and Surface Water.

E. Submit backfill material sources and product quality information in accordance with requirements of Section 02229 - Utility Backfill Materials.

F. Submit project record documents under provisions of Section 01720 - Project Record Documents. Record location of utilities, as installed, referenced to survey benchmarks. Include location of utilities encountered or rerouted. Give horizontal dimensions, elevations, inverted and gradients.

1.05 TESTS

A. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory provided by the Owner in accordance with requirements of Section 01410 - Testing Laboratory Services and as specified in this Section.

B. Contractor shall perform embedment and backfill material source qualification testing in accordance with requirements of Section 02229- Utility Backfill Materials.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Perform excavation with equipment suitable for achieving the requirements of this Specification.

B. Use equipment which will produce the degree of compaction specified. Backfill within 3 feet of walls shall be compacted with hand-operated equipment. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to the depth of the fill at that time. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.

2.02 MATERIAL CLASSIFICATIONS

A. Backfill materials shall conform to the classifications and product descriptions of Section 02229 - Utility Backfill Materials. The classification or product description for backfill applications shall be as shown on the Drawings and as specified.
PART 3  \textbf{EXECUTION}

3.01 \textbf{PREPARATION}

A. Conduct an inspection to determine condition of existing structures and other permanent installations.

B. Set up necessary street detours and barricades in preparation for excavation if construction will affect traffic. Conform to requirements of Section 01570 - Traffic Control and Regulation. Maintain barricades and warning devices at all times for streets and intersections where work is in progress, or where affected by the Work, and is considered hazardous to traffic movements.

C. Perform work in accordance with OSHA standards. Employ an excavation safety system as specified in Section 01526 - Trench Safety Systems for excavations over 5 feet deep.

D. Remove old pavements and structures, including sidewalks and driveways, in accordance with requirements of Section 02076 - Removing Existing Pavements and Structures.

E. Install and operate necessary dewatering and surface water control measures in accordance with requirements of Section 01563 - Control of Ground Water and Surface Water.

3.02 \textbf{PROTECTION}

A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits as designated on the Drawings, and in accordance with requirements of Section 01535 - Tree and Plant Protection.

B. Protect and support above-grade and below-grade utilities which are to remain.

C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities is indicated on the Drawings.

D. Prevent erosion of excavations and backfill. Do not allow water to pond in excavations.

E. Maintain excavation and backfill areas until start of subsequent work. Repair and recompact slides, washouts, settlements, or areas with loss of density at no additional cost to the Owner.

3.03 \textbf{EXCAVATION}

A. Perform excavation work so that the underground structure can be installed to depths and alignments shown on Drawings. Use caution during excavation work to avoid
disturbing surrounding ground and existing facilities and improvements. Keep excavation to the absolute minimum necessary. No additional payment will be made for excess excavation not authorized by Owner’s Representative.

B. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work. Notify Owner’s Representative and obtain instructions before proceeding in such areas.

C. Immediately notify the agency or company owning any line which is damaged, broken or disturbed. Obtain approval from Owner’s Representative and agency for any repairs or relocations, either temporary or permanent.

D. Avoid settlement of surrounding soil due to equipment operations, excavation procedures, vibration, dewatering, or other construction methods.

E. Provide surface drainage during construction to protect work and to avoid nuisance to adjoining property. Where required, provide proper dewatering and piezometric pressure control during construction.

F. Conduct hauling operations so that trucks and other vehicles do not violate the City’s Stormwater Protection Ordinance. Verify that truck beds are sufficiently tight and loaded in such a manner that materials will not spill onto streets. Promptly clear away any dirt, mud, or other materials that spill onto streets or are deposited onto streets by vehicle tires.

G. Maintain permanent benchmarks, monumentation, and other reference points. Unless otherwise directed, replace those which are damaged or destroyed by the Work.

H. Provide sheeting, shoring, and bracing where required to safely complete the Work, to prevent excavation from extending beyond limits indicated on Drawings, and to protect the Work and adjacent structures or improvements. Sheetling, shoring, and bracing used to protect workmen and the public shall conform to requirements of Section 01526 - Trench Safety Systems.

I. Prevent voids from forming outside of sheeting. Immediately fill voids with grout, concrete fill, cement stabilized sand, or other material approved by Owner’s Representative.

J. After completion of the structure, remove sheeting, shoring, and bracing unless Owner’s Representative has approved in writing that such temporary structures may remain. Remove sheeting, shoring and bracing in such a manner as to maintain safety during backfilling operations and to prevent damage to the Work and adjacent structures or improvements.

K. Immediately fill and compact voids left or caused by removal of sheeting with cement stabilized sand or material approved by Owner’s Representative.
3.04 HANDLING EXCAVATED MATERIALS

A. Classify excavated materials. Place material which is suitable for use as backfill in orderly piles at a sufficient distance from excavation to prevent slides or cave-ins.

B. Provide additional backfill material in accordance with requirements of Section 02251 - Utility Backfill Materials, if adequate quantities of suitable material are not available from excavation and trenching operations at the site.

3.05 DEWATERING

A. Provide ground water control per Section 01563 - Control of Ground Water and Surface Water.

B. Maintain the ground water surface a minimum of two feet below the bottom of the foundation base.

C. Maintain ground water control as directed by Section 01563 - Control of Ground Water and Surface Water and until the structure is sufficiently complete to provide the required weight to resist hydrostatic uplift with a minimum safety factor of 1.2.

3.06 FOUNDATION EXCAVATION

A. Notify Owner’s Representative at least 48 hours prior to planned completion of foundation excavations. Do not place the foundation base until the excavation is accepted by the Owner’s Representative.

B. Excavate to elevations shown on Drawings, as needed to provide space for the foundation base, forming a level undisturbed surface, free of mud or soft material. Remove pockets of soft or otherwise unstable soils and replace with foundation backfill material or a material as directed by the Owner’s Representative. Prior to placing material over it, recompact the subgrade, scarifying, as needed, to 95 percent of the maximum Standard Proctor Density according to ASTM D 698. If the specified level of compaction cannot be achieved, moisture condition the subgrade and recompact until 95 percent is achieved, over-excavate to provide a minimum layer of 24 inches of foundation backfill material, or other means acceptable to the Owner’s Representative.

C. Fill unauthorized excessive excavation with foundation backfill material or other material as directed by the Owner’s Representative.

D. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in a satisfactory, undisturbed condition. Keep excavations free of standing water and completely free of water during concrete placement.
E. Soils which become unsuitable due to inadequate dewatering or other causes, after initial excavation to the required subgrade, shall be removed and replaced with foundation backfill material, as directed by Owner’s Representative, at no additional cost to the Owner.

F. Place foundation base, or foundation backfill material, where needed, over the subgrade on same day that excavation is completed to final grade. Where base of excavations are left open for longer periods, protect them with a seal slab or cement-stabilized sand.

G. All crushed aggregate, and other free draining Class I materials, shall have a geotextile filter fabric separating it from native soils or select material backfill. The fabric shall overlap a minimum of 12 inches beyond where another material stops contact with the soil.

H. Crushed aggregate, and other Class I materials, shall be placed in uniform layers of 8-inch maximum thickness. Compaction shall be by means of at least two passes of a vibratory compactor.

3.07 FOUNDATION BASE

A. After the subgrade is properly prepared, including the placement of foundation backfill where needed, the foundation base shall be placed. The foundation base shall consist of a 12-inch layer of crushed aggregate or cement stabilized sand. Alternately, a 4-inch minimum seal slab may be placed. The foundation base shall extend a minimum of 12 inches beyond the edge of the structure foundation. Refer to the project plans and comply with actual design requirement when more stringent than stated herein.

B. Where the foundation base and foundation backfill are of the same material, both can be placed in one operation.

3.08 BACKFILL

A. Complete backfill to surface of natural ground or to lines and grades shown on Drawings. Use existing material that qualifies as select material, unless indicated otherwise. Deposit backfill in uniform layers and compact each layer as specified.

B. Do not place backfill against concrete walls or similar structures until laboratory test breaks indicate that the concrete has reached a minimum of 85 percent of the specified compressive strength. Where walls are supported by slabs or intermediate walls, do not begin backfill operations until the slab or intermediate walls have been placed and concrete has attained sufficient strength.

C. Remove concrete forms before starting backfill and remove shoring and bracing as work progresses.
D. Maintain fill material at no less than 2 percent below nor more than 2 percent above optimum moisture content. Place fill material in uniform 8-inch maximum loose layers. Compaction of fill shall be to at least 95 percent of the maximum Standard Proctor Density according to ASTM D 698 under paved areas. Compact to at least 90 percent around structures below unpaved areas.

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

F. Place backfill using cement-stabilized sand in accordance with Section 02252 - Cement Stabilized Sand.

3.09 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. Tests will be performed initially on minimum of three different samples of each material type for plasticity characteristics, in accordance with ASTM D 4318, and for gradation characteristics, in accordance with Tex-101-E and Tex-110-E. Additional classification tests will be performed whenever there is a noticeable change in material gradation or plasticity.

C. In-place density tests of compacted subgrade and backfill will be performed according to ASTM D 1556, or ASTM D 2922 and ASTM D 3017, and at the following frequencies and conditions:

1. A minimum of one test for every 100 cubic yards of compacted backfill material.

2. A minimum three density tests for each full work shift.

3. Density tests will be performed in all placement areas.

4. The number of tests will be increased if inspection determines that soil types or moisture contents are not uniform or if compacting effort is variable and not considered sufficient to attain uniform density.

D. At least three tests for moisture-density relationships will be initially performed for each type of backfill material in accordance with ASTM D 698. Additional moisture-density relationship tests will be performed whenever there is a noticeable change in material gradation or plasticity.

E. If tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at Contractor's expense.
3.10 DISPOSAL OF EXCESS MATERIAL

A. Dispose of excess materials in accordance with requirements of Section 01564 - Waste Material Disposal.

END OF SECTION
SECTION 02227

EXCAVATION AND BACKFILL FOR UTILITIES

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Excavation, trenching, foundation, embedment, and backfill for installation of utilities.

1.02 UNIT PRICES

A. No additional payment will be made for trench excavation, embedment and backfill. Include payment in the unit price for applicable bid items.

B. No separate or additional payment will be made for surface water control, or for excavation drainage. Include payment in the unit price for applicable bid items.

1.03 DEFINITIONS

A. Pipe Foundation: Suitable and stable native soils that are exposed at the trench subgrade after excavation to depth of bottom of the bedding as shown on the Drawings, or foundation backfill material placed and compacted in over-excavations.

B. Pipe Bedding: The portion of trench backfill that extends vertically from top of foundation up to a level line at bottom of pipe, and horizontally from one trench sidewall to opposite sidewall.

C. Haunching: The material placed on either side of pipe from top of bedding up to springline of pipe and horizontally from one trench sidewall to opposite sidewall.

D. Initial Backfill: The portion of trench backfill that extends vertically from springline of pipe (top of haunching) up to a level line 12 inches above top of pipe, and horizontally from one trench sidewall to opposite sidewall.

E. Pipe Embedment: The portion of trench backfill that consists of bedding, haunching and initial backfill.
F. Trench Zone: The portion of trench backfill that extends vertically from top of pipe embedment up to pavement subgrade or up to final grade when not beneath pavement.

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

H. Suitable Material: Suitable soil materials are those meeting specification requirements. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement are considered suitable, unless otherwise indicated.

I. Backfill: Suitable material meeting specified quality requirements, placed and compacted under controlled conditions.

J. Ground Water Control Systems: Installations external to trench, such as well points, eductors, or deep wells. Ground water control includes dewatering to lower ground water, intercepting seepage which would otherwise emerge from side or bottom of trench excavation, and depressurization to prevent failure or heaving of excavation bottom. Refer to Section 01563 - Control of Ground Water and Surface Water.

K. Surface Water Control: Diversion and drainage of surface water runoff and rain water away from trench excavation. Rain water and surface water accidentally entering trench shall be controlled and removed as a part of excavation drainage.

L. Excavation Drainage: Removal of surface and seepage water in trench by sump pumping and using a drainage layer, as defined in ASTM D 2321, placed on the foundation beneath pipe bedding or thickened bedding layer of Class I material.

M. Trench Conditions are defined with regard to the stability of trench bottom and trench walls of pipe embedment zone. Maintain trench conditions that provide for effective placement and compaction of embedment material directly on or against undisturbed soils or foundation backfill, except where structural trench support is necessary.
1. Dry Stable Trench: Stable and substantially dry trench conditions exist in pipe embedment zone as a result of typically dry soils or achieved by ground water control (dewatering or depressurization) for trenches extending below ground water level.

2. Stable Trench with Seepage: Stable trench in which ground water seepage is controlled by excavation drainage.
   a. Stable Trench with Seepage in Clayey Soils: Excavation drainage is provided in lieu of or to supplement ground water control systems to control seepage and provide stable trench subgrade in predominately clayey soils prior to bedding placement.
   b. Stable Wet Trench in Sandy Soils: Excavation drainage is provided in the embedment zone in combination with ground water control in predominately sandy or silty soils.

3. Unstable Trench: Unstable trench conditions exist in the pipe embedment zone if ground water inflow or high water content causes soil disturbances, such as sloughing, sliding, boiling, heaving or loss of density.

N. Subtrench: Subtrench is a special case of benched excavation. Subtrench excavation below trench shields or shoring installations may be used to allow placement and compaction of foundation or embedment materials directly against undisturbed soils. Depth of a subtrench depends upon trench stability and safety as determined by the Contractor.

O. Trench Dam: A placement of low permeability material in pipe embedment zone or foundation to prohibit ground water flow along the trench.

P. Over-Excavation and Backfill: Excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials below top of foundation as shown on Drawings, and backfilled with foundation backfill material.

Q. Foundation Backfill Materials: Natural soil or manufactured aggregate of controlled gradation, and geotextile filter fabrics as required, to control drainage and material separation. Foundation backfill material is placed and compacted as backfill to provide stable support for bedding. Foundation backfill materials may include concrete seal slabs.

R. Trench Safety Systems include both Protective Systems and Shoring Systems as defined in Section 01526 - Trench Safety Systems.
S. Trench Shield (Trench Box): A portable worker safety structure moved along the trench as work proceeds, used as a Protective System and designed to withstand forces imposed on it by cave-in, thereby protecting persons within the trench. Trench shields may be stacked if so designed or placed in a series depending on depth and length of excavation to be protected.

T. Shoring System: A structure that supports sides of an excavation to maintain stable soil conditions and prevent cave-ins, or to prevent movements of the ground affecting adjacent installations or improvements.

1.04 SCHEDULING

A. Schedule work so that pipe embedment can be completed on the same day that acceptable foundation has been achieved for each section of pipe installation, manhole, or other structures.

1.05 SUBMITTALS

A. Submittals shall conform to the requirements of all provisions and sections of these specifications.

B. Submit a written description for information only of the planned typical method of excavation, backfill placement and compaction, including:
   1. Sequence of work and coordination of activities.
   2. Selected trench widths.
   3. Procedures for foundation and embedment placement, and compaction.
   4. Procedure for use of trench boxes and other premanufactured systems while assuring specified compaction against undisturbed soil.
   5. Procedure for installation of Special Shoring at locations identified on the Drawings.

C. Submit a ground and surface water control plan in accordance with requirements in this Section and Section 01563 - Control of Ground Water and Surface Water.

D. Submit backfill material sources and product quality information in accordance with requirements of Section 02229 - Utility Backfill Materials.

E. Submit a trench excavation safety program in accordance with requirements of Section 01526 - Trench Safety System. Include designs for special shoring meeting the requirements defined in Paragraph 1.03 of Section 01526.
F. Submit record of location of utilities as installed, referenced to survey control points. Include locations of utilities encountered or rerouted. Give stations, horizontal dimensions, elevations, inverts, and gradients.

1.06 TESTS

A. Perform backfill material source qualification testing in accordance with requirements of Section 02229 - Utility Backfill Materials.

B. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory provided by the Owner in accordance with requirements of Section 01410 - Testing Laboratory Services and as specified in this Section.

1.07 PROTECTION

A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits as designated on the Drawings, and in accordance with requirements of Section 01535 - Tree and Plant Protection.

B. Protect and support above-grade and below-grade utilities which are to remain.

C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities are indicated on the Drawings.

1.08 SPECIAL SHORING DESIGN REQUIREMENTS

A. Have Special Shoring designed or selected by the Contractor's Professional Engineer to provide support for the sides of the excavations, including soils and hydrostatic ground water pressures as applicable, and to prevent ground movements affecting adjacent installations or improvements such as structures, pavements and utilities. Special shoring may be a premanufactured system selected by the Contractors Professional Engineer to meet the project site requirements based on the manufacturer’s standard design.

PART 2 PRODUCTS

2.01 EQUIPMENT
A. Perform excavation with hydraulic excavator or other equipment suitable for achieving the requirements of this Section.

B. Use only hand-operated tamping equipment until a minimum cover of 12 inches is obtained over pipes, conduits, and ducts. Do not use heavy compacting equipment until adequate cover is attained to prevent damage to pipes, conduits, or ducts.

C. Use trench shields or other Protective Systems or Shoring Systems which are designed and operated to achieve placement and compaction of backfill directly against undisturbed native soil.

D. Use Special Shoring systems where required which may consist of braced sheeting, braced soldier piles and lagging, slide rail systems, or other systems meeting the Special Shoring design requirements.

2.02 MATERIAL CLASSIFICATIONS

A. Embedment and Trench Zone Backfill materials: Conform to the classifications and product descriptions of Section 02229 - Utility Backfill Materials.

B. Concrete Backfill: Conform to requirements for Class B concrete as specified in the pertinent Section.

P. Geotextile (Filter Fabric): Conform to requirements of Section 02249 - Geotextile.

Q. Concrete for Trench Dams: Concrete backfill or 3 sack premixed (bag) concrete.

E. Timber Shoring Left in Place: Untreated oak.

PART 3 EXECUTION

3.01 STANDARD PRACTICE

A. Install flexible pipe, including "semi-rigid" pipe, to conform to standard practice described in ASTM D 2321, and as described in this Section. Where an apparent conflict occurs between the standard practice and the requirements of this Section, this Section governs.
B. Install rigid pipe to conform with standard practice described in ASTM C 12, and as described in this Section. Where an apparent conflict occurs between the standard practice and the requirements of this Section, this Section governs.

3.02 PREPARATION

A.Establish traffic control to conform with requirements of Section 01570 - Traffic Control and Regulation. Maintain barricades and warning lights for streets and intersections where Work is in progress or where affected by the Work, and is considered hazardous to traffic movements.

B. Perform Work to conform with applicable safety standards and regulations. Employ a trench safety system as specified in Section 01526 - Trench Safety Systems.

C. Immediately notify the agency or company owning any existing utility line which is damaged, broken, or disturbed. Obtain approval from the Owner’s Representative and agency for any repairs or relocations, either temporary or permanent.

D. Remove existing pavements and structures, including sidewalks and driveways, to conform with requirements of Section 02076 - Removing Existing Pavements and Structures, as applicable.

E. Install and operate necessary dewatering and surface water control measures to conform with Section 01563 - Control of Ground Water and Surface Water.

F. Maintain permanent benchmarks, monumentation, and other reference points. Unless otherwise directed in writing, replace those which are damaged or destroyed in accordance with Section 01050 - Field Surveying.

G. PREPARATION: Complete, as incidental to construction, site preparation work including clearing and grubbing; removal and disposal of trash, rubbish, debris, and minor obstacles to construction; relocation of savable items; stripping topsoil within excavation areas, stockpiling topsoil; and, after construction, spreading topsoil over disturbed areas as required and finishing and grading surface within construction areas.

H. Perform a Potential Conflict Investigation at all critical locations. Locate existing utilities ahead of pipe laying activities. Notify Owner’s Representative in writing immediately upon identification of any conflict. In the event, Contractor will not be
entitled to extra cost for downtime including, but not limited, payroll, equipment, overhead demobilization and remobilization.

3.03 EXCAVATION

A. Except as otherwise specified or shown on the Drawings, install underground utilities in open cut trenches with vertical sides.

B. Perform excavation work so that pipe, conduit, and ducts can be installed to depths and alignments shown on the Drawings. Avoid disturbing surrounding ground and existing facilities and improvements. Excavate trench so that pipe is centered in trench. Do not obstruct sight distance for vehicles utilizing roadways or detours with stockpiled materials.

C. Determine trench excavation widths using the following schedule (as a minimum) as related to pipe outside diameter (O.D.) Or as shown on the drawings. Maximum trench width shall be the minimum trench width plus 24 inches.

<table>
<thead>
<tr>
<th>Nominal Pipe Size, Inches</th>
<th>Minimum Trench Width, Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 18</td>
<td>O.D. + 18</td>
</tr>
<tr>
<td>18 to 30</td>
<td>O.D. + 24</td>
</tr>
<tr>
<td>Greater than 30</td>
<td>O.D. + 36</td>
</tr>
</tbody>
</table>

D. Use sufficient trench width or benches above the embedment zone for installation of well point headers or manifolds and pumps where depth of trench makes it uneconomical or impractical to pump from the surface elevation. Provide sufficient space between shoring cross braces to permit equipment operations and handling of forms, pipe, embedment and backfill, and other materials.

E. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work at that location. Notify the Owner’s Representative and obtain instructions before proceeding.

F. Shoring of Trench Walls.

1. Install Special Shoring in advance of trench excavation or simultaneously with the trench excavation, so that the soils within the full height of the trench excavation walls will remain fully laterally supported at all times.
2. For all types of shoring, support trench walls in the pipe embedment zone throughout the installation. Provide trench wall supports sufficiently tight to prevent washing the trench wall soil out from behind the trench wall support.

3. Unless otherwise directed by the Owner’s Representative, leave sheeting driven into or below the pipe embedment zone in place to preclude loss of support of foundation and embedment materials. Leave rangers, walers, and braces in place as long as required to support sheeting, which has been cut off, and the trench wall in the vicinity of the pipe zone.

4. Employ special methods for maintaining the integrity of embedment or foundation material. Before moving supports, place and compact embedment to sufficient depths to provide protection of pipe and stability of trench walls. As supports are moved, finish placing and compacting embedment.

5. If sheeting or other shoring is used below top of the pipe embedment zone, do not disturb pipe foundation and embedment materials by subsequent removal. Maximum thickness of removable sheeting extending into the embedment zone 1 inch. Fill voids left on removal of supports with compacted backfill material.

G. Use of Trench Shields. When a trench shield (trench box) is used as a worker safety device, the following requirements apply:

1. Make trench excavations of sufficient width to allow shield to be lifted or pulled freely, without damage to the trench sidewalls.

2. Move trench shields so that pipe, and backfill materials, after placement and compaction, are not damaged nor disturbed, nor the degree of compaction reduced.

3. When required, place, spread, and compact pipe foundation and bedding materials beneath the shield. For backfill above bedding, lift the shield as each layer of backfill is placed and spread. Place and compact backfill materials against undisturbed trench walls and foundation.

4. Maintain trench shield in position to allow sampling and testing to be performed in a safe manner.

H. Cover:

1. Provide 24 in. Minimum cover over top of pipe where surface grades are definitely established and 30 in. in other locations.

2. Greater depth of cover may be necessary on vertical curves or to provide necessary clearance beneath pipes, conduits, drains, drainage structures or other obstructions encountered at normal pipe grades.

3. For water mains, provide 4 ft. minimum cover unless noted otherwise.
4. Measure depth of backfill cover vertically from top of pipe to finish ground or pavement surface elevations.

I. Trenching:
1. Excavation for pipe stubs to be laid transversely across streets may be made with trench hoe.
2. Where surface or underground obstructions make excavation inaccessible to trenching machine, trench hoe may be used.
3. Where trench hoe is used, do not use excavated material composed of large chunks and clods for backfill.
4. No excavated material will be stockpiled along trench or on paved surfaces. Load excavated material into dump truck as trench is excavated.
5. Topsoil excavated from the trench shall be returned to trench to be used as backfill material for the top 12 inches of the trench.
6. For trench excavations requiring cement stabilized sand backfill to subgrade of pavement, stockpiling of cement stabilized sand on pavement is not permitted.

J. Voids under paving area outside shield will require removal of pavement, consolidation and replacement of pavement in accordance with Contract Documents. Repair damage resulting from failure to provide adequate supports.

K. Place sand or soil behind shoring or trench shield to prevent soil outside shoring from collapsing and causing voids under pavement. Immediately pack suitable material in outside voids following excavation to avoid caving of trench walls.

L. Do not use excavators with side cutters installed while working within 15 feet of pipeline company’s pipeline. Use a small, rubber-tired excavator, such as a backhoe, to do exploratory excavation. Bucket that is used to dig in close proximity to pipelines shall not have teeth or shall have a guard installed over teeth to approximate a bucket without teeth. Excavate by hand within 1 foot of pipeline company’s line. Do not use larger excavation equipment normally used to dig water main trench in vicinity of pipeline until all pipelines have been uncovered and fully exposed. Do not place large excavation and hauling equipment directly over pipelines unless approved by pipeline company’s representative.

M. Regrade adjacent ground surfaces where surfaces have been disturbed during construction operations to original and matching grades.
N. Trees and shrubs designated to remain that sustain cutting or injury to roots, trunk, or limbs shall be pruned by a tree surgeon and cut or injury painted with asphaltic horticultural coating without cost to Owner.

O. Perform repair on pipe in locations shown on plans/specifications.

P. Where pipe is to be installed in fill, complete area fill and compaction to an elevation not less than 1 ft. above top of pipe before open-cut excavation and trenching for pipe.

Q. Excavate adequate but not excessive working space and clearances for installation of work and form removal.

R. Allow not less than 6 in. clearance in horizontal dimensions of excavations for outside plastering of manholes and similar structures constructed of masonry units.

S. Do not undercut excavation faces for extended footings of structures.

T. Excavate by hand within 2 ft. of existing utility to remain.

U. BLASTING: Use of explosions will not be permitted.

V. UNAUTHORIZED EXCAVATION: Refill excavation below subgrade elevations with tamped sand, gravel, cement stabilized sand, or concrete.

3.04 HANDLING EXCAVATED MATERIALS

A. Use only excavated materials which are suitable as defined in this Section and conforming with Section 02229 - Utility Backfill Materials. Place material suitable for backfilling in stockpiles at a distance from the trench to prevent slides or cave-ins.

B. When required, provide additional backfill material conforming with requirements of Section 02229 - Utility Backfill Materials.

C. Do not place stockpiles of excavated materials on streets and adjacent properties. Maintain site conditions in accordance with Section 01500 - Temporary Facilities and Controls.

D. Dispose of unsuitable excavated materials off-site in legal manner.
E. Excess excavated material shall become the property of the contractor to be disposed of off-site in a legal manner.

3.05 GROUND WATER CONTROL

A. Implement ground water control according to Section 01563 - Control of Ground Water and Surface Water. Provide a stable trench to allow installation in accordance with the Specifications.

3.06 TRENCH FOUNDATION

A. Excavate bottom of trench to uniform grade to achieve stable trench conditions and satisfactory compaction of foundation or bedding materials.

B. Place trench dams in Class I foundations in line segments longer than 100 feet between manholes, and not less than one in every 300 feet of pipe placed. Install additional dams as needed to achieve workable construction conditions. Do not place trench dams closer than 5 feet from manholes.

C. Where rock or other incompressible material is encountered, remove material to depth 6 in. below subgrade and backfill with tamped sand, gravel, or concrete.

D. Reinforce trench bottoms or subgrade surfaces for concrete structures which are solid, but which become mucky on top due to construction operations with specified sand.

E. Use only tamped sand, gravel, or concrete to bring fills to lines and grades indicated and for replacing unsatisfactory materials.

3.07 PIPE EMBEDMENT PLACEMENT AND COMPACTION

A. Immediately prior to placement of embedment materials, the bottoms and sidewalls of trenches shall be free of loose, sloughing, caving, or otherwise unsuitable soil.

B. Place geotextile to prevent particle migration from the in-situ into open-graded (Class I) embedment materials or drainage layers.

C. Place embedment including bedding, haunching and initial backfill to meet requirements indicated on Drawings.
D. For pipe installation, manually spread embedment materials around the pipe to provide uniform bearing and side support when compacted. Do not allow materials to free-fall from heights greater than 24 inches above top of pipe. Perform placement and compaction directly against the undisturbed soils in the trench sidewalls, or against sheeting which is to remain in place.

E. Do not place trench shields or shoring within height of the embedment zone unless means to maintain the density of compacted embedment material are used. If moveable supports are used in embedment zone, lift the supports incrementally to allow placement and compaction of the material against undisturbed soil.

F. Do not damage coatings or wrappings of pipes during backfilling and compacting operations. When embedding coated or wrapped pipes, do not use crushed stone or other sharp, angular aggregates.

G. Place haunching material manually around the pipe and compact it to provide uniform bearing and side support. If necessary, hold small-diameter or lightweight pipe in place during compaction of haunch areas and placement beside the pipe with sand bags or other suitable means.

H. Place electrical conduit directly on foundation without bedding.

I. Shovel pipe embedment material in place and compact it using pneumatic tampers in restricted areas, and vibratory-plate compactors or engine-powered jumping jacks in unrestricted areas. Compact each lift before proceeding with placement of the next lift.
   1. Class I embedment materials.
      a. Maximum 6-inches compacted lift thickness.
      b. Systematic compaction by at least two passes of vibrating equipment. Increase compaction effort as necessary to effectively embed the pipe to meet the deflection test criteria.
      c. Moisture content as determined by Contractor for effective compaction without softening the soil of trench bottom, foundation or trench walls.
   2. Class II embedment and cement stabilized sand.
      a. Maximum 6-inches compacted thickness.
      b. Compaction by methods determined by Contractor to achieve a minimum of 95 percent of the maximum dry density as determined according to ASTM D 698 for Class II materials and according to ASTM D 558 for cement stabilized materials.
c. Moisture content of Class II materials within 3 percent of optimum as determined according to ASTM D 698. Moisture content of cement stabilized sands on the dry side of optimum as determined according to ASTM D 558 but sufficient for effective hydration.

J. Place trench dams in Class I embedments in line segments longer than 100 feet between manholes, and not less than one in every 500 feet of pipe placed. Install additional dams as needed to achieve workable construction conditions. Do not place trench dams closer than 5 feet from manholes.

3.08 TRENCH ZONE BACKFILL PLACEMENT AND COMPACTION

A. Place backfill for pipe or conduits and restore surface as soon as practicable. Leave only the minimum length of trench open as necessary for construction.

B. Where damage to completed pipe installation work is likely to result from withdrawal of sheeting, leave the sheeting in place. Cut off sheeting 1.5 feet or more above the crown of the pipe. Remove trench supports within 5 feet from the ground surface.

C. For sewer pipes, use backfill materials described here as determined by trench limits. As trench zone backfill in paved areas for streets and to one foot back of curbs and pavements, use cement stabilized sand for pipe of nominal sizes less than 36 inches, or bank run sand for pipe of nominal sizes 36 inches and larger or as indicated on the Drawings. Uniformly backfill trenches partially within limits one foot from streets and curbs according to the paved area criteria. Use select backfill within one foot below pavement subgrade for rigid pavement. For asphalt concrete or limestone roadway, use flexible base material within one foot below pavement subgrade.

D. For water lines, backfill in trench zone, including auger pits, with bank run sand, select fill material as specified in Section 02229 - Utility Backfill materials.

E. For trench excavations under pavement, place trench zone backfill in lifts and compact by methods indicated below or as stated on the plans. Fully compact each lift before placement of the next lift.

1. Bank run sand.
   a. Maximum 9-inches compacted lift thickness.
   b. Compaction by vibratory equipment to a minimum of 95 percent of the maximum dry density determined according to ASTM D 698.
   c. Moisture content within 3 percent of optimum determined according to ASTM D 698
2. Cement-stabilized sand.
   a. Place backfill in 8 in. maximum layers to achieve uniform placement and required compaction.
   b. Compaction by vibratory equipment to a minimum of 95 percent of the maximum dry density determined according to ASTM D 558.
   c. Moisture content on the dry side of optimum determined according to ASTM D 558 but sufficient for cement hydration.

3. Select fill
   a. Maximum 6-inches compacted thickness.
   b. Compaction by equipment providing tamping or kneading impact to a minimum of 95 percent of the maximum dry density determined according to ASTM D 698.
   c. Moisture content within 2 percent of optimum determined according to ASTM D 698.
   d. Add backfill material as necessary where backfill settled below ground surface.

F. Do not backfill with wet, mucky, or unsuitable materials or with large rocks or clods of material.

G. Trench backfill above pipe embedment shall conform to requirements for type and location of pipe as shown on the drawing.

H. Place backfill material to minimum depth 12 in. above pipe before ceasing backfilling operations for day.

I. Base Material Backfill for Patching of Existing Pavement: Provide 12 in. of base material.

J. Flooding of backfill for compaction (water tamping) is not acceptable. Obtain compaction by mechanical means which allows access to all areas of backfill.

3.09 MANHOLES, JUNCTION BOXES AND OTHER PIPELINE STRUCTURES

A. Meet the requirements of adjoining utility installations for backfill of pipeline structures, as shown on the Drawings.

3.10 FIELD QUALITY CONTROL
A. Test for material source qualifications as defined in Section 02229 - Utility Backfill Materials.

B. Provide excavation and trench safety systems at locations and to depths required for testing and retesting during construction.

C. Laboratory Quality Control by Contractor:
   1. Establish optimum moisture-maximum density curve for bedding and backfill material, ASTM D 698.
      a. For those soils which will not exhibit a well defined moisture-density relationship, determine maximum and minimum index densities of the soil, ASTM D4253 and D4254, for calculation of the relative density of the soil in the field.
   2. Establish optimum moisture-maximum density curve, ASTM D 698; Atterberg Limits, ASTM D 4318; and sieve analysis, ASTM D 422 for the following:
      a. Borrow bedding and backfill material to be used.
      b. Excavated material of questionable suitability for use as bedding and backfill material.
   3. One optimum moisture-maximum density curve, ASTM D 698, shall be established for each significant change in materials.
   4. Bedding and backfill materials which do not meet specified requirements shall be replaced with suitable materials.

D. Field Quality Control by Owner
   1. Laboratory density testing of trench backfill:
      a. One field in-place density test per 500 linear ft. of trench for each fill layer.
      b. One field in-place density test per 150 linear ft. of trench for each fill layer under existing or proposed paved areas and at least one test per fill layer at each road crossing.
   2. Laboratory density testing of general fill: One field in-place density test per 100 cu. yds. of fill placed.
   3. Field in-place density tests shall be in compliance with ASTM D 1556, ASTM D 2922, or ASTM D 2167.

E. Submit minimum 10 lb. Samples of any borrow bedding and backfill material to be used to materials testing laboratory.
F. Recondition, recompact, and retest at Contractor's expense if tests indicate Work does not meet specified compaction requirements. For hardened soil cement with nonconforming density, core and test for compressive strength at Contractor's expense.

G. Acceptability of crushed rock compaction will be determined by inspection.

3.11 DISPOSAL OF EXCESS MATERIAL

A. Dispose of excess materials in accordance with requirements of Section 01564 - Waste Material Disposal.

3.12 POTENTIAL OBSTRUCTION INVESTIGATION

A. Horizontal and vertical location of various underground lines shown on Drawings, including but not limited to water mains, gas lines, storm sewers, sanitary sewers, telephone lines, electric lines or power ducts, pipelines (petrochemical or petroleum product), concrete and debris, are based on best information available but are only approximate locations. At critical locations field verify horizontal and vertical locations of such lines within a zone 2 feet vertically and 4 feet horizontally of proposed main. Verify location of existing utilities prior to commencing construction. Use extreme caution and care when uncovering these lines. Any damage to known on unknown utilities or obstructions occurring during Potential Obstruction Investigation will be full responsibility of Contractor. No separate payment shall be made for performing such efforts.

B. Prior to actual field verification phase, notify all utility companies involved and request that their respective utility lines be marked in field. If any utility or pipeline company requires their line be excavated, or exposed prior to construction, comply with that request and utilize a methodology approved by the said company in locating or exposing their lines. Provide Owner’s Representative with 48 hours notice prior to any field excavation or related work.

C. Once known, unknown or potential obstructions have been uncovered, survey vertical and horizontal locations relative to project baseline and datum and plot on 11" X 17" copy of Drawings.

D. Submit 11" X 17" copy of Drawing with plotted utility or obstruction location titled Potential Obstruction Report to Owner’s Representative before or simultaneous with pipe shop drawing submittal.
E. Owner’s Representative will promptly review Potential Obstruction Report and approve construction of proposed main as designed or modify design if necessary. Contractor will be promptly notified of any design modifications.

END OF SECTION
SECTION 02238
HOT MIX ASPHALTIC BASE COURSE

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Foundation course of compacted a mixture of coarse and fine aggregates, and asphaltic material.

1.02 UNIT PRICES

A. Measurement for hot mix asphaltic base is on square yard basis. Separate measurement will be made for each different required thickness of base course. All load tickets shall be submitted before payment is processed.

B. Refer to Section 01025 - Measurement and Payment for unit price procedures.

C. Refer to paragraph 3.10 for unit price adjustments.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all provisions and sections of these specifications.

B. Submit certificates that asphaltic materials and aggregates meet requirements of paragraph 2.01.

C. Submit proposed design mix and test data for each type and strength of base course in Work.

D. Submit manufacturer's description and characteristics of mixing plant for approval.

E. Submit manufacturer's description and characteristics of spreading and finishing machine for approval.

PART 2  PRODUCTS

2.01 MATERIALS

A. Coarse Aggregate: Gravel or crushed stone, or combination thereof that is retained on No. 10 sieve, uniform in quality throughout and free from dirt, organic, or other injurious matter occurring either free or as coating on aggregate. Aggregate shall conform to ASTM C33 except for gradation. Furnish rock or gravel with Los Angeles abrasion loss not to exceed 40 percent by weight when tested in accordance with ASTM C131.
Fine Aggregate: Sand or stone screenings, or combination thereof, passing No. 10 sieve. Aggregate shall conform to ASTM C33 except for gradation. Use sand composed of sound, durable stone particles free from loams or other injurious foreign matter. Furnish screenings of same or similar material as specified for coarse aggregate. Plasticity index of that part of fine aggregate passing No. 40 sieve shall be not more than 6 when tested by Tex-106-E. Sand equivalent shall have a minimum value of 45 when tested by Tex-203-F.

Composite Aggregate: Conform to the grading limits of TxDOT Item 340 for the paving type indicated on the Drawings.

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

<table>
<thead>
<tr>
<th>VISCOSITY GRADE</th>
<th>AC-10</th>
<th>AC-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST</td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>Viscosity, 140°F stokes</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>Viscosity, 275°F stokes</td>
<td>1.9</td>
<td>-</td>
</tr>
<tr>
<td>Penetration, 77°F, 100 g, 5 sec.</td>
<td>85</td>
<td>-</td>
</tr>
<tr>
<td>Flash Point, C.E.C., F.</td>
<td>450</td>
<td>-</td>
</tr>
<tr>
<td>Solubility in trichloroethylene, percent</td>
<td>99.0</td>
<td>-</td>
</tr>
<tr>
<td>Tests on residues from thin film oven tests:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, 140°F stokes</td>
<td>-</td>
<td>3000</td>
</tr>
<tr>
<td>Ductility, 77°F, 5 cms per min., cms</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Spot tests</td>
<td></td>
<td>Negative for all grades</td>
</tr>
</tbody>
</table>

1. Material shall not be cracked.

2. Owner’s Representative will designate grade of asphalt to use after design tests have been made. Use only one grade of asphalt after grade is determined by test design for project.

2.02 EQUIPMENT

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

1. Cold aggregate bins and proportioning device
2. Dryer
3. Screens
4. Aggregate weight box and batching scales
5. Mixer
6. Asphalt storage and heating devices
7. Asphalt measuring devices
8. Truck scales

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

2.03 MIXES

A. Employ and pay certified testing laboratory to prepare design mixes. Test in accordance with Tex-126-E, Tex-204-F, Tex-208-F, and Tex-227-F.

B. Density and Stability Requirements:

<table>
<thead>
<tr>
<th>Percent Density</th>
<th>Percent</th>
<th>HVEEM Stability Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>Max</td>
<td>Optimum</td>
</tr>
<tr>
<td>95</td>
<td>99</td>
<td>97</td>
</tr>
</tbody>
</table>

C. Proportions for Asphaltic Material: As specified in TxDOT Item 340 for the mix type shown on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is ready to support imposed loads.

B. Verify lines and grades are correct.
3.02 PREPARATION

A. Complete backfill of new utilities below future grade.

B. Prepare subgrade in accordance with requirements of Section 02221 and Section 02225 or Section 02241.

C. Correct subgrade deviations in excess of plus or minus 1/2 inch in cross section, or in 16-foot length by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

D. Prepare sufficient subgrade in advance of base course for efficient operations.

3.03 PRIME COAT

A. Conform to requirements of Section 02511.

3.04 TACK COAT

A. Conform to requirements of Section 02512.

3.05 PLACEMENT

A. Do not place asphaltic base when air temperature is below 50 degrees F and falling. Base may be placed when air temperature taken in shade and away from artificial heat is above 40 degrees F and rising.

B. Haul prepared and heated asphaltic concrete mixture to project in tight vehicles previously cleaned of foreign material. Mixture shall be at temperature between 250 degrees F and 325 degrees F when laid.

C. Spread material into place with approved mechanical spreading and finishing machine of screening or tamping type. Use track-mounted finish machine to place base course directly on earth subgrade.

D. Place base courses 4 inches or greater in thickness in two or more layers, each having compacted thickness of not greater than 4 inches. Spread all lifts. Attain smooth course of uniform density to section, line and grades as indicated on Drawings.

E. Place courses as nearly continuously as possible. Pass roller over unprotected ends of freshly laid mixture only when mixture has become cooled. When work is resumed, cut back laid material to produce slightly beveled edge for full thickness of course. Remove old material which has been cut away and lay new mix against fresh cut.

F. When new asphalt is laid against existing asphalt, existing asphalt shall be saw cut full depth to provide straight smooth joint. Clean joint and apply tack coat before placement.
G. In restricted areas where use of paver is impractical, spread and finish asphalt by mechanical compactor. Use wood or steel forms, rigidly supported to assure correct grade and cross section. Carefully place materials to avoid segregation of mix. Do not broadcast material. Remove any lumps that do not break down readily. Place asphalt courses in same sequence as if placed by machine.

3.06 COMPACATION

A. Begin rolling while pavement is still hot and as soon as it will bear roller without undue displacement or hair cracking. Keep wheels properly moistened with water to prevent adhesion of surface mixture. Do not use excessive water.

B. Compress surface thoroughly and uniformly, first with power-driven, 3-wheel, or tandem rollers weighing from 8 to 10 tons. Obtain subsequent compression by starting at side and rolling longitudinally toward center of pavement, overlapping on successive trips by at least one-half width of rear wheels. Make alternate trips slightly different in length. Continue rolling until no further compression can be obtained and all rolling marks are eliminated. Complete all rolling before mixture temperature drops below 175 degrees F.

C. Along walls, curbs, headers and similar structures, and in all locations not accessible to rollers, compact mixture thoroughly with lightly oiled tamps.

D. Compact base course to density not less than 92 percent of maximum possible density of voidless mixture composed of same materials in like proportions.

3.07 TOLERANCES

A. Furnish templates for checking surface of finished sections. Maximum deflection of templates, when supported at center, shall not exceed 1/8 inch.

B. Completed surface, when tested with 10-foot straightedge laid parallel to center line of pavement, shall show no deviation in excess of 1/8 inch in 10 feet. Correct any surface not meeting this requirement.

3.08 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. Minimum of one core will be taken at random locations per 1000 feet per lane of roadway or 1000 square yards of base to determine in-place depth and density.

C. In-place density will be determined in accordance with Tex-207-F and Tex-227-F from cores or sections of asphaltic base located near each core. Other methods of determining in-place density, which correlate satisfactorily with results obtained from roadway specimens, may be used when approved by the Owner’s Representative.
D. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths to determine limits of nonconformity.

E. Fill cores and density test sections with new compacted asphaltic base.

3.09 NONCONFORMING PAVEMENT

A. Recompact pavement sections not meeting specified densities or replace them with new asphaltic concrete material. Patch asphalt pavement sections in accordance with procedures established by Asphalt Institute.

B. Remove and replace areas of asphaltic base found deficient in thickness by more than 10 percent. Use new asphaltic base of thickness shown on Drawings.

C. Nonconforming pavement sections shall be replaced at no additional cost to Owner.

3.10 UNIT PRICE ADJUSTMENT

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

1. Adjusted Unit Price shall be ratio of average thickness determined by cores to thickness bid upon, times unit price bid.

2. Adjustment shall apply to lower limit of 90 percent of unit price bid.

3. Average depth below 90 percent may be rejected by the Owner’s Representative.

3.11 PROTECTION

A. Do not open base to traffic until 12 hours after completion of rolling, or as shown on Drawings.

B. Maintain asphalt base in good condition until completion of Work.

C. Repair defects immediately by replacing base to full depth.

END OF SECTION
PART 1  GENERAL

1.01 SECTION INCLUDES

A. Foundation course of lime stabilized natural subgrade material.

1.02 UNIT PRICES

A. Measurement for Lime Stabilized Subgrade is on a square yard basis. Separate measurement will be made for each different required thickness of stabilized subgrade.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all sections and provisions of these specifications.

B. Submit certificates stating that hydrated lime, quicklime, or commercial lime slurry complies with these specifications.

C. Submit weight tickets, certified by supplier, with each bulk delivery of lime to work site.

D. Submit manufacturer's description and characteristics for rotary speed mixer and compaction equipment for approval.

1.04 TESTS

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. Tests and analysis of soil materials will be performed in accordance with ASTM D4318.

C. Sampling and testing of lime slurry shall be in accordance with Tex-600-J.

D. Sample mixtures of hydrated lime or quicklime in slurry form will be tested to establish compliance with specifications.

E. Soil will be evaluated to establish percent of hydrated lime, quicklime, or lime slurry to be applied to subgrade material.
F. Moisture-density relationship will be established on material sample from roadway, after stabilization with lime, in accordance with ASTM D698.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Bagged lime shall bear manufacturer's name, product identification, and certified weight. Bags varying more than 5 percent of certified weight may be rejected; average weight of 50 random bags in each shipment shall not be less than certified weight.

B. Store lime in weatherproof enclosures. Protect lime from ground dampness.

C. Quicklime can be dangerous; exercise extreme caution if used for the Work. Contractor shall become informed about recommended precautions in the handling, storage and use of quicklime.

PART 2 PRODUCTS

2.01 WATER

A. Water shall be clean; clear; and free from oil, acids, alkali, or organic matter.

2.02 LIME

A. Type A - Hydrated lime: Dry material consisting essentially of calcium hydroxide or mixture of calcium hydroxide and an allowable percentage of calcium oxide and magnesium hydroxide.

B. Type B - Commercial lime slurry: Liquid mixture consisting essentially of lime solids and water in slurry form. Water or liquid portion shall not contain dissolved material in sufficient quantity to be injurious or objectionable for purpose intended.

C. Type C - Quicklime: Dry material consisting essentially of calcium oxide. Furnish quicklime in either of the following grades:


2. Grade S: Finely-graded quicklime for use in the preparation of a slurry for wet placing. Do not use grade S quicklime for dry placing.

D. Lime shall conform to following requirements:

<table>
<thead>
<tr>
<th>CHEMICAL COMPOSITION</th>
<th>TYPE</th>
</tr>
</thead>
</table>

02241-2
E. Lime slurry may be delivered to the job site as commercial lime, or may be prepared at the job site by using hydrated lime or quicklime. The slurry shall be free of liquids other than water and shall be of a consistency that can be handled and uniformly applied without difficulty.

PART 3   EX E C U T I O N

3.01 EXAMINATION
A. Verify compacted subgrade is ready to support imposed loads.
B. Verify subgrade lines and grades are correct.

3.02 PREPARATION

A. Complete backfill of new utilities below future grade.
B. Cut material to bottom of subgrade using an approved cutting and pulverizing machine meeting following requirements:
   1. Cutters accurately provide a smooth surface over entire width of cut to plane of secondary grade.
   2. Visible indication that cut is to proper depth.
C. Alternatively, scarify or excavate to bottom of stabilized subgrade. Remove material or windrow to expose secondary grade. Correct wet or unstable material below secondary grade by scarifying, adding lime, and compacting. Obtain uniform stability.
D. Proof roll subgrade prior to lime application.

3.03 LIME SLURRY APPLICATION

A. Mix hydrated lime or quicklime with water to form a slurry of the solids content specified. Commercial lime slurry shall have dry solids content as specified. Conform to cautionary requirements of Paragraph 1.05C concerning use of quicklime.
B. Apply slurry with a distributor truck equipped with an agitator to keep lime and water in a consistent mixture. Make successive passes over measured section of roadway to attain proper moisture and lime content. Limit spreading to an area where preliminary mixing operations can be completed on the same working day.
C. Apply so that dry subgrade will contain a minimum lime content of 5 percent by weight of dry subgrade unless otherwise instructed by Testing Laboratory.

3.04 PRELIMINARY MIXING

A. Do not mix and place material when temperature is below 40 degrees F and falling. Base may be placed when temperature taken in shade and away from artificial heat is above 35 degrees F and rising.
B. Use approved single-pass or multiple-pass rotary speed mixers to mix soil, lime, and water to required depth. Obtain a homogeneous friable mixture free of clods and lumps.
C. Shape mixed subgrade to final lines and grades.

D. Eliminate following operations and final mixing if pulverization requirements of Paragraph 3.05C can be met during preliminary mixing:
   1. Seal subgrade as a precaution against heavy rainfall by rolling lightly with light pneumatic rollers.
   2. Cure soil-lime material for 3 days minimum. Keep subgrade moist during cure.

3.05 FINAL MIXING

A. Use approved single-pass or multiple-pass rotary speed mixers to uniformly mix cured soil and lime to required depth.

B. Add water to bring moisture content of soil mixture to a minimum of optimum or above.

C. Mix and pulverize until all material passes a 1-3/4-inch sieve; a minimum of 85 percent, excluding nonslacking fractions, passes a 3/4-inch sieve; and a minimum of 60 percent excluding nonslacking fractions passes a No. 4 sieve.

D. Shape mixed subgrade to final lines and grades.

E. Do not expose hydrated lime to open air for 6 hours or more during interval between application and mixing. Avoid excessive hydrated lime loss due to washing or blowing.

3.06 COMPACtion

A. Aerate or sprinkle to attain optimum moisture content as determined by Testing Laboratory. Remove and reconstruct sections where average moisture content exceeds ranges specified at time of final compaction.

B. Start compaction immediately after final mixing, unless approved by Owner’s Representative.

C. Spread and compact in two or more approximately equal layers where total compacted thickness is to be greater than 8 inches.

D. Compact with approved heavy pneumatic or vibrating rollers, or a combination of tamping rollers and light pneumatic rollers. Begin compaction at the bottom and continue until entire depth is uniformly compacted.
E. Do not allow stabilized base to mix with underlying material. Correct irregularities or weak spots immediately by replacing material and recompacting.

F. Compact to following minimum densities at a moisture content of optimum to 3 percent above optimum as determined by ASTM D698, unless otherwise indicated on the Drawings:
   1. Areas to receive pavement without subsequent base course: Minimum density of 98 percent of maximum dry density.
   2. Areas to receive subsequent base course: Minimum density of 95 percent of maximum dry density.

G. Seal with approved light pneumatic tired rollers: Prevent surface hair line cracking. Rework and recompact at areas where hairline cracking develops.

3.07 CURING

A. Moist cure for a minimum of 3 days before placing base or surface course, or opening to traffic. Time may be adjusted as approved by Owner’s Representative. Subgrade may be opened to traffic after 2 days if adequate strength has been attained to prevent damage. Restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base, surface, or seal course within 14 days after final mixing and compaction unless prior approval is obtained from Owner’s Representative.

3.08 TOLERANCES

A. Completed surface shall be smooth and conform to typical section and established lines and grades.

B. Top of compacted surface: Plus or minus 1/4 inch in cross section or in 16-foot length.

3.09 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. A minimum of one phenolphthalein test will be made at random locations per 1000 linear feet per lane of roadway or 1000 square yards of base to determine in-place depth.
C. Contractor may, at his own expense, request additional cores in the vicinity of cores indicating nonconforming in-place depths. If the average of the tests falls below the required depth, place and compact additional material at no cost to the Owner.

D. Compaction Testing will be performed in accordance with ASTM D1556 or ASTM D2922 and ASTM D3017 at a random location near depth determination tests. Rework and recompact areas that do not conform to compaction requirements at no cost to the Owner.

E. Fill test sections with new compacted lime stabilized subgrade.

3.10 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course. Protect the asphalt membrane, if used, from being picked up by traffic.

B. Repair defects immediately by replacing material to full depth.

END OF SECTION
SECTION 02242
LIME FLY ASH STABILIZED SUBGRADE

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Foundation course of lime-fly ash stabilized natural subgrade material.

1.02  UNIT PRICES
A. Measurement for Lime Stabilized Subgrade is on a square yard basis. Separate measurement will be made for each different required thickness of base course.
B. Measurement for hydrated lime and quicklime is by the ton of 2,000 pounds dry-weight basis.
C. Measurement for commercial lime slurry is by the ton of 2,000 pounds of lime calculated on the percentage by weight of dry solids for the grade of slurry.
D. Measurement for fly ash is by the ton of 2,000 pounds dry-weight basis.

1.03  SUBMITTALS
A. Submittals shall conform to requirements of all sections and provisions of these specifications.
B. Submit certificates stating that fly ash, hydrated lime, quicklime, or commercial lime slurry complies with these specifications.
C. Submit weight tickets, certified by supplier, with each bulk delivery of lime to work site.
D. Submit manufacturer's description and characteristics for rotary speed mixer and compaction equipment for approval.

1.04  TESTS
A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.
B. Tests and analysis of soil materials will be performed in accordance with ASTM D4318.
C. Sampling and testing of lime slurry shall be in accordance with Tex-600-J.
D. Sample mixtures of hydrated lime or quicklime in slurry form will be tested to establish compliance with specifications.

E. Soil will be evaluated to establish percent of fly ash and hydrated lime, quicklime, or lime slurry to be applied to subgrade material.

F. Moisture-density relationship will be established on material sample from roadway, after stabilization with lime-fly ash, in accordance with ASTM D698.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Conform to requirements of Section 02241 - Lime Stabilized Subgrade.

B. Quicklime can be dangerous: exercise extreme caution if used for the Work. Contractor shall become informed about recommended precautions in the handling, storage and use of quicklime.

PART 2 PRODUCTS

2.01 MATERIALS

A. Water shall be clean; clear; and free from oil, acids, alkali, or vegetable matter.

B. Type A - hydrated lime, Type C - quicklime, and Type B - commercial lime slurry shall conform to requirements of Section 02241 - Lime Stabilized Subgrade.

C. Fly Ash: Residue or ash remaining after burning finely pulverized coal at high temperatures conforming to the requirements of ASTM C618, Class C, and the following:

1. Have a minimum CaO content of 20 percent.

2. Loss on ignition shall not exceed 3 percent.

3. Contain no lignite ash.

D. Asphaltic seal cure: Conform to requirements of Section 02241.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is ready to support imposed loads.

B. Verify subgrade lines and grades are correct.

3.02 PREPARATION
THE CITY OF GALVESTON  

LIME FLY ASH STABILIZED SUBGRADE

A. Complete backfill of new utilities below future grade.

B. Cut material to bottom of subgrade using an approved cutting and pulverizing machine meeting following requirements:
   1. Cutters accurately provide a smooth surface over entire width of cut to plane of secondary grade.
   2. Visible indication that cut is to proper depth.

C. Alternatively, scarify or excavate to bottom of stabilized subgrade. Remove material or windrow to expose secondary grade. Correct wet or unstable material below secondary grade by scarifying, adding lime, and compacting. Obtain uniform stability.

D. Proof roll subgrade prior to lime fly ash application.

3.03 LIME SLURRY APPLICATION

A. Mix hydrated lime or quicklime and fly ash with water to form a slurry of the solids content specified. Commercial lime slurry shall have dry solids content as specified. Conform to cautionary requirements of Paragraph 1.05C concerning use of quicklime.

B. Apply slurry with a distributer truck equipped with an agitator to keep lime, fly ash and water in a consistent mixture. Make successive passes over measured section of roadway to attain proper moisture and lime content. Limit spreading to an area where preliminary mixing operations can be completed on the same working day.

C. Apply so that dry subgrade will contain a minimum lime content of 5 percent by weight of dry subgrade unless otherwise instructed by Testing Laboratory.

3.04 PRELIMINARY MIXING

A. Do not mix and place material when temperature is below 40 degrees F and falling. Base may be placed when temperature taken in shade and away from artificial heat is above 35 degrees F and rising.

B. Use approved single-pass or multiple-pass rotary speed mixers to mix soil, lime, fly ash and water to required depth. Obtain a homogeneous friable mixture free of clods and lumps.

C. Contractor shall conduct operations to minimize elapsed time between mixing and compacting fly-ash stabilized subgrade in order to take advantage of rapid initial set characteristics. Complete compaction within 2 hours of commencing compaction, and not more than 6 hours after adding and mixing the last stabilizing agent.
D. Shape mixed subgrade to final lines and grades.

E. Eliminate following operations and final mixing if pulverization requirements of Paragraph 3.05C can be met during preliminary mixing:

1. Seal subgrade as a precaution against heavy rainfall by rolling lightly with light pneumatic rollers.

2. Cure soil-lime material for 3 days minimum. Keep subgrade moist during cure.

3.05 FINAL MIXING

A. Use approved single-pass or multiple-pass rotary speed mixers to uniformly mix cured soil and lime to required depth.

B. Add water to bring moisture content of soil mixture to a minimum of optimum or above.

C. Mix and pulverize until all material passes a 1-3/4-inch sieve; a minimum of 85 percent, excluding nonslacking fractions, passes a 3/4-inch sieve; and a minimum of 60 percent excluding nonslacking fractions passes a No. 4 sieve.

D. Shape mixed subgrade to final lines and grades.

E. Do not expose hydrated lime to open air for 6 hours or more during interval between application and mixing. Avoid excessive hydrated lime loss due to washing or blowing.

3.06 COMPACTION

A. Aerate or sprinkle to attain optimum moisture content as determined by Testing Laboratory. Remove and reconstruct sections where average moisture content exceeds ranges specified at time of final compaction.

B. Start compaction immediately after final mixing, unless approved by Owner’s Representative.

C. Spread and compact in two or more approximately equal layers where total compacted thickness is to be greater than 8 inches.

D. Compact with approved heavy pneumatic or vibrating rollers, or a combination of tamping rollers and light pneumatic rollers. Begin compaction at the bottom and continue until entire depth is uniformly compacted.
E. Do not allow stabilized base to mix with underlying material. Correct irregularities or weak spots immediately by replacing material and recompacting.

F. Compact to following minimum densities at a moisture content of optimum to 3 percent above optimum as determined by ASTM D698, unless otherwise indicated on the Drawings:

1. Areas to receive pavement without subsequent base course: Minimum density of 98 percent of maximum dry density.

2. Areas to receive subsequent base course: Minimum density of 95 percent of maximum dry density.

G. Seal with approved light pneumatic tired rollers: Prevent surface hair line cracking. Rework and recompact at areas where hairline cracking develops.

3.07 CURING

A. Moist cure for a minimum of 3 days before placing base or surface course, or opening to traffic. Time may be adjusted as approved by Owner’s Representative. Subgrade may be opened to traffic after 2 days if adequate strength has been attained to prevent damage. Restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base, surface, or seal course within 14 days after final mixing and compaction unless prior approval is obtained from Owner’s Representative.

3.08 TOLERANCES

A. Completed surface shall be smooth and conform to typical section and established lines and grades.

B. Top of compacted surface: Plus or minus 1/4 inch in cross section or in 16-foot length.

3.09 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. A minimum of one phenolphthalein test will be made at random locations per 1000 linear feet per lane of roadway or 1000 square yards of base to determine in-place depth.
C. Contractor may, at his own expense, request additional cores in the vicinity of cores indicating nonconforming in-place depths. If the average of the tests falls below the required depth, place and compact additional material at no cost to the Owner.

D. Compaction Testing will be performed in accordance with ASTM D1556 or ASTM D2922 and ASTM D3017 at a random location near depth determination tests. Rework and recompact areas that do not conform to compaction requirements at no cost to the Owner.

E. Fill test sections with new compacted lime stabilized subgrade.

3.10 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course. Protect the asphalt membrane, if used, from being picked up by traffic.

3.11 REPAIR DEFECTS IMMEDIATELY BY REPLACING MATERIAL TO FULL DEPTH.

END OF SECTION
SECTION 02244

CEMENT STABILIZED BASE COARSE (ROAD MIXED)

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Foundation course of cement treated base constructed by in-place pulverization and blending of the existing flexible pavement, including existing base material, and the introduction of additives.

1.02 UNIT PRICES

A. Measurement and payment for road mixed cement stabilized base is on a square yard basis, complete in place. Separate payment will be made for each different required thickness of base course.

B. Measurement and payment for portland cement is on a per ton basis.

1.03 REFERENCES


D. ASTM D1556 - Test Methods for Density and Unit Weight of Soil in Place by the Sand Cone Method.

E. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).


G. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.

H. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.

I. TxDOT Tex-120-E - Unconfined Compressive Strength.
1.04 SUBMITTALS
   A. Submittals shall conform to requirements of all sections and provisions of these specifications. Submit Samples of pulverized road base and new aggregate for testing at least 14 days prior to start of construction.
   B. Submit manufacturer’s mill certificates for all additives, such as portland cement, proposed for use.

1.05 TESTS
   A. Testing shall be performed under the provisions of Section 01410 - Testing Laboratory Services.
   B. Laboratory and field tests shall be performed in accordance with the applicable ASTM and TxDOT standard test methods as described in this Section.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT
   A. Portland Cement shall meet minimum material requirements for ATM C150 Type I.
   B. Portland Cement may be delivered to the project site in bulk transports or in 1 c.f. sacks.

2.02 MIXING WATER
   A. Water shall be clean, potable, and free from oil, acids, alkali, or vegetable matter.

2.03 NEW AGGREGATE
   A. New Aggregate shall meet the material requirements of TxDOT Item 247, Type A, Grade 1 Flexible Base.

2.04 ASPHALT SEAL CURE
   A. Cutback asphalt or emulsified petroleum resin meeting the material and applications requirements as per Section 02511 - Prime coat.

PART 3 EXECUTION

3.01 EQUIPMENT
A. Pulverization of the existing pavement shall be accomplished with a self-propelled machine capable of pulverizing and mixing the existing materials to the plan depth in one pass.

B. The mixing equipment shall be capable of mixing the pulverized material, any required new aggregate and additives to obtain a homogeneous mixture.

C. Proof roller - Pneumatic tired roller with at least four wheels on axles carrying not more than two wheels. The proof roller shall have a rolling width of from 8 ft. to 10 ft. and having an operating gross load of from 25 to 50 tons.

3.02 PREPARATION

A. Complete backfill of underground utilities, as required, below future grade.

B. When directed by the Owner’s Representative, proof roll the existing flexible pavement to identify weak base or subgrade conditions. Weak areas shall be corrected as directed by the Owner’s Representative.

3.03 PLACEMENT

A. When new aggregate is required, it shall be spread on the existing pavement evenly across the entire section before pulverization begins.

B. Should the existing subgrade be exposed during the mixing process, it shall be firm and able to support, without displacement, the construction equipment. Soft or yielding subgrade shall be corrected as directed by the Owner’s Representative prior to replacement of base materials.

C. The existing flexible pavement shall be pulverized to the depth specified and mixed to obtain a homogeneous mixture. After mixing, the pulverized material shall be spread and shaped to conform to the lines, grades, and cross-sections shown in the plans.

D. The pulverized base, prior to the addition of cement, shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Retained (byWeight)</th>
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</thead>
<tbody>
<tr>
<td>2”</td>
<td>0</td>
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</table>

02244-3
CEMENT STABILIZED
THE CITY OF GALVESTON
BASE COARSE (ROAD MIXED)

<table>
<thead>
<tr>
<th>1 ½”</th>
<th>0 to 5</th>
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</thead>
<tbody>
<tr>
<td>1”</td>
<td>3 to 15</td>
</tr>
</tbody>
</table>

E. Cement Content shall be selected by the Owner’s Representative based on compressive strength tests on pulverized samples of the existing pavement. The mix design shall be performed in accordance with Test Method Tex-120-E. The cement content shall be selected so the base material, when placed as described in this Section, shall have a minimum compressive strength of 650 psi at 7 days when tested in accordance with Tex-120-E.

F. Cement shall be spread on the prepared base (as described above) only in that area where the mixing, compacting, and finishing operations can be completed during the same working day. Cement shall be spread by an approved spreader or by bag distribution at a uniform rate and in such a manner to reduce to a minimum the scattering of cement by wind. Should excessive wind conditions exist, or if excessive blowing of cement occurs due to inadequate spreading methods, the Owner’s Representative may direct the CONTRACTOR to cease operations until such time as the wind subsides, or adequate spreading equipment can be employed.

G. The cement shall be dry-mixed with the prepared base materials prior to the addition of water. Immediately after dry-mixing, sufficient quantities of water shall be applied and mixed with the base to adjust the moisture content to within two (2) percentage points of the optimum moisture content as determined by the standard proctor method (ATM D698). After mixing, the loose mixture shall be spread and shaped to conform to the lines, grades and cross sections shown on the plans.

3.04 COMPACTION

A. Compact the mixture to a minimum of 95% of the maximum dry density as determined by ASTM D698.

B. Finish the compacted base course by skinning or blading by a maintainer, removing all loose material from the surface. The surface shall be sprinkled with small amounts of water as needed while rolling with a pneumatic tired roller. The pneumatic tired roller used for finish rolling shall be light enough to prevent surface cracking. Rework and recompact those areas where cracking develops.

C. Maintain a smooth surface conforming to the lines, grades, and cross sections shown on the plans.

3.05 CURING
A. The completed base shall be moist cured for a minimum of three (3) days or prevented from drying by addition of an asphalt material following the requirements of Section 02511 in these specifications.

B. Completed sections may be opened immediately to local traffic and construction equipment only after the curing period, or as directed by the Owner’s Representative, provided the material has hardened sufficiently to prevent damage to the base course by equipment or traffic.

3.06 MAINTENANCE

A. The CONTRACTOR is required to maintain the base course in good condition until all work has been completed and accepted. Maintenance shall include immediate repairs to any defects that may occur. Repairs shall be performed for the full depth of the base. The addition of thin layers for any reason will not be permitted. This work shall be done by the CONTRACTOR at his own expense.

3.07 TOLERANCES

A. Completed surface of the road base shall be smooth and conform to the specified cross section and established lines and grades.

B. Top surface of base course shall be within plus or minus ¼ inch in cross section, or in 16-ft. length.

3.08 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. A minimum of one core will be taken at random locations per 500 linear feet per lane of roadway or 500 square yards of base, whichever is less, to determine in-place depth.

C. CONTRACTOR may, at his own expense, request additional cores in the vicinity of cores indicating nonconforming in-place depths to determine limits of nonconformance. If the tests falls below the required depth, place and compact additional material at no additional cost to the OWNER.

D. Compaction Testing will be performed in accordance with ASTM D1556 or ASTM D2922 and ASTM D3017 at a random location near each depth determination core. Rework and recompact areas that do not conform to compaction requirements.

E. Fill core holes with new compacted crushed stone flexible base.
END OF SECTION
SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

PART 1  GENERAL

1.01  SECTION INCLUDES

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

1.02  UNIT PRICES

A.  Measurement for asphaltic concrete pavement is on square yard basis. Separate measurement will be made for each different required thickness of pavement.

B.  Payment for asphaltic concrete pavement includes payment for associated work performed in accordance with Section 02512.

C.  Refer to paragraph 3.08 for unit price adjustments.

1.03  SUBMITTALS

A.  Submittals shall conform to requirements of all sections and provisions of these specifications.

B.  Submit certificates that asphaltic materials and aggregates meet requirements of Article 2.01, Materials, of this Specification Section.

C.  Submit proposed design mix and test data for each type and strength of surface course in Work.

D.  Submit manufacturer's description and characteristics of mixing plant for approval.

E.  Submit manufacturer's description and characteristics of spreading and finishing machine for approval.

F.  Submit batch plant tickets for each truck load delivery of hot mix asphalt. Tickets should be delivered to Owner’s Representative.

PART 2  PRODUCTS

2.01  MATERIALS

A.  Coarse Aggregate: Gravel or crushed stone, or combination thereof, that is retained on No. 10 sieve, uniform in quality throughout and free from dirt, organic or other
injurious matter occurring either free or as coating on aggregate. Aggregate shall conform to ASTM C33 except for gradation. Furnish rock or gravel with Los Angeles abrasion loss not to exceed 40 percent by weight when tested in accordance with ASTM C131.

B. Fine Aggregate: Sand or stone screenings or combination of both passing No. 10 sieve. Aggregate shall conform to ASTM C33 except for gradation. Use sand composed of sound, durable stone particles free from loams or other injurious foreign matter. Furnish screenings of same or similar material as specified for coarse aggregate. Plasticity index of that part of fine aggregate passing No. 40 sieve shall be not more than 6 when tested by Tex-106-E. Sand equivalent shall have a minimum value of 45 when tested by Tex-203-F.

C. Composite Aggregate: Conform to the grading limits of TxDOT Item 340 for the paving type indicated on the drawings.

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

<table>
<thead>
<tr>
<th>Test</th>
<th>AC-10</th>
<th>AC-20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>Viscosity, 140E strokes</td>
<td>1000</td>
<td>±200</td>
</tr>
<tr>
<td>Viscosity, 275E strokes</td>
<td>1.9</td>
<td>-</td>
</tr>
<tr>
<td>Penetration, 77E, 100 g, 5 sec.</td>
<td>85</td>
<td>-</td>
</tr>
<tr>
<td>Flash Point, C.O.C., F.</td>
<td>450</td>
<td>-</td>
</tr>
<tr>
<td>Solubility in trichloroethkene</td>
<td>99.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Tests on residues from thin film oven tests:

<table>
<thead>
<tr>
<th>Test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, 140E strokes</td>
<td>-</td>
<td>3000</td>
</tr>
<tr>
<td>Ductility, 77E, 5 cms per min., cms</td>
<td>70</td>
<td>-</td>
</tr>
<tr>
<td>Spot tests</td>
<td></td>
<td>Negative for all grades</td>
</tr>
</tbody>
</table>

1. Material shall not be cracked

2. The Owner Representative will designate grade of asphalt to use after design tests have been made. Use only one grade of asphalt after grade is determined by test design for project.
2.02 EQUIPMENT

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

1. Cold aggregate bins and proportioning device.
2. Dryer.
3. Screens.
4. Aggregate weight box and batching scales.
5. Mixer.
6. Asphalt storage and heating devices.
8. Truck scales.

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

2.03 MIXES

A. Employ and pay certified testing laboratory to prepare design mixes. Test in accordance with Tex-126-E or Tex-204-F and Tex-208-F.

B. Density and Stability Requirements:

<table>
<thead>
<tr>
<th>Percent Density</th>
<th>Percent</th>
<th>HVEEM Stability Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>Max.</td>
<td>Optimum</td>
</tr>
<tr>
<td>95</td>
<td>99</td>
<td>97</td>
</tr>
</tbody>
</table>
C. Proportions for Asphalitic Material: As specified in TxDOT Item 340 for the paving type shown on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted base course is ready to support imposed loads.

B. Verify lines and grades are correct.

3.02 PREPARATION

A. Prime Coat: If indicated on the Drawings, apply a prime coat conforming to requirements of Section 02511. Do not apply a tack coat until primed base has cured to satisfaction of the Owner’s Representative.

B. Tack Coat: Conform to requirements of Section 02512.

C. Do not use cutback asphalt during the period of April 16 to September 15 unless approved by the Owner Representative.

3.03 PLACEMENT

A. Place asphalitic mixture when the roadway surface temperature is 60 degrees F or higher. Measure the roadway surface temperature with a handheld infrared thermometer. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Owner Representative.

B. Haul prepared and heated asphalitic concrete mixture to the project in tight vehicles previously cleaned of foreign material. Mixture shall be at temperature between 250 degrees F and 325 degrees F when laid.

C. Spread material into place with approved mechanical spreading and finishing machine of screening or tamping type.

D. Surface Course Material: Surface course 2 inches or less in thickness may be spread in one lift. Spread all lifts in such manner that, when compacted, finished course will be smooth, of uniform density, and will be to section, line and grade as shown. Coincide construction joints on surface courses with lane lines, or as directed by the Owner’s Representative.

E. Place courses as nearly continuously as possible. Pass roller over unprotected ends of freshly laid mixture only when mixture has cooled. When work is resumed, cut back
laid material to produce slightly beveled edge for full thickness of course. Remove old material which has been cut away and lay new mix against fresh cut.

F. When new asphalt is laid against existing or old asphalt, existing or old asphalt shall be saw cut full depth to provide straight smooth joint.

G. In restricted areas where use of paver is impractical, spread and finish asphalt by mechanical compactor. Use wood or steel forms, rigidly supported to assure correct grade and cross section. Carefully place materials to avoid segregation of mix. Do not broadcast material. Remove any lumps that do not break down readily. Place asphalt courses in same sequence as if placed by machine.

3.04 COMPACTION

A. Begin rolling while pavement is still hot and as soon as it will bear roller without undue displacement or hairline cracking. Keep wheels properly moistened with water to prevent adhesion of surface mixture. Do not use excessive water.

B. Compress surface thoroughly and uniformly, first with power-driven, 3-wheeled, or tandem rollers weighing from 8 to 10 tons. Obtain subsequent compression by starting at side and rolling longitudinally toward center of pavement, overlapping on successive trips by at least one-half width of rear wheels. Make alternate trips slightly different in length. Continue rolling until no further compression can be obtained and all rolling marks are eliminated. Complete all rolling before mixture temperature drops below 175 degrees F.

C. Use tandem roller for final rolling. Double coverage with approved pneumatic roller on asphaltic concrete surface is acceptable after flat wheel and tandem rolling has been completed.

D. Along walls, curbs, headers and similar structures, and in all locations not accessible to rollers, compact mixture thoroughly with lightly oiled tamps.

E. Compact binder course and surface course to density not less than 93 percent of the maximum possible density of voidless mixture composed of same materials in like proportions.

3.05 TOLERANCES

A. Furnish templates for checking surface in finished sections. Maximum deflection of templates, when supported at center, shall not exceed 1/8 inch.

B. Completed surface, when tested with 10-foot straightedge laid parallel to center line of pavement, shall show no deviation in excess of 1/8 inch in 10 feet. Correct any surface not meeting this requirement.
3.06 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. Minimum of one core will be taken at random locations per 1,000 feet per lane of roadway or 1,000 square yards of asphalt concrete pavement to determine in-place depth and density.

C. In-place density will be determined in accordance with Tex-207-F and Tex-227-F from cores or sections of asphaltic base located near each core. Other methods of determining in-place density, which correlate satisfactorily with results obtained from roadway specimens, may be used when approved by the Owner’s Representative.

D. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths. In-place depth at these locations shall be average depth of four cores.

E. Fill cores and density test sections with new compacted asphaltic concrete pavement.

3.07 NONCONFORMING PAVEMENT

A. Recompact pavement sections not meeting specified densities or replace them with new asphaltic concrete material. Replace with new material sections of surface course pavement not meeting surface test requirements or having unacceptable surface texture. Patch asphalt pavement sections in accordance with procedures established by Asphalt Institute.

B. Remove and replace areas of asphaltic concrete pavement found deficient in thickness by more than 10 percent. Use new asphaltic concrete pavement of thickness shown on Drawings.

C. Nonconforming pavement sections shall be replaced at no cost to Owner.

3.08 UNIT PRICE ADJUSTMENT

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

1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price bid.

2. Adjustment shall apply to lower limit of 90 percent and upper limit of 100 percent of unit price bid.
3. Average depth below 90 percent may be rejected by the Owner’s Representative.

3.09 PROTECTION

A. Do not open pavement to traffic until 12 hours after completion of rolling, or as shown on Drawings.

B. Maintain asphaltic concrete pavement in good condition until completion of Work.

C. Repair defects immediately by replacing asphaltic concrete pavement to full depth.

END OF SECTION
SECTION 02511

PRIME COAT

PART 1  GENERAL

1.01  SECTION INCLUDES

A.  Prime coat for asphaltic concrete paving

1.02  UNIT PRICES

A.  No separate payment will be made for prime coat under this Section. Include payment in unit price for asphaltic concrete pavement.

1.03  SUBMITTALS

A.  Submittals shall conform to requirements of all sections and provisions of these specifications.

B.  Submit product data for proposed prime coat.

C.  Submit report of recent calibration of distributor.

PART 2  PRODUCTS

2.01  CUTBACK ASPHALT

A.  Provide moisture-free homogeneous material which will not foam when heated to 347°F and which meets following requirements:

1.  Asphalt material for prime coat shall be MC-30 or MC-70 and shall meet following requirements:

<table>
<thead>
<tr>
<th>Properties</th>
<th>MC-30</th>
<th>Max.</th>
<th>MC-70</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water, percent</td>
<td>0.2</td>
<td>---</td>
<td>0.2</td>
<td>---</td>
</tr>
<tr>
<td>Flash Point, T.O.C., °F</td>
<td>100</td>
<td>---</td>
<td>100</td>
<td>---</td>
</tr>
<tr>
<td>Kinematic Viscosity at 140°F, cst</td>
<td>30</td>
<td>60</td>
<td>70</td>
<td>140</td>
</tr>
</tbody>
</table>
2. Distillate shall be as follows, expressed as percent by volume of total distillate to 680° F:

<table>
<thead>
<tr>
<th>Temperature</th>
<th>MC-30 Min</th>
<th>MC-30 Max</th>
<th>MC-70 Min</th>
<th>MC-70 Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>to 437°F</td>
<td>---</td>
<td>25</td>
<td>---</td>
<td>20</td>
</tr>
<tr>
<td>to 500°F</td>
<td>40</td>
<td>70</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>to 600°F</td>
<td>75</td>
<td>93</td>
<td>65</td>
<td>90</td>
</tr>
</tbody>
</table>

Residue from 680°F Distillation,
Volume, percent

<table>
<thead>
<tr>
<th>Volume, percent</th>
<th>MC-30 Min</th>
<th>MC-70 Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>55</td>
</tr>
</tbody>
</table>

3. Tests on Distillation Residue:

<table>
<thead>
<tr>
<th>Property</th>
<th>MC-30 Min</th>
<th>MC-30 Max</th>
<th>MC-70 Min</th>
<th>MC-70 Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetration at 77°F, 100g, 5 sec.</td>
<td>120</td>
<td>250</td>
<td>120</td>
<td>250</td>
</tr>
<tr>
<td>Ductility at 77°F, 5 cm/min. cms</td>
<td>100*</td>
<td>---</td>
<td>100*</td>
<td>---</td>
</tr>
<tr>
<td>Solubility in trichloroethylene, %</td>
<td>99</td>
<td>---</td>
<td>99</td>
<td>---</td>
</tr>
</tbody>
</table>

Spot Test All Negative

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

2.02 EMULSIFIED PETROLEUM RESIN

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

<table>
<thead>
<tr>
<th>Properties</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
</table>

02511-2
Fural Viscosity at 77°F, sec  
Residue by Evaporation, % by weight  
Sieve Test, %  
Particle Charge Test  
Tests on the Distillation Residue:

Flash Point, COC (F)  
Kinematic Viscosity @ 140°F (cSt)  

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 APPLICATION, GENERAL

A. Apply prime coat with approved type of self-propelled pressure distributor. Distribute prime coat evenly and smoothly under pressure necessary for proper distribution.
B. Keep all storage tanks, piping, retorts, booster tanks and distributors used in handling asphaltic materials clean and in good operating conditions. Conduct operations so that asphaltic material does not become contaminated.
C. If yield of asphaltic material appears to be in error, recalibrate distributor prior to continuing Work.
D. Maintain the surface until Work is accepted by Owner.

3.04 APPLICATION, CUTBACK ASPHALT

A. Do not use cutback asphalt during the period of April 16 to September 15 unless approved by Owner Representative.

B. Apply the mixture when the air temperature is 60 degrees F and above, or above 50 degrees F and rising. Measure the air temperature in the shade away from artificial heat. The Owner Representative will determine when weather conditions are suitable for application.

C. Distribute at rate of 0.25 to 0.35 gallons per square yard.

D. Provide all necessary facilities for determining temperature of asphaltic material in all heating equipment and in distributor, for determining rate of application, and for obtaining uniformity at junction of two distributor loads. Provide and maintain in good working order, recording thermometer at storage heating unit at all times.

E. Temperature of application shall be based on temperature-viscosity relationship that will permit application of asphalt with viscosity of 100 to 125 centistokes. Maintain asphalt within 15° F of temperature required to meet viscosity. Selected temperature shall be within following range.

<table>
<thead>
<tr>
<th>Prime Coat Type</th>
<th>Minimum (° F)</th>
<th>Maximum (° F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC-30</td>
<td>70</td>
<td>150</td>
</tr>
<tr>
<td>MC-70</td>
<td>125</td>
<td>175</td>
</tr>
</tbody>
</table>

F. Do not allow temperature of MC-30 to exceed 175° F at any time.

G. Do not allow temperature of MC-70 to exceed 200° F at any time.

3.05 APPLICATION, EMULSIFIED PETROLEUM RESIN

A. Do not place prime coat when air temperature is below 36° F and falling.

B. Distribute at rate of 0.15 to 0.25 gallons per square yard.

3.06 PROTECTION
A. No traffic or placing of subsequent courses shall be permitted over freshly applied prime coat until authorized by the Owner’s Representative.

END OF SECTION
SECTION 02512

TACK COAT

PART 1    GENERAL

1.01 SECTION INCLUDES

A. Tack coat for asphaltic concrete paving.

1.02 UNIT PRICES

A. No separate payment will be made for tack coat under this Section. Include payment in unit price for asphaltic concrete pavement.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all sections and provisions of these specifications.

B. Submit product data for proposed tack coat.

C. Submit report of recent calibration of distributor.

PART 2    PRODUCTS

2.01 CUTBACK ASPHALT

A. Provide moisture-free homogeneous material which will not foam when heated to 347 degrees F and which meets following requirements:

1. Asphalt material for tack coat: RC-250 and meet following:

<table>
<thead>
<tr>
<th>Properties</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water, percent</td>
<td>---</td>
<td>0.2</td>
</tr>
<tr>
<td>Flash Point, T.O.C., deg. F</td>
<td>80</td>
<td>---</td>
</tr>
<tr>
<td>Kinematic Viscosity at 140EF, cst</td>
<td>250</td>
<td>400</td>
</tr>
</tbody>
</table>

2. Distillate: Expressed as percent by volume of total distillate to 680° F:
### 3. Tests on Distillation Residue:

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetration at 77°F, 100g, 5 sec.</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>Ductility at 77°F, 5 cm/min. cms</td>
<td>100</td>
<td>---</td>
</tr>
<tr>
<td>Solubility in trichloroethylene</td>
<td>99</td>
<td>---</td>
</tr>
</tbody>
</table>

- Spot Test: All Negative

---

### 2.02 EMULSION

#### A. Provide homogeneous material which shall show no separation of asphalt after mixing and shall meet the viscosity requirements at any time within 30 days after delivery.

1. Emulsion material for tack coat: SS-1 and meet following:

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furol Viscosity as 77°F, sec.</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Residue by Distillation, %</td>
<td>60</td>
<td>---</td>
</tr>
<tr>
<td>Oil Portion of Distillate, %</td>
<td>---</td>
<td>2</td>
</tr>
</tbody>
</table>
### The City of Galveston

#### Tack Coat

<table>
<thead>
<tr>
<th>Test</th>
<th>Result 1</th>
<th>Result 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieve Test, %</td>
<td>---</td>
<td>0.1</td>
</tr>
<tr>
<td>Miscibility (Standard Test)</td>
<td>Passing</td>
<td>Passing</td>
</tr>
<tr>
<td>Cement Mixing, %</td>
<td>---</td>
<td>2.0</td>
</tr>
<tr>
<td>Storage Stability, 1 Day, %</td>
<td>---</td>
<td>1</td>
</tr>
</tbody>
</table>

**Test on Residue:**
- Penetration at 77°F, 100 g, 5 sec: 120 (160)
- Solubility in Trichloroethylene, %: 97.5 (---)
- Ductility at 77°F, cm/min, cms: 100 (---)

2. For emulsions used for tack coats during the period of April 16 to September 15, volatile organic compound solvents (VOC) shall not exceed 12% by weight when tested in accordance with ASTM D244.

#### Part 3  Execution

**3.01 Examination**

A. Verify compacted base is ready to support imposed loads.

B. Verify lines and grades are correct.

**3.02 Preparation**

A. Thoroughly clean base course or concrete surface of loose material by brooming prior to application of tack coat.

**3.03 Application**

A. Apply tack coat uniformly by use of approved distributor at rate not to exceed 0.04 to 0.10 gallons per square yard of surface.

B. Paint all contact surfaces of curbs and structures, and all joints with thin uniform coat of tack coat.

C. Cutback Asphalt:
   1. Do not use cutback asphalt during the period of April 16 to September 15.
   2. Ally the mixture when the air temperature is 60 degrees F and above, or above 50 degrees F and rising. Measure the air temperature in the shade away from 02512-3
artificial heat. The Owner Representative will determine when weather conditions are suitable for application.

3. Temperature of tack coat shall be between 125 degrees F and 180 degrees F when applied.

4. Do not heat tack coat above 200 degrees F at any time.

3.04 PROTECTION

A. No traffic or placing of subsequent courses shall be permitted over freshly applied tack coat until authorized by the Owner’s Representative.

END OF SECTION
SECTION 02521

CONCRETE PAVING

PART 1  GENERAL

1.01  SECTION INCLUDES

A.  Portland Cement Concrete Paving.

1.02  UNIT PRICES

A.  Measurement for concrete paving is on square yard basis. Separate measurement will be made for each different required thickness of pavement.

B.  Refer to Paragraph 3.15 for unit price adjustments.

1.03  SUBMITTALS

A.  Submittals shall conform to requirements of all sections and provisions of these specifications.

B.  Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual compressive strength obtained from design mixes at required test ages.

C.  Submit manufacturer's description and characteristics for mixing equipment, and for traveling form paver, if proposed for use, for approval.

D.  Submit manufacturer's certificates giving properties of reinforcing steel. Provide specimens for testing when required by the Owner’s Representative.

1.04  HANDLING AND STORAGE

A.  Do not mix different classes of aggregate without written permission of the Owner’s Representative.

B.  Class of aggregate being used may be changed before or during Work with written permission of the Owner’s Representative. New class shall comply with specifications.

C.  Segregated aggregate will be rejected. Before using aggregate whose particles are separated by size, mix them uniformly to grading requirements.

D.  Aggregates mixed with dirt, weeds or foreign matter will be rejected.
E. Do not dump or store aggregate in roadbed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement:

1. Sample and test cement to verify compliance with Standards of ASTM C150, Type I or Type III.

2. Bulk cement which meets referenced standards may be used if the method of handling is approved by the Owner’s Representative. When using bulk cement, provide satisfactory weighing devices.

3. Fly ash which meets standards of ASTM C618 may be used as mineral fill if the method of handling is approved by the Owner’s Representative.

B. Water: Fresh, clear and apparently clean conforming to requirements for water in ASTM C94.
C. Coarse Aggregate: Crushed stone or gravel, or combination thereof, which is clean, hard, durable, conforms to requirements of ASTM C33, and has abrasion loss not more than 45 percent by weight when subjected to Los Angeles Abrasion Test (ASTM C131).

1. Maximum percentage by weight of deleterious substances shall not exceed following values:

<table>
<thead>
<tr>
<th>Item</th>
<th>Sample Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay lumps and friable particles</td>
<td>3.0</td>
</tr>
<tr>
<td>Material finer then 75-µm (No. 200) sieve:</td>
<td></td>
</tr>
<tr>
<td>Concrete subject to abrasion</td>
<td>3.0*</td>
</tr>
<tr>
<td>All Other concrete</td>
<td>5.0*</td>
</tr>
<tr>
<td>Coal and lignite:</td>
<td></td>
</tr>
<tr>
<td>Where surface appearance of concrete</td>
<td></td>
</tr>
<tr>
<td>is of importance</td>
<td>0.5</td>
</tr>
<tr>
<td>All other concrete</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* In case of manufactured sand, if material is finer than 75-µm (No. 200) sieve consists of dust of fracture, essentially free from clay or shale, these limits may be increased to 5 and 7 percent, respectively.
2. Coarse aggregate (size 1-1/2 inch to No. 4 sieve) shall conform to requirements of ASTM C33. Gradation shall be within following limits when graded in accordance with ASTM C136:

<table>
<thead>
<tr>
<th>Sieve Designation</th>
<th>Percentage by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained on 1-3/4” sieve</td>
<td>0</td>
</tr>
<tr>
<td>Retained on 1-1/2” sieve</td>
<td>0 to 5</td>
</tr>
<tr>
<td>Retained on 3/4” sieve</td>
<td>30 to 65</td>
</tr>
<tr>
<td>Retained on 3/8” sieve</td>
<td>70 to 90</td>
</tr>
<tr>
<td>Retained on No. 4 sieve</td>
<td>95 to 100</td>
</tr>
</tbody>
</table>

Loss by Decantation Test
*Methode Tex-406-A 1.0 maximum

* In case of aggregates made primarily from crushing of stone, if material finer than 200 sieve is dust of fracture essentially free from clay or shale as established by Part III of Tex-406-A, percent may be increased to 1.5.
D. Fine Aggregate: Sand, manufactured sand, or combination thereof, composed of clean, hard, durable, uncoated grains, free from loams or other injurious foreign matter. Fine aggregate for concrete shall conform to requirements of ASTM C33. Gradation shall be within following limits when graded in accordance with ASTM C136:

<table>
<thead>
<tr>
<th>Sieve Designation</th>
<th>Percentage by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained on 3/8” sieve</td>
<td>0</td>
</tr>
<tr>
<td>Retained on No. 4 sieve</td>
<td>0 to 5</td>
</tr>
<tr>
<td>Retained on No. 8 sieve</td>
<td>0 to 20</td>
</tr>
<tr>
<td>Retained on No. 16 sieve</td>
<td>15 to 50</td>
</tr>
<tr>
<td>Retained on No. 30 sieve</td>
<td>35 to 75</td>
</tr>
<tr>
<td>Retained on No. 50 sieve</td>
<td>65 to 90</td>
</tr>
<tr>
<td>Retained on No. 100 sieve</td>
<td>90 to 100</td>
</tr>
<tr>
<td>Retained on No. 200 sieve</td>
<td>97 to 100</td>
</tr>
</tbody>
</table>

1. When subjected to color test for organic impurities (ASTM C40), fine aggregate shall not show color darker than standard color. Fine aggregate shall be subjected to Sand Equivalent Test (Tex-203-F). Sand equivalent value shall not be less than 80, unless higher value is shown on Drawings.

E. Mineral Filler: Class C fly ash of acceptable quality and meeting requirements of ASTM C618 may be used as mineral admixture in concrete mixture. When fly ash mineral filler is used, it shall be stored and inspected in accordance with ASTM C618. Fly ash shall not be used in amounts to exceed 30 percent by absolute volume of cementitious material in mix design. Cement content may be reduced if strength requirements can be met. Note: When fly ash is used, the term "cement" is defined as cement plus fly ash.

F. Air Entraining Agent: Furnish an air entraining agent conforming to requirements of ASTM C260.

G. Water Reducer: Water reducing admixture conforming to requirements of ASTM C494 may be used if required to improve the workability of concrete. Amount and type of such admixture shall be subject to approval by the Owner's Representative.
H. Reinforcing Steel:

1. Provide new billet steel manufactured by open hearth process and conforming to ASTM A615, Grade 60. Store steel to protect it from mechanical injury and rust. At time of placement, steel shall be free from dirt, scale, rust, paint, oil or other injurious materials.

2. Cold bend reinforcing steel to shapes shown. Once steel has been bent, it may not be rebent.

I. Fibrous Reinforcing: Conform to requirements of Section 03240. Not to be used in lieu of steel reinforcing.

2.02 EQUIPMENT

A. Equipment: Conform to requirements of ASTM C94.

2.03 MIXING

A. Employ and pay certified testing laboratory to prepare mix designs. Compressive strength shall be as specified using test specimens prepared in accordance with ASTM C31 and tested in accordance with ASTM C39. Contractor shall determine and measure batch quantity of each ingredient, including all water for batch designs and all concrete produced for Work. Mix shall conform to these specifications and other requirements indicated on Drawings.

B. Mix design to produce concrete which will have compressive strength of 3000 psi at 7 days and 3500 psi at 28 days. When high-early-strength cement is used, it shall reach at least 3250 psi at 72 hours and 3500 psi at 28 days. Slump of concrete shall be at least 1 inch, but no more than 5 inches, when tested in accordance with ASTM C143.

1. Concrete pavement shall contain at least 5-1/2 sacks (94 pounds per sack) of cement per cubic yard, with not more than 6.5 gallons of water, net, per sack of cement (water cement ratio maximum 0.57). Cement content shall be determined in accordance with ASTM C138. Addition of mineral filler may be used to improve workability or plasticity of concrete to limits specified.

2. Coarse dry aggregate shall not exceed 85 percent of loose volume of concrete.

3. Add air-entraining admixture to ensure uniform distribution of agent throughout batch. Base air content of freshly mixed air-entrained concrete upon trial mixes with materials to be used in Work, adjusted to produce concrete of required plasticity and workability. Percentage of air entrainment in mix shall be 4-1/2 percent plus or minus 1-1/2 percent. Air content shall be determined by testing in accordance with ASTM C231.
4. Use retardant when temperature exceeds 90 degrees F. Proportion shall be as recommended by manufacturer. Use same brand as used for air-entraining agent. Add and batch material using same methods as used for air-entraining agent.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted base is ready to support imposed loads and meets compaction requirements.

B. Verify lines and grades are correct.

3.02 PREPARATION

A. Properly prepare, shape and compact each section of subgrade before placing forms, reinforcing steel or concrete. After forms have been set to proper grade and alignment, use subgrade planer to shape subgrade to its final cross section. Check contour of subgrade with template.

B. Remove subgrade that will not support loaded form. Replace and compact subgrade to required density.

3.03 EQUIPMENT

A. Alternate equipment and methods, other than those required by this article, may be used provided the Contractor demonstrates that equal, or better, results will be obtained and if approved by the Owner’s Representative. Maintain equipment for preparing subgrade and for finishing and compacting concrete in good working order.

B. Subgrade Planer and Template:

1. Use subgrade planer with adjustable cutting blades to trim subgrade to exact section shown on Drawings. Select planer mounted on visible rollers which ride on forms. Planer frame must have sufficient weight so that it will remain on form at all times, and have such strength and rigidity that, under tests made by changing support from wheels to center, planer will not develop deflection of more than 1/8 inch. Tractors used to pull planer shall not produce ruts or indentations in subgrade. When slip form method of paving is used, operate subgrade planer on prepared track grade or have it controlled by electronic sensor system operated from string line to establish horizontal alignment and elevation of subbase.

2. Provide template for checking contour of subgrade. Template shall be long enough to rest upon side forms and have such strength and rigidity that, when
supported at center, maximum deflection shall not exceed 1/8 inch. Fit template with accurately adjustable rods projecting downward at 1-foot intervals. Adjust these rods to gauge cross sections of slab bottom when template is resting on side forms.

C. Machine Finisher: Provide a power-driven, transverse finishing machine designed and operated to strike off and consolidate concrete. Machine shall have two screeds accurately adjusted to crown of pavement and with frame equipped to ride on forms. Use finishing machine with rubber tires if it operates on concrete pavement.

D. Hand Finishing (Only to be used when approved by the Owner):

1. Provide mechanical strike and tamping template 2 feet longer than width of pavement to be finished. Shape template to pavement section.

2. Provide two bridges to ride on forms and span pavement for finishing expansion and dummy joints. Provide floats and necessary edging and finishing tools.

E. Belt Finishing: While concrete is still workable, give surface final belting to produce a uniform surface of gritty texture. Perform belting with short rapid transverse strokes having sweeping longitudinal motion.

F. Vibrators: Furnish mechanically operated synchronized vibrators mounted on tamping bar which rides on forms and hand-manipulated mechanical vibrators. Furnish vibrators with frequency of vibration to provide maximum consolidation of concrete without segregation.

G. Traveling Form Paver: Approved traveling form paver may be used in lieu of construction methods employing forms, consolidating, finishing and floating equipment. Requirements of this specification for subgrade, pavement tolerances, pavement depth, alignments, consolidation, finishing and workmanship shall be met. If traveling form paver does not provide concrete paving that meets the compaction, finish and tolerances requirements of this specification, its use shall be immediately discontinued when so ordered by the Owner’s Representative and conventional methods shall be used.

1. Equip traveling paver with longitudinal transangular finishing float adjustable to crown and grade. Float shall be long enough to extend across pavement to side forms or edge of slab.

2. Insure that continuous deposit of concrete can be made at paver to minimize starting and stopping. Use conventional means of paving locations
inaccessible to traveling paver, or having horizontal or vertical curvature that
traveling paver cannot negotiate.

3. Where Drawings require tie bars for adjacent paving, securely tie and support bars to prevent displacement. Tie bars may be installed with approved mechanical bar inserter mounted on traveling-form paver. Replace any pavement in which tie bars assume final position other than that shown on Drawings, unless corrective alternates are authorized in writing by the Owner’s Representative.

3.04 FORMS

A. Side Forms: Use metal or wood forms of approved shape and section. Preferred depth of form shall be equal to required edge thickness of pavement. Forms with depths greater or less than required edge thickness of pavement will be permitted, provided difference between form depth and edge thickness is not greater than 1 inch, and further provided that forms of depth less than pavement edge are brought to required edge thickness by securely attaching wood or metal strips to bottom of form, or by grouting under form. Aluminum forms are not allowed. All forms shall be approved by the Owner’s Representative. Length of form sections shall be not less than 10 feet and each section shall provide for staking in position with not less than 3 pins. Flexible or curved forms of wood or metal of proper radius shall be used for curves of 200-foot radius or less. Forms shall have ample strength and shall be provided with adequate devices for secure setting so that when in-place they will withstand, without visible springing or settlement, impact and vibration of finishing machine. Forms shall be free from warp, bends or kinks and shall be sufficiently true to provide reasonable straight edge on concrete. Top of each form section, when tested with straight edge, shall conform to requirements specified for surface of completed pavement. Provide sufficient forms for satisfactory placement of concrete. For short radius curves, forms less than 10 feet in length or curved forms may be used. For curb returns at street intersections and driveways, wood forms of good grade and quality may be used.

B. Form Setting:

1. Rest forms directly on subgrade. Do not shim with pebbles or dirt. Accurately set forms to required grade and alignment and, during entire operation of placing, compacting and finishing of concrete, do not deviate from this grade and alignment more than 1/8 inch in 10 feet of length. Do not remove forms for at least 8 hours after completion of finishing operations. Provide supply of forms that will be adequate for orderly and continuous placing of concrete. Set forms and check grade for at least 300 feet ahead of mixer or as approved by the Owner’s Representative.
2. Adjacent slabs may be used instead of forms, provided that concrete is well protected from possible damage by finishing equipment. These adjacent slabs shall not be used for forms until concrete has aged at least 7 days.

3.05 REINFORCING STEEL AND JOINT ASSEMBLIES

A. Accurately place reinforcing steel and joint assemblies and position them securely as indicated on Drawings. Tie reinforcing bars with wire securely together at intersections and splices. Bars and coatings shall be free of rust, dirt or other foreign matter when concrete is placed. Place all reinforcing steel and secure to chairs.

B. Place pavement joint assemblies at required locations and elevations, and rigidly secure all parts in required positions. Install dowel bars accurately in joint assemblies as shown, each parallel to pavement surface and to center line of pavement. Rigidly secure in required position to prevent displacement during placing and finishing of concrete. Accurately cut header boards, joint filler and other material used for forming joints to receive each dowel bar. Drill dowels into existing pavement, secure with epoxy, and provide paving headers, as required, to provide rigid pavement sections.

3.06 FIBROUS REINFORCING

A. Do not use fibrous reinforcing to replace structural, load bearing or moment reinforcing steel.

B. Mix and place in accordance with requirements of Section 03240 (Only when specified).

3.07 PLACEMENT

A. Place concrete only when air temperature taken in shade and away from artificial heat is above 35 degrees F and rising. Concrete shall not be placed when temperature is below 40 degrees F and falling.

When concrete temperature is 85 degrees F or above, do not exceed 60 minutes between introduction of cement to the aggregates and discharge. When the weather is such that the concrete temperature would exceed 90 degrees F, employ effective means, such as pre-cooling of aggregates and mixing water, using ice or placing at night, as necessary to maintain concrete temperature, as placed, below 90 degrees F.
B. Place concrete within 90 minutes of mixing if concrete temperature is 85 degrees or less. Remove and dispose of concrete not placed within this period.

C. Concrete slump during placement shall be 1 to 5 inches, except when using traveling-form paver slump shall be maximum of 2 inches.

D. Deposit concrete rapidly and continuously on subgrade or subbase in successive batches. Distribute concrete to required depth and for entire width of placement in manner that will require as little rehandling as possible. Where hand spreading is necessary, distribute concrete with shovels or by other approved methods. Use only concrete rakes in handling concrete. At end of day or in case of unavoidable interruption of more than 30 minutes, place transverse construction joint at point of stopping work. Remove and replace sections less than 10 feet long.

E. Take special care in placing and spading concrete against forms and at longitudinal and transverse joints to prevent honeycombing. Voids in edge of finished pavement will be cause for rejection.

3.08 COMPACTION

A. Consolidate the concrete using mechanical vibrators as specified herein. Extend a vibratory unit across the pavement, not quite touching side forms. Space individual vibrators at close enough intervals to vibrate and consolidate entire width of pavement uniformly. Mount mechanical vibrators to avoid contact with forms, reinforcement, transverse or longitudinal joints.

B. Furnish enough hand-manipulated mechanical vibrators for proper consolidation of concrete along forms, at joints and in areas not covered by mechanically controlled vibrators.

3.09 FINISHING

A. Finish concrete pavement with power-driven transverse finishing machines or by hand finishing methods (Hand finishing allowed only if approved by the Owner).

1. Use transverse finishing machine to make at least two trips over each area. Make last trip continuous run of not less than 40 feet. After transverse screeding, use hand-operated longitudinal float to test and level surface to required grade.

2. Hand finish with mechanical strike and tamping template as wide as pavement to be finished. Shape template to pavement section. Move strike template forward in direction of placement, maintaining slight excess of material in front of cutting edge. Make at least two trips over each area. Screed pavement surface to required section. Work screed with combined transverse
and longitudinal motion in direction work is progressing. Maintain screed in contact with forms. Use longitudinal float to level surface.

B. On narrow strips and transitions, finish concrete pavement by hand. Thoroughly work concrete around reinforcement and embedded fixtures. Strike off concrete with strike-off screed. Move strike-off screed forward with combined transverse and longitudinal motion in direction work is progressing, maintaining screed in contact with forms, and maintaining slight excess of materials in front of cutting edge. Tamp concrete with tamping template. Use longitudinal float to level surface.

C. While concrete is still workable, give surface final belting to produce a uniform surface of gritty texture and striations of \(1/16\)” to \(1/8\)” deep.

3.10 JOINTS AND JOINT SEALING

A. Conform to requirements of Section 02523.

3.11 CONCRETE CURING

A. Conform to requirements of Section 02525.

3.12 TOLERANCES

A. Test entire surface before initial set and correct irregularities or undulations. Bring surface within requirements of following test and then finish. Place 10-foot straightedge parallel to center of roadway to bridge any depressions and touch all high spots. Do not permit ordinates measured from face of straight edge to surface of pavement to exceed 1/16 inch per foot from nearest point of contact. Maximum ordinate with 10-foot straightedge shall not exceed 1/8 inch. Grind spots in excess of requirements of this paragraph to meet surface test requirements, only if approved by the Owner and Owner’s representative. Restore texture by grooving concrete to meet surface finishing specifications.

3.13 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.

B. Compressive Strength Test Specimens: Four test specimens for compressive strength test will be made for each 150 cubic yards or less of pavement that is placed in one day. Two specimens will be tested at 7 days or at number of hours as directed by the Project Manager for high early strength concrete. Test the remaining two specimens at 28 days. Specimens will be made, cured and tested in accordance with ASTM C-39. Minimum compressive strength shall be 3000 pounds per square inch at 7 days and 3500 pounds per square inch at 28 days.
C. Yield test will be made in accordance with ASTM C138 for cement content per cubic yard of concrete. If such cement content is found to be less than that specified per cubic yard, reduce batch weights until amount of cement per cubic yard of concrete conforms to requirements.

D. Minimum of one 4-inch diameter core will be taken at random locations per 1,000 feet per lane or 1000 square yards of pavement to measure in-place depth. Each core may be tested for 28-day compressive strength according to methods of ASTM C42. The 28-day compressive strength of each core tested shall be a minimum of 3500 pounds per square inch.

E. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths. In-place depth at these locations shall be average depth of four cores.

F. Fill cores and density test sections with new concrete paving or non-shrink grout.

3.14 NONCONFORMING PAVEMENT

A. Remove and replace areas of pavement found deficient in thickness by more than 10 percent, or that fail compressive strength tests, with concrete of thickness shown on Drawings unless accepted by the Owner’s Representative.

B. Remove and replace pavement with unsatisfactory finish as determined by the Owner and Owner’s Representative. An unsatisfactory finish includes, but is not limited to, rain event that occurs during or after a concrete pour resulting in a poor finish, poor tooling, finishing or sections shall be replaced at no cost to Owner.

3.15 UNIT PRICE ADJUSTMENT

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

1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price bid.

2. Adjustment shall apply to a lower limit of 90 percent of unit price bid.

3. No adjustment will be made for excess thickness.

3.16 PAVEMENT MARKINGS

A. Restore pavement markings to match those existing in accordance with standard specifications and details and the Owner’s Representative's requirements.

3.17 PROTECTION
A. Barricade pavement section from use until concrete has attained minimum design strength.

B. On those sections of pavement to be opened to traffic, seal joints, clean pavement and place earth against pavement edges before permitting use by traffic. Such opening of pavement to traffic shall not relieve Contractor from his responsibility for Work.

C. Maintain concrete paving in good condition until completion of Work.

D. Repair defects by replacing concrete to full depth.

END OF SECTION
SECTION 02523
CONCRETE JOINTS

PART 1       GENERAL

1.01 SECTION INCLUDES
A. Joints for concrete paving; concrete sidewalks; and curbs, and curb and gutter.
B. Saw-cutting existing concrete or asphalt pavements for new joints.

1.02 UNIT PRICES
A. No separate payment will be made for concrete joints under this Section. Include payment in unit price for Concrete Paving.
B. No separate payment will be made for formed or sawed street pavement contraction joints and longitudinal weakened plane joints. Include payment in unit price for Concrete Paving.
C. No separate payment will be made for joints or sawcutting for Curb, Curb and Gutter; Concrete Sidewalks; Wheelchair Ramps; and Concrete Driveways. Include payment in unit price for Curb and Gutter; Concrete Sidewalks; Wheelchair Ramps; and Concrete Driveways.

1.03 SUBMITTALS
A. Submit product data and samples in accordance with requirements of all sections and provisions of these specifications.
B. Submit product data for joint sealing compound and proposed sealing equipment for approval.
C. Submit samples of dowel cup, metal supports, and deformed metal strip for approval.

PART 2       PRODUCTS

2.01 MATERIALS
A. Board Expansion Joint Material: Filler board of selected stock. Use wood of density and type as follows:
   1. Clear, all-heart cypress weighing no more than 40 pounds per cubic foot, after being oven dried to constant weight.
2. Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.

3. Use wood only when part of a load transmission device assembly.

B. Joint Sealing Compound:

1. Joint sealing compound shall be self-leveling Low Modulas Silicone sealant single component meeting the requirements of TxDOT Specification 433.2, Class 5.

C. Load Transmission Devices:

1. Smooth, steel dowel bars conforming to ASTM A615, Grade 60. When indicated on Drawings, encase one end of dowel bar in approved cap having inside diameter 1/16 inch greater than diameter of dowel bar.

2. Deformed steel tie bars conforming to ASTM A615, Grade 60.

D. Metal Supports for Reinforcing Steel and Joint Assembly: Employ metal supports of approved shape and size that will secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete. Space supports as directed by the Owner’s Representative.

PART 3 E X E C U T I O N

3.01 PLACEMENT

A. When new work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.

B. If the limit of removal of existing concrete or asphaltic pavement does not fall on existing joint, saw cut existing pavement minimum of 2 inches deep to provide straight, smooth joint surface without chipping, spalling or cracks.

3.02 CONSTRUCTION JOINTS

A. Place transverse construction joint wherever concrete placement must be stopped for more than 30 minutes. Place longitudinal construction joints at interior edges of pavement lanes using No. 5 deformed tie bars, 30 inches long and spaced 18 inches on centers.

3.03 EXPANSION JOINTS

A. Place 3/4-inch expansion joints at locations shown on drawings. Use no boards shorter than 6 feet. When pavement is 24 feet or narrower, use not more than 2
lengths of board. Secure pieces to form straight joint. Shape board filler accurately to cross section of concrete slab. Use load transmission devices of type and size shown on Drawings. Seal with joint sealing compound. Maximum spacing shall be 60 feet.

3.04 CONTRACTION JOINTS
A. Place formed groove contraction joints at same locations as in adjacent pavement or at spaces indicated on Drawings. Maximum spacing of contraction/construction joints is 20 feet, or as shown on plans. Polyethylene foam backer rods shall be installed in contraction joints. Seal groove with joint sealing compound.

3.05 LONGITUDINAL WEAKENED PLANE JOINTS
A. Place longitudinal weakened plane joints at spaces indicated on Drawings. Seal groove with joint sealing compound.

3.06 SAWED JOINTS
A. Contractor may use sawed joints as an alternate to formed groove contraction and weakened plane joints. Circular cutter shall be capable of cutting straight line groove 1/4 – 3/8” inch wide. Depth shall be one quarter of pavement thickness plus 1/2 inch. Commence sawing as soon as concrete has hardened sufficiently to permit cutting without chipping, spalling or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing between 4 to 24 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.

B. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Provide at least one standby saw in good working order. Maintain an ample supply of saw blades at work site at all times during sawing operations. Sawing equipment shall be on job at all times during concrete placement.

3.07 JOINTS FOR CURB, CURB AND GUTTER
A. Place 3/4-inch preformed expansion joints through curb and gutters at locations of expansion and contraction joints in pavement; at end of radius returns at street intersections and driveways; and at curb inlets. Maximum spacing shall be 60-foot centers.

3.08 JOINTS FOR CONCRETE SIDEWALKS
A. Provide 3/4-inch expansion joints conforming to ASTM A1751 along and across sidewalk at back of curbs, at intersections with driveways, steps, and walls; and across walk at intervals not to exceed 36 feet. Provide expansion joint material conforming to ASTM D994 for small radius curves and around fire hydrants and...
utility poles. Extend the expansion joint material full depth of the slab. Reinforcing bars shall extend 10 inches beyond the expansion joint and then shall be wrapped with building paper, or approved sleeves, so that the 10 inches shall not be bonded to the concrete.

3.09 JOINTS FOR CONCRETE DRIVEWAYS

A. Provide 3/4-inch expansion joints conforming to ASTM D1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. Extend expansion joint material full depth of slab. Where dowels are used, wrap or sleeve one end.

3.10 JOINT SEALING

A. Seal joints only when surface and joints are dry, ambient temperature is within manufacturers’ recommendations and weather is not foggy or rainy.

B. Joint sealing equipment shall be in first-class working condition, and be approved by the Owner’s Representative. Use concrete grooving machine or power-operated wire brush and other equipment such as plow, brooms, brushes, blowers or hydro or abrasive cleaning as required to produce satisfactory joints.

C. Clean joints of loose scale, dirt, dust and curing compound. Term joint includes wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.

D. Fill joints neatly with joint sealer to depth shown. Pour sufficient joint sealer into joints so that, upon completion, surface of sealer within joint will be 1/4 inch below level of adjacent surface or at elevation as directed.

3.11 PROTECTION

A. Maintain joints in good condition until completion of Work.

B. Replace damaged joints material with new material as required by this Section.

END OF SECTION
SECTION 02525

CONCRETE PAVEMENT CURING

PART 1  GENERAL

1.01  SECTION INCLUDES

   A.  Curing of Portland Cement Concrete Paving.

1.02  UNIT PRICES

   A.  No separate payment will be made for concrete curing under this Section. Include payment in unit price for Concrete Paving; Concrete Sidewalks; Wheelchair Ramps; and Curb, Curb and Gutter.

1.03  SUBMITTALS

   A.  Submittals shall conform to requirements of all sections and provisions of these specifications.

   B.  Submit manufacturer's product data for cover materials and liquid membrane-forming compounds

PART 2  PRODUCTS

2.01  COVER MATERIALS FOR CURING

   A.  Curing materials shall conform to one of following:

      1.  Polyethylene Film: Opaque pigmented white film conforming to requirements of ASTM C171.

2.02  LIQUID MEMBRANE-FORMING COMPOUNDS

   A.  Liquid membrane-forming compounds shall conform to ASTM C309. Membrane shall restrict loss of water to not more than 0.55 kg/m² of surface in 72 hours.

PART 3  EXECUTION

3.01  GENERAL

   A.  Concrete pavement shall be cured by protecting it against loss of moisture for period of not less than 72 hours immediately upon completion of finishing operations. Do not use membrane curing for concrete pavement to be overlaid by asphaltic concrete.
B. Where curing requires use of water, curing shall have prior right to all water supply or supplies. Failure to provide sufficient cover material shall be cause for immediate suspension of concreting operations.

3.02 POLYETHYLENE FILM CURING

A. Immediately after finishing surface, and after concrete has taken its initial set, apply water in the form of a fine spray. Cover surface with polyethylene film so film will remain in intimate contact with surface during specified curing period.

B. Cover entire surface and both edges of pavement slab. Joints in film sheets shall overlap minimum of 12 inches. Immediately repair tears or holes occurring during curing period by placing acceptable moisture-proof patches or by replacing.

3.03 LIQUID MEMBRANE-FORMING COMPOUNDS

A. Immediately after finishing surface, and after concrete has taken its initial set, apply liquid membrane-forming compound in accordance with manufacturer's instructions.

END OF SECTION
SECTION 02530

CONCRETE SIDEWALKS

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A.  Reinforced concrete sidewalks.

1.02  UNIT PRICES

A.  Measurement for concrete sidewalks is on square foot basis.
B.  Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03  SUBMITTALS

A.  Submittals shall conform to requirements of Section 01300 - Submittals.
B.  Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual flexural strength obtained from design mixes at required test ages.
C.  Submit manufacturer’s certificates giving properties of reinforcing steel. Provide specimens for testing when required by the Owner Representative.

PART 2  P R O D U C T S

2.01  MATERIALS

A.  Concrete: Conform to material and proportion requirements for concrete of Section 02521.
B.  Reinforcing Steel: Conform to material requirements for reinforcing steel of Section 02521.
C.  Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 02523.
D.  Joint Sealing Compound: Conform to material requirements of Section 02523.
E.  Sand Bed: Conform to material requirements for bank run sand of Section 02229.
PART 3  E X E C U T I O N

3.01 REPLACEMENT

A. Replace sidewalks which are removed or damaged during construction with sidewalk of thickness and width equivalent to one removed or damaged.

B. Provide replaced and new sidewalks with wheelchair ramps if sidewalk intersects curb at street or driveway intersection.

3.02 PREPARATION

A. Identify and protect utilities which are to remain.

B. Protect living trees, other plant growth, and features designated to remain.

C. Conduct clearing and grubbing operations in accordance with Section 02100.

D. Excavate subgrade 6 inches beyond outside lines of sidewalk. Shape to the line, grade and cross section. Compact subgrade, to a minimum of 95 percent maximum dry density at optimum to 3 percent above optimum moisture content, as determined by ASTM D698.

3.03 PLACEMENT

A. Forms: Straight, unwarped wood or metal forms with nominal 4-inch depth. Securely stake forms to line and grade, and maintain in true position during concrete placement.

B. Reinforcement: Install No. 3 reinforcing steel bars spaced in accordance with Drawing detail. Lay longitudinal bars in walk continuously, through expansion joints in accordance with Section 02523. Support reinforcement in manner to maintain reinforcement in center of slab vertically during placement.

C. Expansion Joints: Install expansion joints in accordance with Section 02523.

D. Place concrete in forms to specified depth and tamp thoroughly with "jitterbug" tamp, or other acceptable method. Bring mortar to surface.

E. Strike off to smooth finish with wood strike board. Finish smoothly with wood hand float. Brush across sidewalk lightly with fine-haired brush.

F. Unless otherwise indicated on Drawings, mark off joints 1/8 inch deep, at spacing equal to width of walk. Use joint tool equal in width to edging tool.

G. Finish edges with tool having 1/4-inch radius.

H. After concrete has set sufficiently, refill space along sides of sidewalk to top of walk with suitable material. Tamp unit firm and solid. Dispose of excess material in accordance with Section 01564.
3.04 CURING
   A. Conform to requirements of Section 02525.

3.05 PROTECTION
   A. Maintain sidewalks in good condition until completion of Work.
   B. Replace damaged sidewalks in accordance with Paragraph 3.01 in this Section.

3.06 ACCESSIBILITY STANDARDS
   A. All sidewalk and wheelchair ramp shall meet criteria of the Texas Accessibility Standards and the Federal Design Guidelines, i.e. slopes, texture and coloring. If applicable, the Texas Department of Licensing and Regulation (TDLR) shall inspect the site and rule on compliance. Any item found out of compliance shall be remedied at the expense of the Contractor.

END OF SECTION
SECTION 02531

CONCRETE DRIVEWAYS

PART 1   GENERAL

1.01 SECTION INCLUDES
   A. Portland cement concrete driveways.

1.02 UNIT PRICES
   A. Measurement for concrete driveways is on square yard basis.

1.03 SUBMITTALS
   A. Submittals shall conform to requirements of all sections and provisions of these specifications.
   B. Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual flexural strength obtained from design mixes at required test ages.

PART 2   PRODUCTS

2.01 MATERIALS
   A. Concrete: Conform to material and proportion requirements for concrete of Section 02521.
   B. Reinforcing Steel: Conform to material requirements of Section 02521.
   C. Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 02523.
   D. Joint Sealing Compound: Conform to material requirements of Section 02523.
   E. Sand Bed: Conform to material requirements for bank run sand of Section 02229.

PART 3   EXECUTION

3.01 PREPARATION
   A. Prepare subgrade in accordance with applicable portions of Sections 02221 through 02227 and 02241.

3.02 PLACEMENT
A. Place and finish concrete in accordance with applicable portions of Section 02521.

3.03 JOINTS
A. Install joints in concrete driveway in accordance with Section 02523.

3.04 CONCRETE CURING
A. Cure concrete driveway in accordance with Section 02525.

3.05 PROTECTION
A. Conform to applicable requirements of Section 02525.

END OF SECTION
SECTION 02532
CURB, CURB & GUTTER

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A.  Reinforced concrete curb, reinforced monolithic concrete curb and gutter, and mountable curb.

B.  Paving headers poured monolithically with concrete base or pavement.

1.02  UNIT PRICES

A.  Measurement for curbs and for curbs and gutter is on linear foot basis measured along face of curb.

B.  Measurement for headers is on linear foot basis measured between lips of gutters adjacent to concrete base and measured between backs of curbs adjacent to concrete pavement.

1.03  SUBMITTALS

A.  Submittals shall conform to requirements of all sections and provisions of these specifications.

B.  Submit details of proposed formwork for approval.

C.  Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual flexural strength obtained from design mixes at required test ages.

D.  Submit manufacturer’s certifications giving properties of reinforcing steel. Provide specimens for testing when required by the Owner Representative.

PART 2  P R O D U C T S

2.01  M A T E R I A L S

A.  Concrete: Conform to material and proportion requirements for concrete of Section 02521.

B.  Reinforcing Steel: Conform to material requirements for reinforcing steel of Section 02521.

C.  Grout: Nonmetallic, nonshrink grout containing no chloride producing agents conforming to the following requirements.
THE CITY OF GALVESTON

CURB, CURB & GUTTER

Compressive strength, psi
at 7 days 3500
at 28 days 8000
Initial set time, minutes 45
Final set time, hours 1.5

D. Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 02523.

E. Joint Sealing Compound: Conform to material requirements of Section 02523.

F. Mortar: Mortar finish composed of one part Portland cement and 1-1/2 parts of fine aggregate. Use only when approved by the Owner’s Representative.

PART 3  E X E C U T I O N

3.01 PREPARATION

A. Prepare subgrade or base in accordance with applicable portions of Sections 02221 and 02225.

3.02 PLACEMENT

A. Guideline: Set to follow top line of curb. Attach indicator to provide constant comparison between top of curb and guideline. Insure flow lines for monolithic curb and gutters conform to slopes indicated on Drawings.

B. Forms: Brace sufficiently to maintain position during pour. Use metal templates cut to section shown on Drawings.

C. Reinforcement: Secure in proper position so that steel will remain in place throughout placement.

D. Joints: Place in accordance with Section 02523. Place dummy groove joints at 6-foot centers at right angles to curb lines. Cut dummy grooves 1/4 inch deep using an approved edging tool.

E. Place concrete in forms to required depth. Consolidate thoroughly. Do not permit rock pockets in form. Entirely cover top surfaces with mortar.

3.03 MANUAL FINISHING

A. After concrete is in place, remove front curb forms. Form exposed portions of curb, and of curb and gutter, using mule which conforms to curb shape, as shown on Drawings.

B. Thin coat of mortar may be worked into exposed face of curb using mule and two-handled wooden darby at least 3 feet long.
C. Before applying final finish move 10-foot straightedge across gutter and up curb to back form of curb. Repeat until curb and gutter are true to grade and section. Lap straightedge every 5 feet.

D. Steel trowel finish surfaces to smooth, even finish. Make face of finished curb true and straight.

E. Edge outer edge of gutter with 1/4-inch edger. Finish edges with tool having 1/4-inch radius.

F. Finish visible surfaces and edges of finished curb and gutter free from blemishes, form marks and tool marks. Finished curb or curb and gutter shall have uniform color, shape and appearance.

3.04 MECHANICAL FINISHING

A. Mechanical curb forming and finishing machines may be used instead of, or in conjunction with, previously described methods, if approved by the Owner Representative. Use of mechanical methods shall provide specified curb design and finish.

3.05 CURING

A. Immediately after finishing operations, cure exposed surfaces of curbs and gutters in accordance with Section 02525.

3.06 TOLERANCES

A. Top surfaces of curb and gutter shall have uniform width and shall be free from humps, sags or other irregularities. Surfaces of curb top, curb face and gutter shall not vary more than 1/8 inch from edge of a 10-foot long straightedge laid along them, except at grade changes.

3.07 PROTECTION

A. Maintain curbs and gutters in good condition until completion of Work.

B. Replace damaged curbs and gutters to comply with this Section.

END OF SECTION
SECTION 02570

PAVEMENT REPAIR AND RESURFACING

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Repairing and resurfacing streets, highways, driveways, sidewalks and other pavements that have been cut, broken or otherwise damaged during construction.

B. Repairing areas of failed paving in preparation for resurfacing

1.02 UNIT PRICES

A. Unit Prices:

1. No separate payment shall be made for pavement repair and resurfacing under this Section. Payment shall be in accordance with Measurement and Payment for work as required in appropriate sections.

B. Stipulated Price (Lump Sum):

1. If contract is a stipulated price contract, payment for work in this Section is included in the total stipulated price.

PART 2  PRODUCTS

2.01 MATERIALS


B. Base: Provide base material as required by applicable portions of Section 02233 Cement Stabilized Base Course, 02231 – Crushed Stone Flexible Base Course, 02234 – Recycled Crushed Concrete Base, and 02238 – Hot Mix Asphaltic Base Course.

C. Pavement: Provide paving materials as required by applicable portions of Section 02510 - Asphaltic Concrete Pavement, Section 02521 – Concrete Paving, Section 02530 – Concrete Sidewalks, Section 02531 – Concrete Driveways, Section 02532 – Curb, Curb and Gutter, and Headers.

PART 3  EXECUTION

3.01 PREPARATION
A. Notify the Owner Representative prior to commencement of excavation in pavement for which an excavation in public right of way permit has been obtained. Follow directions contained in the permit.

B. Conform to requirement of Section 02076 – Remove Existing Pavements and Structures, for removals.

C. When removing pavement to existing deformed metal strip, saw cut pavement a minimum of two inches deep on opposite side of deformed metal strip. Place saw joint far enough behind deformed metal strip to obtain continuously straight joint. Remove damaged portion of deformed metal strip as required to provide proper joint. Saw cut and remove metal strip before placement of new concrete pavement.

D. Protect edges of existing pavement to prevent damage during removals, utility placement, backfill and paving operations. For concrete pavement, protect undisturbed subgrade that is to remain to support replacement slab.

E. Dowel in to existing pavement where no reinforcement is found or is broken due to construction activities. Unless otherwise directed by the Owner Representative, provide No. 6 reinforcing bars twenty four inches long, drilled and embedded twelve inches into center of existing slab with “PO-ROC” epoxy grout or approved equal. Space dowels to match new pavement reinforcement spacing.

F. Provide transitional paving, additional base depth and undercutting of existing pavement as required to tie proposed pavement to existing pavement when unable to dowel new pavement into existing pavement.

G. Temporarily fill hole with base material or bridge with three-quarter inch steel plates until ready to place concrete.

3.02 INSTALLATION

A. Parking Areas, Service Drives, Driveways and Sidewalks: Replace with material equal to or better than existing or as indicated on the Drawings. Conform to applicable requirements of sections referenced in Paragraph 2.01 Materials.

B. Street Pavements and Curbs, Curbs and Gutters: Replace subgrade, base and surface course with like materials or as indicated on the drawings and the City of Galveston Standard Details and Technical Specifications. Curbs and curbs and gutters shall match existing. Conform to requirements of sections referenced in Paragraph 2.01 Materials.

C. For concrete pavement, install size and length of reinforcing steel and pavement thickness indicated on the Drawings and the City of Galveston Standard Details and Technical Specifications. Place types and spacing of joints to match existing joints or as indicated on the Drawings.

D. Where existing pavement consists of concrete pavement with asphaltic surfacing, match existing thickness of the concrete pavement and asphalt surfacing.
E. Repair TxDOT highway and county crossings in accordance with TxDOT permit or county requirements as appropriate, and within one week after pavement removal.

3.03 WASTE MATERIAL DISPOSAL

A. Dispose of waste material in accordance with requirements of Section 01564 – Waste Material Disposal.

3.04 PROTECTION

A. Maintain pavement in good condition until completion of the Work.

B. Replace pavement damaged by the Contractor’s operations at not cost to the Owner.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Repairing and resurfacing streets, highways, driveways, sidewalks, curbs and gutters, and other pavements that have been cut, broken, or damaged during construction.

   1. Parking areas, service drives, driveways, and sidewalks: Replace with material equal to or better than existing or as indicated on Drawings.

   2. Street pavements and curbs, curbs and gutters: Match general pavement type and provide subgrade, base, and surface materials as indicated on the Drawings and as specified in this Section.

B. Repair State highway crossings in accordance with the highway department permit and within 1 week after utility work is installed.

C. Conform to Section 02076 - Removing Existing Pavement and Structures, for removal of existing pavements.

1.02 UNIT PRICES

A. Payment for pavement repair for utilities is on a unit price basis as listed in the Proposal Form.

B. Limits for measurement will be as shown on plans.

C. Total compensation for required Unit Price Work shall be included in Unit Price bid.

D. Quantity and measurement estimates stated in the Agreement are for contract purposes only. Quantities and measurements supplied or placed in the Work and verified by Owner’s Representative shall determine payment as stated in Article 6 of the General Conditions.

E. The Contractor will verify all measurements and compute quantities accordingly. The Owner’s Representative will verify these quantities.

F. Contractor shall assist by providing necessary equipment, workers, and survey personnel as required by Owner Representative.

1.03 NONCONFORMING PAVEMENT
A. Remove and replace areas of non-conforming Portland cement concrete or asphaltic concrete pavement found deficient in thickness by more than 10 percent, or that fail specified tests, unless accepted by Owner Representative.

1.04 UNIT PRICE ADJUSTMENT

A. For non-conforming pavement, accepted by the Owner Representative, unit price adjustments shall be made for actual in-place depth determined by cores as follows:

1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price bid.

2. Adjustment shall apply to lower limit of 90 percent of unit price. No adjustments in price will be made for excess thickness.

1.05 SUBMITTALS

A. Submittals shall conform to requirements of all sections and provisions of these specifications.

B. Submit test results or other data confirming that materials meet the specified requirements for:

1. Fill, backfill and subgrade materials
2. Base course materials
3. Asphalt materials and mix designs
4. Concrete materials and mix design
5. Joint material

PART 2 PRODUCTS

2.01 SUBGRADE


2.02 BASE COURSE MATERIALS

A. Provide base material as required by applicable portions of Section 02233 Cement Stabilized Base Course, 02231 – Crushed Stone Flexible Base Course, 02234 – Recycled Crushed Concrete Base, and 02238 – Hot Mix Asphalitic Base Course.
2.03 PAVEMENT

A. Provide paving materials as required by applicable portions of Section 02510 - Asphaltic Concrete Pavement, Section 02521 – Concrete Paving, Section 02530 – Concrete Sidewalks, Section 02531 – Concrete Driveways, Section 02532 – Curb, Curb and Gutter, and Headers.

PART 3 EXECUTION

3.01 EQUIPMENT

A. Alternate equipment and methods, other than those required by this section, may be used provided the Contractor demonstrates that equal or better results will be obtained. Maintain equipment for preparing subgrade and for finishing and compaction of pavement in good working order.

3.02 PREPARATION


B. Base: Prepare base material as required by applicable portions of Section 02233 Cement Stabilized Base Course, 02231 – Crushed Stone Flexible Base Course, 02234 – Recycled Crushed Concrete Base, and 02238 – Hot Mix Asphaltic Base Course.

C. Pavement: Provide paving materials as required by applicable portions of Section 02510 - Asphaltic Concrete Pavement, Section 02521 – Concrete Paving, Section 02530 – Concrete Sidewalks, Section 02531 – Concrete Driveways, Section 02532 – Curb, Curb and Gutter, and Headers.

D. Notify the Owner Representative prior to commencement of excavation in pavement for which an excavation in public right of way permit has been obtained. Follow directions contained in the permit.

E. Conform to requirement of Section 02076 – Remove Existing Pavements and Structures, for removals.

F. When removing pavement to existing deformed metal strip, saw cut pavement a minimum of two inches deep on opposite side of deformed metal strip. Place saw joint far enough behind deformed metal strip to obtain continuously straight joint. Remove
damaged portion of deformed metal strip as required to provide proper joint. Saw cut and remove metal strip before placement of new concrete pavement.

G. Protect edges of existing pavement to prevent damage during removals, utility placement, backfill and paving operations. For concrete pavement, protect undisturbed subgrade that is to remain to support replacement slab.

H. Dowel into existing pavement where no reinforcement is found or is broken due to construction activities. Unless otherwise directed by the Owner Representative, provide No. 6 reinforcing bars twenty four inches long, drilled and embedded twelve inches into center of existing slab with “PO-ROC” epoxy grout or approved equal. Space dowels to match new pavement reinforcement spacing.

I. Provide transitional paving, additional base depth and undercutting of existing pavement as required to tie proposed pavement to existing pavement when unable to dowel new pavement into existing pavement.

J. Temporarily fill hole with base material or bridge with three-quarter inch steel plates until ready to place concrete.

3.03 INSTALLATION

A. Parking Areas, Service Drives, Driveways and Sidewalks: Replace with material equal to or better than existing or as indicated on the Drawings. Conform to applicable requirements of sections referenced in Paragraph 2.01 Materials.

B. Street Pavements and Curbs, Curbs and Gutters: Replace subgrade, base and surface course with like materials or as indicated on the drawings and the City of Galveston Standard Details and Technical Specifications. Curbs and curbs and gutters shall match existing. Conform to requirements of sections referenced in Paragraph 2.01 Materials.

C. For concrete pavement, install size and length of reinforcing steel and pavement thickness indicated on the Drawings and the City of Galveston Standard Details and Technical Specifications. Place types and spacing of joints to match existing joints or as indicated on the Drawings.

D. Where existing pavement consists of concrete pavement with asphaltic surfacing, match existing thickness of the concrete pavement and asphalt surfacing.

E. Repair TxDOT highway and county crossings in accordance with TxDOT permit or county requirements as appropriate, and within one week after pavement removal.

3.04 WASTE MATERIAL DISPOSAL

A. Dispose of waste material in accordance with requirements of Section 01564 – Waste Material Disposal.
3.05 PROTECTION

A. Maintain pavement in good condition until completion of the Work.

B. Replace pavement damaged by the Contractor’s operations at no cost to the Owner.

END OF SECTION
SECTION 02620

PVC PIPE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Polyvinyl chloride pressure pipe for water distribution in nominal diameters 4 inches through 16 inches.

B. Polyvinyl chloride sewer pipe for gravity sanitary sewers in nominal diameters 4 inches through 48 inches.

C. Polyvinyl chloride pressure pipe for gravity sanitary sewers and force mains in nominal diameters 4 inches through 36 inches.

1.02 UNIT PRICES

A. No separate payment will be made for PVC pipe under this section. Include cost in unit price for water mains, gravity sanitary sewer, and force mains.

1.03 SUBMITTALS

A. Conform to requirements of all provisions and sections of these specifications.

B. Submit shop drawings showing design of new pipe and fittings indicating alignment and grade, laying dimensions, fabrication, fittings, flanges, and special details.

1.04 QUALITY CONTROL

A. Submit manufacturer's certifications that PVC pipe and fittings meet requirements of this Section and AWWA C 900 or AWWA C 905 for pressure pipe applications, or the appropriate ASTM standard specified for gravity sewer pipe.

B. Submit manufacturer's certification that PVC pressure pipe has been hydrostatically tested at the factory in accordance with AWWA C 900 or AWWA C 905 and this Section.

PART 2 - PRODUCTS

2.01 MATERIAL
A. Use PVC compounds in the manufacture of pipe that contain no ingredient in an amount that has been demonstrated to migrate into water in quantities considered to be toxic.

B. Furnish PVC pressure pipe manufactured from Class 12454-A or Class 12454-B virgin PVC compounds as defined in ASTM D 1784. Use compounds qualifying for a rating of 4000 psi for water at 73.4 degrees F per requirements of PPI TR3. Provide pipe which is homogeneous throughout, free of voids, cracks, inclusions, and other defects, uniform as commercially practical in color, density, and other physical properties. Deliver pipe with surfaces free from nicks and scratches with joining surfaces of spigots and joints free from gouges and imperfections which could cause leakage.

C. For PVC pressure pipe used for water mains, provide self-extinguishing PVC pipe that bears Underwriters' Laboratories mark of approval and is acceptable without penalty to Texas State Fire Insurance Committee for use in fire protection lines.

D. Gaskets:
   
   1. Gaskets shall meet the requirements of ASTM F 477. Use elastomeric factory-installed gaskets to make joints flexible and watertight.

   2. Pipes to be installed in potentially contaminated areas, especially where free product is found near the elevation of the proposed sewer, shall have the following gasket materials for the noted contaminants.

<table>
<thead>
<tr>
<th>CONTAMINANT</th>
<th>GASKET MATERIAL REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum (diesel, gasoline)</td>
<td>Nitrile Rubber</td>
</tr>
<tr>
<td>Other Contaminants</td>
<td>As recommended by the pipe manufacturer</td>
</tr>
</tbody>
</table>

E. Lubricant for rubber-gasketed joints: Water soluble, non-toxic, non-objectionable in taste and odor imparted to fluid, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

2.02 WATER SERVICE PIPE

A. Pipe 4-inch through 12-inch: AWWA C 900, Class 150, DR 18; nominal 20-foot lengths; cast iron equivalent outside diameters.
B. Pipe 16-inch: AWWA C 905; Class 235; DR 18; nominal 20-foot lengths; cast iron equivalent outside diameter.

C. Joints: ASTM D 3139; push-on type joints in integral bell or separate sleeve couplings. Do not use socket type or solvent weld type joints.

D. Make curves and bends by deflecting the joints. Do not exceed maximum deflection recommended by the pipe manufacturer. Submit details of other methods of providing curves and bends for review by the Owner Representative.

E. Hydrostatic Test: AWWA C 900, AWWA C 905, ANSI A21.10 (AWWA C110); at point of manufacture; submit manufacturer's written certification.

2.03 BENDS AND FITTINGS FOR PVC PRESSURE PIPE

A. Bends and Fittings: ANSI A21.10, ductile iron; ANSI A21.11 single rubber gasket push-on type joint; minimum 150 psi pressure rating.

B. Coatings and Linings: Conform to requirements of Section 02610 - Ductile-Iron Pipe and Fittings.

C. Restraints for large diameter PVC pipe (AWWA C905) at the bell shall be consist of the following:

1. The restraint shall be manufactured of ductile iron conforming to ASTM A536.

2. A backup ring shall be utilized behind the PVC bell.

3. A restraint ring, incorporating a plurality or individually actuating gripping surfaces, shall used to connect the bell ring and gripping ring.

4. The restraint shall be the Series 2800 as manufactured by EBAA Iron, Inc., or approved equal.

2.04 GRAVITY SANITARY SEWER PIPE

A. PVC gravity sanitary sewer pipe shall be in accordance with the provisions in the following table:
### WALL CONSTRUCTION | MANUFACTURER | PRODUCT OPTIONS | ASTM DESIGNATION | SDR (Max.)/STIFFNESS | DIAMETER SIZE RANGE
--- | --- | --- | --- | --- | ---
Solid | J-M Manufacturing Co, Inc. | Approved | D3034 | SDR 26 / PS 115 | 6” to 15”
  | CertainTeed | Approved | F679 (T-1) | SDR 26 / PS 115 | 18” to 24”
  | Can-Tex | Approved | F679 (T-1) | SDR 35 / PS 46 | 27” to 36”
  | Carlon Company | Approved | F679 (T-1) | SDR 35 / PS 46 | 27” to 36”
  | Diamond Plastics Corp | Approved | AWWA C900 | DR 18 / N/A | 4” to 12”
  | North American Pipe Corporation (NAPCO) | Approved | AWWA C905 | DR 18 / N/A | 14” to 36”

B. When solid wall PVC pipe 18 inches to 27 inches in diameter is required in SDR 26, provide pipe conforming to ASTM F679, except provide wall thickness as required for SDR 26 and pipe strength of 115 psi.

C. For sewers up to 12-inch-diameter crossing over waterlines, or crossing under waterlines with less than 2 feet separation, provide minimum 150 psi pressure-rated pipe conforming to ASTM D 2241 with suitable PVC adapter couplings.

D. Joints: Spigot and integral wall section bell with solid cross section elastomeric or rubber ring gasket conforming to requirements of ASTM D 3212 and ASTM F 477, or ASTM D 3139 and ASTM F 477, shall be provided. Gaskets shall be factory-assembled and securely bonded in place to prevent displacement. The manufacturer shall test a sample from each batch conforming to requirements ASTM D2444.

E. Fittings: Provide PVC gravity sewer sanitary bends, tee, or wye fittings for new sanitary sewer construction. PVC pipe fittings shall be full-bodied, either injection molded or factory fabricated. Saddle-type tee or wye fittings are not acceptable.

### 2.05 SANITARY SEWER FORCE MAIN PIPE

A. Provide PVC pressure pipe conforming to the requirements for water service pipe, and conforming to the minimum working pressure rating specified in Section 02731 - Sanitary Sewage Force Mains.
B. Acceptable pipe joints are integral bell-and-spigot, containing a bonded-in elastomeric sealing ring meeting the requirements of ASTM F 477. In designated areas requiring restrained joint pipe and fittings, use EBAA Iron Series 2000PV, Uniflange Series 1350 restrainer, or equal joint restraint device conforming to UNI-B-13, for PVC pipe 12-inch diameter and less.

C. Fittings: Provide ductile iron fittings as per Paragraph 2.03, except furnish all fittings with one of the following internal linings:

1. Nominal 40 mils (35 mils minimum) virgin polyethylene complying with ASTM D 1248, heat fused to the interior surface of the fitting, as manufactured by American Cast Iron Pipe "Polybond", or U.S. Pipe "Polyline".

2. Nominal 40 mils (35 mils minimum) polyurethane, Corro-pipe II by Madison Chemicals, Inc.

3. Nominal 40 mils (35 mils minimum) ceramic epoxy, Protecto 401 by Enduron Protective Coatings.

D. Exterior Protection: Provide polyethylene wrapping of ductile iron fittings as required by Section 02630 - Polyethylene Wrap.

E. Hydrostatic Tests: Hydrostatically test pressure rated pipe in accordance with Paragraph 2.02 E.

PART 3 - EXECUTION

3.01 PROTECTION

A. Store pipe under cover out of direct sunlight and protect from excessive heat or harmful chemicals in accordance with the manufacturer's recommendations.

B. Contractor is responsible for proper storage and protection of stored pipe.

3.02 INSTALLATION

A. Conform to requirements of Section 02664 - Water Mains, Section 02730 - Gravity Sanitary Sewers, Section 02731 - Sanitary Sewage Force Mains, and Section 02763 - Point Repairs to Sanitary Sewers, as applicable.

B. Install PVC pipe in accordance with Section 02227 - Excavation and Backfill for Utilities, ASTM D 2321, and manufacturer's recommendations.
C. Water service pipe 12 inches in diameter and smaller: Installed to clear utility lines and have minimum 4 feet of cover below finished grade above the pipe, unless otherwise required by Drawings.

D. Avoid imposing strains that will overstress or buckle the pipe when lowering pipe into trench.

E. Hand shovel pipe bedding under the pipe haunches and along the sides of the pipe barrel and compact to eliminate voids and ensure side support.

END OF SECTION
SECTION 02920

TOPSOIL

PART 1    GENERAL

1.01    SECTION INCLUDES

A.    Furnishing and placing topsoil for finish grading and for seeding, sodding and planting.

1.02    UNIT PRICES

A.    No separate payment will be made for topsoil. Include payment in Section 02932 - Hydromuch Seeding and Section 02935 - Sodding.

PART 2    PRODUCTS

2.01    TOPSOIL

A.    Topsoil shall be fertile, friable, natural sandy loam surface soil obtained from excavation or borrow operations having the following characteristics:

1.    pH value of between 5.5 and 6.5.

2.    Liquid limit: topsoil not exceed 50

3.    Plasticity index: 10 or less.

4.    Gradation: maximum of 40 percent with a passing the #280 sieve.

B.    Topsoil shall be reasonably free of subsoil, clay lumps, weeds, non-soil materials and other litter or contamination. Topsoil shall not contain roots, stumps, and stones larger than 2 inches.

C.    Obtain topsoil from naturally well-drained areas where topsoil occurs at a minimum depth of 4 inches and has similar characteristics to that found at the placement site. Do not obtain topsoil from areas infected with a growth of, or reproductive parts of nut grass or other noxious weeds.

PART 3    EXECUTION

3.01    EXAMINATION
A. Verify that excavation and embankment operations have been completed to correct lines and grades.

3.02 TOPSOIL EXCAVATION

A. Conform to excavation and stockpiling requirements of section 02225 - Roadway Excavation.

3.03 PLACEMENT

A. For areas to be seeded or sodded, scarify or plow existing material to a minimum depth of 4 inches, or as indicated on the Drawings. Remove any vegetation and foreign inorganic material. Place 4 inches of topsoil on the loosened material and roll lightly with an appropriate lawn roller to consolidate the topsoil.

B. Increase depth of topsoil to 6 inches when placed over sand bedding and backfill materials specified in Section 02229 - Utility Backfill Material.

C. For areas to receive bushes or trees, excavate existing material and place topsoil to the depth and dimensions shown on the Drawings.

D. Remove spilled topsoil from curbs, gutters, and, paved areas and dispose of excess topsoil in accordance with requirements of Section 01564 - Waste Material Disposal.

3.04 PROTECTION

A. Protect topsoil from wind and water erosion until planting is completed.

END OF SECTION
SECTION 02932

HYDROMULCH SEEDING

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Seeding, fertilizing, mulching, and maintenance of areas indicated on Drawings.

1.02 UNIT PRICES

A. No separate payment will be made for work performed under this Section unless unit cost is included in the Bid Proposal. Include cost for such work in unit cost for utility in the Bid Proposal.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all provisions and sections of these specifications.

B. Submit certification from supplier that each type of seed conforms to these specification requirements and the requirements of the Texas Seed Law. Certification shall accompany seed delivery.

C. Submit a certificate stating that fertilizer complies with these specification requirements and the requirements of the Texas Fertilizer Law.

PART 2  PRODUCTS

2.01 MATERIALS

A. Topsoil: Conform to material requirements of Section 02920 - Topsoil.

B. Seed: Conform to U.S. Department of Agriculture rules and regulations of the Federal Seed Act and the Texas Seed Law. Seed shall be certified 90 percent pure and furnish 85 percent germination and meet the following requirements:

1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.

2. Bermuda: Extra-fancy, treated, lawn type common bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.
3. Wet, moldy, or otherwise damaged seed will not be accepted.

4. Seed requirements, application rates and planting dates are:

<table>
<thead>
<tr>
<th>Type</th>
<th>Application Rate</th>
<th>Planting Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hullled Common Bermuda Grass 98/88</td>
<td>40</td>
<td>Jan 1 to Mar 31</td>
</tr>
<tr>
<td>Unhulled Common Bermuda Grass 98/88</td>
<td>40</td>
<td>Apr 1 to Sep 30</td>
</tr>
<tr>
<td>Hullled Common Bermuda Grass 98/88</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Hullled Common Bermuda Grass 98/88</td>
<td>40</td>
<td>Oct 1 to Dec 31</td>
</tr>
<tr>
<td>Unhulled Common Bermuda Grass 98/88</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Annual Rye Grass (Gulf)</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

5. Fertilizer: Dry and free flowing, inorganic, water-soluble commercial fertilizer, which is uniform in composition. Deliver in unopened containers which bear the manufacturers guaranteed analysis. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizer shall contain minimum percentages of the following elements:

- Nitrogen: 10 Percent
- Phosphoric Acid: 20 Percent
- Potash: 10 Percent

6. Mulch: Virgin wood cellulose fibers from whole wood chips having a minimum of 20 percent fibers 0.42 inches (10.7 mm) in length and 0.01 inches (0.27 mm) in diameter. Mulch shall be dyed green for coverage verification purposes.

7. Soil Stabilizer: "Terra Tack" 1 or approved equal.
F. Weed control agent: Pre-emergent herbicide for grass areas, "Benefin" or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Place and compact topsoil in accordance with requirements of Section 02920 - Topsoil.

3.02 APPLICATION

A. Seed: Apply uniformly at rates given in Paragraph 2.01 B for type of seed and planting date.

B. Fertilizer: Apply uniformly at a rate of 500 pounds per acre.

C. Mulch: Apply uniformly at a rate of 50 pounds per 1000 square feet.

D. Soil stabilizer: Apply uniformly at a rate of 40 pounds per acre.

E. Weed control agent: Apply at manufacturer's recommended rate prior to hydromulching.

F. Suspend all operations under conditions of drought, excessive moisture, high winds, or extreme or prolonged cold with Owner’s approval. Obtain the Owner’s Representative’s approval before resuming operations.

3.03 MAINTENANCE

A. Maintain grassed areas a minimum of 90 days, or as required to establish an acceptable lawn with 85% coverage. No acceptance will be given until coverage is at least 85%. For areas seeded in the fall, continue maintenance the following spring until an acceptable lawn is established.

B. Maintain grassed areas by watering, fertilizing, weeding, and trimming.

C. Repair areas damaged by erosion by regrading, rolling and replanting.

END OF SECTION
SECTION 02935

SODDING

PART 1   GENERAL

1.01 SECTION INCLUDES

A. Restoration of existing lawn areas disturbed by construction shall be by installation of new sod.

B. Sod is defined as blocks, squares, strips of turf grass, and adhering soil used for vegetative planting. To be placed edge to edge for complete coverage.

C. Lawn is defined as ground covered with fine textured grass kept neatly mowed.

1.02 UNIT PRICES

A. No separate payment will be made for work performed under this section unless unit cost is included in the Bid Proposal. Include the cost of such work for restoration of the existing sod or lawn areas in unit cost for utility and paving items in the Bid Proposal.

1.03 SUBMITTALS

A. Submittals shall conform to the requirements of all provisions and sections of these specifications.

1.04 QUALITY ASSURANCE

A. Perform sodding only when weather and soil conditions are deemed by Project Owner’s Representative to be suitable for proper placement.

B. Water and fertilize new sod.

C. Guarantee sod to be growing 30 days after completion.

D. Maintenance Period:

1. Begin maintenance immediately after each section of grass sod is installed and continue for a 30-day period from date of substantial completion.

2. Resod unacceptable areas.
3. Water, fertilize, control disease and insect pests, mow, edge, replace unacceptable materials, and perform other procedures consistent with good horticultural practice to ensure normal, vigorous and healthy growth. All disease control shall be installed within guidelines set forth by the Structural Pest Control Board of the State of Texas.

E. Notify Owner’s Representative 10 days before end of maintenance period for inspection.

PART 2 PRODUCTS

2.01 SOD
A. Species: Bermuda (Cynodon Dactylon), Buffalo (Buchloe Dactyloides), or St. Augustine.
B. Contents: 95 percent permanent grass suitable to climate in which it is to be placed; not more than 5 percent weeds and undesirable grasses; good texture, free from obnoxious grasses, roots, stones and foreign materials. Block sod is usually a 16” x 16” square.
C. Size: 16 inch wide strips, uniformly 2 inches thick with clean-cut edges.
D. Sod is to be supplied and maintained in a healthy condition as evidenced by the grass being a normal green color.

2.02 FERTILIZER
A. Available nutrient percentage by weight: 12 percent nitrogen, 4 percent phosphoric acid, and 8 percent potash; or 15 percent nitrogen, 5 percent phosphoric acid, and 10 percent potash.

2.03 WEED AND INSECT TREATMENT
A. Provide acceptable treatment to protect sod from weed and insect infestation. Submit treatment method to the Owner’s Representative for approval. All insect and disease control shall be installed within guidelines set forth by the Structural Pest Control Board of the State of Texas.

2.04 WATER
A. Potable, available on-site through Contractor's water trucks. Do not use private resident's water.

2.05 BANK SAND
A. Free of clay lumps, roots, grass, salt or other foreign material.

PART 3  EXECUTION

3.01 PREPARATION

A. Verify that top soil placement and compaction has been satisfactorily completed. Verify that soil is within allowable range of moisture content.

B. Topsoil shall be free of weeds and foreign material immediately before sodding.

C. Do not start work until conditions are satisfactory. Do not start work during inclement or impending inclement weather.

D. Rake areas to be sodded smooth, free from unsightly variations, bumps, ridges or depressions.

E. Spread 2-inch layer of bank sand over areas to be sodded prior to planting of sod.

F. Apply fertilizer at a rate of 25 lbs/1000 SF. Apply after raking soil surface and not more than 48 hours prior to laying sod. Mix thoroughly into upper 2 inches of soil. Lightly water to aid in dissipation of fertilizer.

3.02 APPLICATION

A. Lay sod with closely fitted joints leaving no voids and with ends of sod strips staggered. Sod shall be laid within 24 hours of harvesting.

B. After sod is laid, irrigate thoroughly to secure 6-inch minimum penetration into soil below sod.

C. Tamp and roll sod with approved equipment to eliminate minor irregularities and to form close contact with soil bed immediately after planting and watering. Submit type of tamping and rolling equipment to be used to the Owner’s Representative for approval, prior to construction.

3.03 MAINTENANCE

A. Watering:

1. Water lawn areas once a day with minimum 1/2 inch water for the first 3 weeks after area is sodded.

2. After 3-week period, water twice a week with 3/4 inch of water each time unless comparable amount has been provided by rain.
3. Make weekly inspections to determine moisture content of soil unless soil is in frozen condition.

4. Water in the morning to enable soil to absorb maximum amount of water with minimum evaporation.

B. Mowing:

1. Mow sod at intervals which will keep grass height from exceeding 3-1/2 inches.

2. Set mower blades at 2-1/2 inches.

3. Not remove more than one-half of grass leaf surface.

4. Sodded areas requiring mowing within 1 month after installation, shall be mowed with a light-weight rotary type mower. The sod shall be mowed only when dry and not in a saturated or soft condition.

5. Remove grass clippings during or immediately after mowing.

C. Fertilizer and Pest Control:

1. Evenly spread fertilizer composite at a rate of 40 pounds per 5,000 square feet or as recommended by manufacturer. Fertilizer shall not be placed until 2 weeks after placement of sod.

2. Restore bare or thin areas by topdressing with a mix of 50 percent sharp sand and 50 percent sphagnum peat moss.

3. Apply mixture 1/4 to 1/2 inch thick.

4. Treat areas of heavy weed and insect infestation as recommended by treatment manufacturer.

3.04 CLEANUP

A. During course of planting, remove excess and waste materials; keep lawn areas clean and take precautions to avoid damage to existing structures, plants, grass and streets.

B. Remove barriers, signs and all other Contractor material and equipment from project site at termination of establishment period.

END OF SECTION
SECTION 03100
CONCRETE FORMWORK

PART 1 G E N E R A L

1.01 SECTION INCLUDES

1.02 UNIT PRICES
   A. No separate payment will be made for concrete formwork under this Section. Include payment in unit price for structural concrete.

1.03 SUBMITTALS
   A. Conform to all provisions and sections of these specifications.
   B. Shop Drawings: Show location, member size and loading of shoring. When reshoring is permitted, submit plans showing locations and member size of reshoring.
   C. Product Data and Samples:
      1. Corrugated Fiberboard Carton Forms: Submit certification of compliance with design criteria, description of forms, and one-foot-long sample.
      2. Form-coating Materials: Submit trade or brand names of manufacturers and complete description of products.
      3. Form ties and related accessories, including taper tie plugs, if taper ties are used.
      4. Form gaskets.
   D. Detailed Layout for Slip-forming: Submit detailed layout of proposed slipforming, including description of equipment, rate of progress, and other data to show suitability of method. Show provisions for ensuring attainment of required concrete surface finish.

PART 2 P R O D U C T S

2.01 MATERIAL
A. Smooth Forms: New plywood, metal, plastic, tempered concrete-form hardboard, dressed lumber faced with plywood or fiberboard lining, or metal-framed plywood-faced panel material, to provide continuous, straight, smooth surfaces. Form material shall be free of raised grain, torn surfaces, worn edges, patches, dents or other defects. Furnish material in largest practical sizes to minimize number of joints and, when indicated on Drawings, conform to joint system indicated. Form material shall have sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.

B. Rough Forms: Plywood, metal, dressed or undressed lumber free of knots, splits or other defects, or other material acceptable to the Owner’s Representative of sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.

C. Plywood: Conform to PS 1, Class 1.

D. Lumber: Conform to PS 20.

E. Edge Forms and Intermediate Screed Strips: Type and strength compatible with the screed equipment and methods used.

F. Plastic Forms: One-piece forms for domes, beams and pan joists. Single lengths for columns not exceeding height of 7'-6". For columns over 7'-6", use 7'-6" sections and filler sections as needed. To facilitate removal of pan joist forms, taper sides 1 inch per foot.

G. Metal Pan Joist Forms: Removable type; fabricated of minimum 14-gage steel; one piece between end closures. Adjustable forms not allowed. Taper sides 1 inch per foot to facilitate removal.

H. Earth Cuts for Forms:

1. Use earth cuts for forming unexposed sides of grade beams cast monolithically with slabs on grade.

2. Where sides of excavations are stable enough to prevent caving or sloughing, following surfaces may be cast against neat-cut excavations:
   a. Sides of footings.
   b. Inside face of perimeter grade beams not monolithic with slab on grade. When inside face is cast against earth, increase beam width indicated on Drawings by 1 inch.
c. Both faces of interior grade beams not monolithic with slab on grade. When grade beam is cast against earth, increase beam width indicated on Drawings by 2 inches.

I. Corrugated Fiberboard Carton Forms:

1. Corrugated fiberboard carton forms, when called for, are intended to form a void space beneath pile-supported and pier-supported slabs and other structural elements as shown.

2. Provide products of a reputable manufacturer regularly engaged in commercial production of double-faced corrugated fiberboard carton forms, constructed of waterproof paper and laminated with waterproof adhesive.

3. Fiberboard forms: Capable of supporting required dead load plus construction loads, and designed to lose their strength upon prolonged contact with moisture and soil bacteria.

4. Seal cuts and ends of each form section by dipping in waterproof wax, unless liners and flutes are completely impregnated with waterproofing.

5. Size forms as indicated on Drawings. Assemble as recommended by manufacturer, either with steel banding at 4'-0" maximum on centers, or, where liners and flutes are impregnated with waterproofing, with adequate stapling.

J. Circular Forms:

1. Form round-section members with paper or fiber tubes, constructed of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation. Provide manufacturer's seamless units to minimize spiral gaps and seams.

2. Fiberglass or steel forms may be used for round-section members.

K. Shores: Wood or adjustable metal, with bearing plates; with double wedges at lower end.

L. Form Ties:

1. Use commercially-manufactured ties, hangers and other accessories for embedding in concrete. Do not use wire not commercially fabricated for use as a form accessory.
2. Fabricate ties so ends or end fasteners can be removed without causing spalling of concrete faces. Depth from formed concrete face to the embedded portion: At least 1 inch, or twice the minimum dimension of tie, whichever is greater.

3. Provide waterstop feature for form ties used on liquid-containing structures and on concrete walls which will have earth backfill on one side.

4. Removable ties: Taper ties may be used when approved by the Owner’s Representative. In the hole left by the removal of the taper tie, insert a preformed neoprene or polyurethane plug sized to seat at the center of the wall.

M. Form Coating: Commercial formulation of form oil or form-release agent having proven satisfactory performance. Coating shall not bond with, stain or otherwise adversely affect concrete surfaces, or impair their subsequent treatment, including application of bonding agents, curing compounds, paint, protective liners and membrane waterproofing.

N. Coating for Plastic Forms: Alkali-resistant gel-coat.

O. Chamfer Strips: Unless otherwise indicated on Drawings, provide 3/4 inch chamfer strips in corners of forms to produce beveled edges where required by Part 3, Execution.

P. Form Gaskets: Polyethylene rod, closed cell, 1-inch diameter.

2.02 DESIGN OF FORMWORK

A. Conform to ACI 117, ACI 347 and building codes, unless more restrictive requirements are specified or shown on Drawings. Contractor shall design and engineer concrete formwork, including shoring and bracing. Design formwork for applicable gravity loads, lateral pressure, wind loads and allowable stresses. Camber formwork to compensate for anticipated deflection during placement of concrete when required to maintain specified tolerances. Design formwork to be readily removed without impact, shock or damage to concrete surfaces and adjacent materials.

B. Slip Forming: Permitted on written approval of the Owner’s Representative. Contractor shall demonstrate suitability of method proposed.
A. Formwork Construction

1. Construct and maintain formwork so that it will maintain correct sizes of members, shape, alignment, elevation and position during concrete placement and until concrete has gained sufficient strength. Provide for required openings, offsets, sinkages, keyways, recesses, moldings, anchorages and inserts.

2. Construct forms for easy removal without damage to concrete surfaces.

3. Make formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins. Provide gaskets for wall forms to prevent concrete paste leakage at their base.

4. Place chamfer strips in forms to bevel edges and corners permanently exposed to view, except top edges of walls, and slabs which are indicated on Drawings to be tooled. Do not bevel edges of formed joints and interior corners unless indicated on Drawings. Form beveled edges for vertical and horizontal corners of equipment bases. Unless otherwise indicated on Drawings, make bevels 3/4 inch wide.

5. Provide temporary openings at bases of column and wall forms and other points as required for observation and cleaning immediately before concrete is placed.

6. Where runways are required for moving equipment, support runways directly on the formwork or structural members. Do not allow runways or supports to rest on reinforcing steel.

7. Use smooth forms on formed concrete surfaces required to have smooth form finish or rubbed finish as specified in Section 03345 - Concrete Finishing.

8. Rough forms may be used on formed concrete surfaces indicated to have rough form finish as specified in Section 03345 - Concrete Finishing.

B. Forms for Surfaces Requiring Smooth Form Finish:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Uniformly space form ties and align in horizontal and vertical rows. Install taper ties, if used, with the large end on the wet face of the wall.

2. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back up joints with extra studs or girts to maintain true, square intersections.
3. Form molding shapes, recesses and projections with smooth-finish materials and install in forms with sealed joints to prevent displacement.

4. Form exposed corners of beams and columns to produce square, smooth, solid, unbroken lines.

5. Provide exterior exposed edges with 3/4-inch chamfer or 3/4-inch radius.

6. Arrange facing material in orderly and symmetrical fashion. Keep number of joints to practical minimum. Support facing material adequately to prevent deflection in excess of allowable tolerances.

7. For flush surfaces exposed to view in completed structure, overlap previously-placed hardened concrete with form sheathing by approximately 1 inch. Hold forms against hardened concrete to maintain true surfaces, preventing offsets or loss of mortar.

C. Forms for Surfaces Requiring Rubbed Finish: Provide forms as specified in paragraph 3.01B, Smooth Form Finish. Use smooth plywood or fiberboard linings or forms, in as large sheets as practicable, and with smooth, even edges and close joints.

D. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure supports for types of screeds required.

E. Circular Forms: Set forms in one piece for full height of member.

F. Surfaces to Receive Membrane Waterproofing: Coordinate surface finish, anchors, reglets and similar requirements with membrane waterproofing applicator.

G. Fireproofing Steel Member: Construct forms to provide not less than the concrete thickness necessary, measured from face of steel member, to provide the required fire rating. Forms for concealed surfaces may be unlined.

H. Tolerances:

1. Unless noted otherwise on Drawings, construct formwork so concrete surfaces will conform to tolerance limits listed in Tables 03100A and 03100B at end of this Section.

2. Establish sufficient control points and benchmarks as references for tolerance checks. Maintain these references in undisturbed condition until final completion and acceptance of the work.

I. Adjustment of Formwork:
1. Use wedges or jacks to provide positive adjustment of shores and struts. After final inspection and before concrete placement, fasten in position wedges used for final adjustment of forms.

2. Brace forms securely against lateral deflections. Prepare to compensate for settling during concrete placement.

3. For wall openings, construct wood forms that facilitate necessary loosening to counteract swelling of forms.

J. Corrugated Fiberboard Carton Forms:

1. Place on smooth firm bed of suitable material to prevent vertical displacement; set tight to prevent horizontal displacement. Exercise care to avoid buckling of forms. Install in accordance with manufacturer's directions and recommendations.

2. Fit carton forms tightly around piles and piers; completely fill the space between subgrade and concrete placement with carton forms to form a void space.

3. Protect carton forms from moisture and maintain in a dry condition until concrete is placed on them. If they become wet before placement of concrete, allow them to dry and carefully inspect for strength before concrete is placed.

4. Before concrete placement, replace damaged or deteriorated forms which are incapable of supporting concrete dead load plus construction live loads.

3.02 PREPARATION OF FORM SURFACES

A. Clean surfaces of forms and embedded materials before placing concrete. Remove accumulated mortar, grout, rust and other foreign matter.

B. Coat forms for exposed or painted concrete surfaces with form oil or form-release agent before placing reinforcement. Cover form surfaces with coating material in accordance with manufacturer's printed instructions. Do not allow excess coating material to accumulate in forms or to contact hardened concrete against which fresh concrete will be placed. Remove coating material from reinforcement before placing concrete.

C. Forms for unexposed surfaces, other than retained-in-place metal forms, may be wet with water immediately before concrete placement in lieu of coating. When possibility of freezing temperatures exists, however, the use of coating is mandatory.

3.03 REMOVAL OF FORMS
A. Time Limits:

1. When repair of surface defects or finishing is required before concrete is aged, forms on vertical surfaces may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations.

2. Remove top forms on sloping surfaces of concrete as soon as concrete has attained sufficient stiffness to prevent sagging. Loosen wood forms for wall openings as soon as this can be accomplished without damage to concrete. Leave formwork for water-retaining structures in place for at least 4 days. Formwork for non-water-retaining columns, walls, sides of beams and other formwork components not supporting weight of concrete may be removed after 12 hours, provided concrete has hardened sufficiently to resist damage from removal operations, and provided removal of forms will not disturb members supporting weight of concrete.

3. Forms and shoring supporting weight of concrete or construction loads: Leave in place until concrete has reached minimum strength specified for removal of forms and shoring. Do not remove such forms in less than 4 days.

B. Circular Paper or Spiral Tube Forms: Follow manufacturer’s directions for form removal. Take necessary precautions to prevent damage to concrete surface. When removal is done before completion of curing time, replace form, tie in place and seal to retard escape of moisture.

C. Removal Strength:

1. Control Tests: Suitable strength-control tests will be required as evidence that concrete has attained specified strength for removal of formwork or shoring supporting weight of concrete in beams, slabs and other structural members. Furnish test cylinders and data to verify strength for early form removal.

   a. Field-cured Test Cylinders: When field-cured test cylinders reach specified removal strength, formwork or shoring may be removed from respective concrete placements.

   b. Laboratory-cured Test Cylinders: When concrete has been cured as specified for structural concrete for same time period required by laboratory-cured cylinders to reach specified strength, formwork or shoring may be removed from respective concrete placements. Determine length of time that concrete has been cured by totaling the days or fractions of days, not necessarily consecutive, during which air temperature surrounding concrete is above 50 degrees F and concrete
has been damp or thoroughly sealed against evaporation and loss of moisture.

2. Compressive Strengths: The minimum concrete compressive strength for removal of formwork supporting weight of concrete is 75 percent of specified minimum 28-day strength for class of concrete involved.

3.04 RESHORING

A. When reshoring is permitted, plan operations in advance and obtain the Owner’s Representative’s approval of such operations. While reshoring is under way, keep live load off new construction. Do not permit concrete in any beam, slab, column or other structural member to be subjected to combined dead and construction loads in excess of loads permitted for developed concrete strength at time of reshoring.

B. Place reshores as soon as practicable after form-stripping operations are complete but in no case later than end of day on which stripping occurs. Tighten reshores to carry required loads without over stressing construction. Leave reshores in place until tests representative of concrete being supported have reached specified strength at time of removal of formwork supporting weight of concrete.

C. Floors supporting shores under newly-placed concrete: Leave original supporting shores in place, or re-shore. Locate reshores directly under shore position above. Extend reshoring over a sufficient number of stories to distribute weight of newly-placed concrete, forms and construction live loads in such manner that design superimposed loads of floors supporting shores are not exceeded.

3.05 FORM REUSE

A. Do not reuse forms that are worn or damaged beyond repair. Thoroughly clean and recoat forms before reuse. For wood and plywood forms to be used for exposed smooth finish, sand or otherwise dress concrete contact surface to original condition or provide form liner facing material. For metal forms, straighten, remove dents and clean to return forms to original condition.
### TABLE 03100A

**TOLERANCES FOR FORMED SURFACES CONCRETE IN BUILDINGS**

<table>
<thead>
<tr>
<th>VARIATION FROM</th>
<th>VARIATION IN</th>
<th>FOR ANY 10-FOOT LENGTH</th>
<th>FOR ANY 20-FOOT LENGTH OR ANY BAY</th>
<th>MAXIMUM FOR ENTIRE DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLUMB OR SPECIFIED BATTER</td>
<td>Lines And Surfaces of Columns, Piers, Walls And Arises</td>
<td>1/4&quot;</td>
<td>---</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>Exposed Corner Columns, Control Joint Grooves, And Other Conspicuous Lines</td>
<td>---</td>
<td>1/4&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>LEVEL OR SPECIFIED GRADE</td>
<td>Slab Soffits, Ceilings, Beam Soffits, And Arrises (Measured Before Removal of Shores)</td>
<td>1/4&quot;</td>
<td>3/8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>Exposed Lintels, Sills, Parapets, Horizontal Grooves And Other Conspicuous Lines</td>
<td>---</td>
<td>1/4&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>DRAWING DIMENSIONS</td>
<td>Position of Linear Building Lines, Columns, Walls, And Partitions</td>
<td>---</td>
<td>1/2&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>Size And Location of Sleeves, Floor Openings And Wall Openings</td>
<td>---</td>
<td>---</td>
<td>+1/4&quot;</td>
</tr>
<tr>
<td></td>
<td>Cross Section of Columns, Beams, Slabs, And Walls</td>
<td>---</td>
<td>---</td>
<td>+1/2&quot;, -1/4&quot;</td>
</tr>
<tr>
<td></td>
<td>Footings* in Plan</td>
<td>---</td>
<td>---</td>
<td>+2&quot;, -1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>Footing Misplacement or Eccentricity in Direction of Error (The Lesser Of)</td>
<td>---</td>
<td>---</td>
<td>2% OF WIDTH OR 2&quot;</td>
</tr>
<tr>
<td></td>
<td>Footing Thickness Decrease</td>
<td>---</td>
<td>---</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Footing Thickness Increase</td>
<td>---</td>
<td>---</td>
<td>NO LIMIT</td>
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<tr>
<td></td>
<td>Step Rise in Flight of Stairs</td>
<td>---</td>
<td>---</td>
<td>+1/8&quot;</td>
</tr>
<tr>
<td></td>
<td>Step Tread in Flight of Stairs</td>
<td>---</td>
<td>---</td>
<td>+1/4&quot;</td>
</tr>
<tr>
<td></td>
<td>Consecutive Step Rise</td>
<td>---</td>
<td>---</td>
<td>+1/16&quot;</td>
</tr>
<tr>
<td></td>
<td>Consecutive Step Tread</td>
<td>---</td>
<td>---</td>
<td>+1/8&quot;</td>
</tr>
</tbody>
</table>

* Footing tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

** Includes water and wastewater process structures.
<table>
<thead>
<tr>
<th>VARIATION FROM</th>
<th>VARIATION IN</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLUMB OR SPECIFIED BATTER</td>
<td>Surfaces of columns, piers and walls</td>
<td>1/2” in 10’</td>
</tr>
<tr>
<td>LEVEL OR SPECIFIED GRADE</td>
<td>Top surfaces of slabs</td>
<td>See Section 03345</td>
</tr>
<tr>
<td>LEVEL OR SPECIFIED GRADE</td>
<td>Top surfaces of curbs and railings</td>
<td>3/16” in 10’</td>
</tr>
<tr>
<td>DRAWING DIMENSIONS</td>
<td>Cross section of columns, caps, walls, beams and similar members</td>
<td>+1/2”, -1/4”</td>
</tr>
<tr>
<td>Thickness of deck slabs</td>
<td></td>
<td>+1/4”, -1/8”</td>
</tr>
<tr>
<td>Size and location of slab and wall openings</td>
<td></td>
<td>± 1/2”</td>
</tr>
<tr>
<td>Footings in plans</td>
<td></td>
<td>+2”, -1/2”</td>
</tr>
<tr>
<td>Footing misplacement or eccentricity in direction of error (the lesser of)</td>
<td></td>
<td>2% of Width or 2”</td>
</tr>
<tr>
<td>Footing thickness decrease</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Footing thickness increase</td>
<td></td>
<td>No Limit</td>
</tr>
<tr>
<td>Step rise in flight of stairs</td>
<td></td>
<td>±1/8”</td>
</tr>
<tr>
<td>Step tread in flight of stairs</td>
<td></td>
<td>±1/4”</td>
</tr>
<tr>
<td>Consecutive step rise</td>
<td></td>
<td>±1/16”</td>
</tr>
<tr>
<td>Consecutive step tread</td>
<td></td>
<td>±1/8”</td>
</tr>
</tbody>
</table>
END OF SECTION
SECTION 03210

REINFORCING STEEL

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Structural concrete reinforcement and grouting of reinforcement dowel bars into hardened concrete.

1.02 UNIT PRICES

A. No separate payment will be made for reinforcing steel or grouting that is part of the Work as bid. Include payment in unit price for structural concrete.

1.03 SUBMITTALS

A. Conform to all provisions and sections in these specifications.

B. Shop Drawings:

1. Submit shop drawings detailing reinforcement fabrication, bar placement location, splices, spacing, bar designation, bar type, length, size, bending, number of bars, bar support type and other pertinent information, including dimensions. Provide sufficient detail for placement of reinforcement without use of Contract Drawings. Information shall correspond directly to data listed on bill of materials.

2. Use of reproductions of Contract Drawings by Contractor, Subcontractor, erector, fabricator or material supplier in preparation of shop drawings (or in lieu of preparation of shop drawings) signifies acceptance by that party of information shown thereon as correct, and acceptance of obligation to pay for any job expense, real or implied, arising due to errors that may occur thereon. Remove references to Design Engineer, including seals, when reproductions of Contract Drawings are used as shop drawings.

3. Detail shop drawings in accordance with ACI 315, Figure 6.

4. Submit shop drawings showing location of proposed additional construction joints as required under Section 03250 - Joints in Concrete Structures, and obtain approval of the Owner’s Representative, prior to submitting reinforcing steel shop drawings.
C. Bill of Materials: Submit with shop drawings.

D. Product Data:
   1. Mechanical Bar Splices: Submit manufacturer's technical literature, including specifications and installation instructions.
   2. Epoxy grout proposed for anchoring reinforcing dowels to hardened concrete: Submit manufacturer's technical literature including recommended installation procedures.

E. Certificates:
   1. Submit steel manufacturer's certificates of mill tests giving properties of steel proposed for use. List manufacturer's test number, heat number, chemical analysis, yield point, tensile strength and percentage of elongation. Identify proposed location of steel in work.
   2. Foreign-manufactured reinforcing bars shall be tested for conformance to ASTM requirements by a certified independent testing laboratory located in United States. Certification from any other source is not acceptable. Submit test reports for review. Do not begin fabrication of reinforcement until material has been approved.

1.04 HANDLING AND STORAGE
   A. Store steel reinforcement above ground on platforms, skids or other supports. Protect reinforcing from mechanical injury, surface deterioration and formation of excessive, loose or flaky rust caused by exposure to weather. Protect epoxy-coated reinforcing from formation of any amount of rust.

1.05 QUALITY ASSURANCE
   A. Notify the Owner’s Representative at least 48 hours before concrete placement so that reinforcement may be inspected, and errors corrected, without delaying Work.

PART 2 PRODUCTS

2.01 MATERIAL
   A. Reinforcing Bars: Deformed bars conforming to ASTM A615, grade as indicated on Drawings, except column spirals and those shown on Drawings to be smooth bars. Where grade is not shown on Drawings, use Grade 60.
B. Smooth Bars: Where indicated on Drawings, use smooth bars conforming to ASTM A36; ASTM A615, Grade 60; or ASTM A675, Grade 70.

C. Column Spirals: Bars conforming to ASTM A615, Grade 60, or wire conforming to ASTM A82.

D. Epoxy-Coated Deformed Bars, Column Spirals and Smooth Bars: Conform to ASTM A775/A775M.

E. Welded Wire Fabric:
   3. Provide wire size, type and spacing as shown. Where type is not shown on Drawings, use welded smooth wire fabric.
   4. Furnish welded wire fabric in flat sheets only.

F. Tie Wire: 16-1/2 gage or heavier annealed steel wire. Use plastic-coated tie wire with epoxy-coated reinforcing steel.

G. Bar Supports: Provide chairs, riser bars, ties and other accessories made of plastic or metal, except as otherwise specified. Use bar supports and accessories of sizes required to provide required concrete cover. Where concrete surfaces are exposed to weather, water or wastewater, provide plastic accessories only; do not use galvanized or plastic-tipped metal in such locations. Provide metal bar supports and accessories rated Class 1 or 2 conforming to CRSI MSP-1 Manual of Standard Practice. Use epoxy-coated bar supports with epoxy-coated reinforcing bars.

H. Slabs on Grade: Provide chairs with sheet metal bases or provide precast concrete bar supports 3 inches wide, 6 inches long, and thick enough to allow required cover. Embed tie wires in 3-inch by 6-inch side.

I. Mechanical Bar Splices:
   1. Conform to ACI 318; use where indicated on Drawings.
      a. Compression splices shall develop ultimate stress of reinforcing bar.
      b. Tension splices shall develop 125 percent of minimum yield point stress of reinforcing bar.
2. Regardless of chemical composition of steel, any heat effect shall not adversely affect performance of reinforcing bar.

J. Welded Splices:

1. Provide welded splices where shown and where approved by the Owner’s Representative. Welded splices of reinforcing steel shall develop a tensile strength exceeding 125 percent of the yield strength of the reinforcing bars connected.

2. Provide materials for welded splices conforming to AWS D1.4.

K. Epoxy Grout: High-strength rigid epoxy adhesive, conforming to ASTM C881, Type IV, manufactured for purpose of anchoring dowels into hardened concrete and the moisture condition, application temperature and orientation of the hole to be filled. Unless otherwise shown, depth of embedment shall be as required to develop the full tensile strength (125 percent of yield strength) of dowel, but not less than 12 diameters.

2.02 FABRICATION

A. Bending: Fabricate bars to shapes indicated on Drawings by cold bending. Bends shall conform to minimum bend diameters specified in ACI 318. Do not straighten or rebend bars. Fabricate epoxy-coated reinforcing steel to required shapes in a manner that will not damage epoxy coating. Repair any damaged epoxy coating with patching material conforming to Item 4.4 of ASTM A775/A775M.

B. Splices:

1. Locate splices as indicated on Drawings. Do not locate splices at other locations without approval of the Owner’s Representative. Use minimum number of splices located at points of minimum stress. Stagger splices in adjacent bars.

2. Length of lap splices: As shown on Drawings.

3. Prepare ends of bars at mechanical splices in accordance with splice manufacturer's requirements.

C. Construction Joints: Unless otherwise shown, continue reinforcing through construction joints.

D. Bar Fabrication Tolerances: Conform to tolerances listed in ACI 315, Figures 4 and 5.
E. Standard Hooks: Conform to the requirements of ACI 318.

F. Marking: Clearly mark bars with waterproof tags showing number of bars, size, mark, length and yield strength. Mark steel with same designation as member in which it occurs.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean reinforcement of scale, loose or flaky rust and other foreign material, including oil, mud or coating that will reduce bond to concrete.

3.02 INSTALLATION

A. Placement Tolerances: Place reinforcement within tolerances of Table 03210A at the end of this Section. Bend tie wire away from forms to maintain the specified concrete coverage.

B. Interferences: Maintain 2-inch clearance from embedded items. Where reinforcing interferes with location of other reinforcing steel, conduit or embedded items, bars may be moved within specified tolerances or one bar diameter, whichever is greater. Where greater movement of bars is required to avoid interference, notify the Owner’s Representative. Do not cut reinforcement to install inserts, conduit, mechanical openings or other items without approval of the Owner’s Representative.

C. Concrete Cover: Provide clear cover measured from reinforcement to face of concrete as listed in Table 03210B at the end of this Section, unless otherwise indicated on Drawings.

D. Placement in Forms: Use spacers, chairs, wire ties and other accessory items necessary to assemble, space and support reinforcing properly. Provide accessories of sufficient number, size and strength to prevent deflection or displacement of reinforcement due to construction loads or concrete placement. Use appropriate accessories to position and support bolts, anchors and other embedded items. Tie reinforcing bars at each intersection, and to accessories. Blocking reinforcement with concrete or masonry is prohibited.

E. Placement for Concrete on Ground: Support bar and wire reinforcement on chairs spaced at approximately 3 feet on centers each way. Use minimum of one support for each 9 square feet. Tie supports to reinforcing bars and wires.

F. Vertical Reinforcement in Columns: Offset vertical bars by at least one bar diameter at splices. Provide accurate templates for column dowels to ensure proper placement.
G. Splices:

1. Do not splice bars, except at locations indicated on Drawings or reviewed shop drawings, without approval of the Owner’s Representative.

2. Lap Splices: Unless otherwise shown or noted, Class B, conforming to ACI 318-89, Section 12.15.1. Tie securely with wire prior to concrete placement, to prevent displacement of splices during concrete placement.

3. Mechanical Bar Splices: Use only where indicated on Drawings or approved by the Owner’s Representative. Install in accordance with manufacturer's instructions.

   a. Couplers located at a joint face shall be of a type which can be set either flush or recessed from the face as shown. Seal couplers prior to concrete placement to completely eliminate concrete or cement paste from entering.

   b. Couplers intended for future connections: Recess 1/2 inch minimum from concrete surface. After concrete is placed, plug coupler and fill recess with sealant to prevent contact with water or other corrosive materials.

   c. Unless noted otherwise, match mechanical coupler spacing and capacity to that shown for the adjacent reinforcing.

H. Construction Joints: Place reinforcing continuous through construction joints, unless noted otherwise.

I. Welded Wire Fabric: Install wire fabric in as long lengths as practicable. Unless otherwise indicated on Drawings, lap adjoining pieces at least 6 inches or one full mesh plus 2 inches, whichever is larger. Lace splices with wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps. Conform to WRI - Manual of Standard Practice for Welded Wire Fabric.

J. Field Bending: Shape reinforcing bent during construction operations to conform to Drawings. Bars shall be cold-bent; do not heat bars. Closely inspect reinforcing for breaks. When reinforcing is damaged, replace, Cadweld, or otherwise repair, as directed by the Owner’s Representative. Do not bend reinforcement after it is embedded in concrete.

K. Epoxy-coated Reinforcing Steel: Install in accordance with Paragraph 3.02J, Field Bending, and in a manner that will not damage epoxy coating. Repair damaged epoxy coating with patching material as specified in Paragraph 2.02A, Bending.
L. Field Cutting: Cut reinforcing bars by shearing or sawing. Do not cut bars with cutting torch.

M. Welding of reinforcing bars is prohibited, except where shown on Drawings.

3.03 GROUTING OF REINFORCING AND DOWEL BARS

A. Use epoxy grout for anchoring reinforcing and dowel steel to existing concrete in accordance with epoxy manufacturer's instructions. Drill hole not more than 1/4 inch larger than steel bar diameter (including height of deformations for deformed bars) in existing concrete. Just before installation of steel, blow hole clean of all debris using compressed air. Partially fill hole with epoxy, using enough epoxy so when steel bar is inserted, epoxy grout will completely fill hole around bar. Dip end of steel bar in epoxy and twist bar while inserting into partially filled hole.
### TABLE 03210A

#### REINFORCEMENT PLACEMENT TOLERANCES

<table>
<thead>
<tr>
<th>PLACEMENT</th>
<th>TOLERANCE IN INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Distance -</td>
<td></td>
</tr>
<tr>
<td>To formed soffit:</td>
<td>-1/4</td>
</tr>
<tr>
<td>To other formed surfaces:</td>
<td>±1/4</td>
</tr>
<tr>
<td>Minimum spacing between bars</td>
<td>-1/4</td>
</tr>
<tr>
<td>Clear distance from unformed surface to top reinforcement -</td>
<td></td>
</tr>
<tr>
<td>Members 8 inches deep or less:</td>
<td>±1/4</td>
</tr>
<tr>
<td>Members more than 8 inches deep but less than 24 inches deep:</td>
<td>-1/4, +1/2</td>
</tr>
<tr>
<td>Members 24 inches deep or greater:</td>
<td>-1/4, +1</td>
</tr>
<tr>
<td>Uniform spacing of bars (but the required number of bars shall not be</td>
<td>±1</td>
</tr>
<tr>
<td>reduced):</td>
<td></td>
</tr>
<tr>
<td>Uniform spacing of stirrups and ties (but the required number of stirrups</td>
<td>±1</td>
</tr>
<tr>
<td>and ties shall not be reduced):</td>
<td></td>
</tr>
<tr>
<td>Longitudinal locations of bends and ends of reinforcement -</td>
<td></td>
</tr>
<tr>
<td>General:</td>
<td>±1</td>
</tr>
<tr>
<td>Discontinuous ends of members:</td>
<td>±1/2</td>
</tr>
<tr>
<td>Length of bar laps:</td>
<td>-1</td>
</tr>
<tr>
<td>Embedded length -</td>
<td></td>
</tr>
<tr>
<td>For bar sizes No. 3 through 11:</td>
<td>-1</td>
</tr>
<tr>
<td>For bar sizes No. 14 and 18:</td>
<td>-2</td>
</tr>
</tbody>
</table>
### TABLE 03210B

**MINIMUM CONCRETE COVER FOR REINFORCEMENT**

<table>
<thead>
<tr>
<th>SURFACE</th>
<th>MINIMUM COVER IN INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slabs and Joists -</td>
<td></td>
</tr>
<tr>
<td>Top and bottom bars for dry conditions -</td>
<td></td>
</tr>
<tr>
<td>No. 14 and No. 18 bars:</td>
<td>1-1/2</td>
</tr>
<tr>
<td>No. 11 bars and smaller:</td>
<td>1</td>
</tr>
<tr>
<td>Formed concrete surfaces exposed to earth, water or weather; over, or in contact with, sewage; and for bottoms bearing on work mat, or slabs supporting earth cover -</td>
<td></td>
</tr>
<tr>
<td>No. 5 bars and smaller:</td>
<td>1-1/2</td>
</tr>
<tr>
<td>No. 6 through No. 18 bars:</td>
<td>2</td>
</tr>
<tr>
<td>Beams and Columns -</td>
<td></td>
</tr>
<tr>
<td>For dry conditions -</td>
<td></td>
</tr>
<tr>
<td>Stirrups, spirals and ties:</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Principal reinforcement:</td>
<td>2</td>
</tr>
<tr>
<td>Exposed to earth, water, sewage or weather -</td>
<td></td>
</tr>
<tr>
<td>Stirrups and ties:</td>
<td>2</td>
</tr>
<tr>
<td>Principal reinforcement:</td>
<td>2-1/2</td>
</tr>
</tbody>
</table>
## Walls -

For dry conditions -

<table>
<thead>
<tr>
<th>No. 11 bars and smaller:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 14 and No. 18 bars:</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

Formed concrete surfaces exposed to earth, water, sewage or weather, or in contact with ground -

<table>
<thead>
<tr>
<th>Circular tanks with ring tension:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>All others:</td>
<td>2</td>
</tr>
</tbody>
</table>

## Footings and Base Slabs -

<table>
<thead>
<tr>
<th>At formed surfaces and bottoms bearing on concrete work mat:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>At unformed surfaces and bottoms in contact with earth:</td>
<td>3</td>
</tr>
<tr>
<td>Over top of piles:</td>
<td>2</td>
</tr>
</tbody>
</table>

Top of footings – same as slabs
END OF SECTION
SECTION 03250

JOINTS IN CONCRETE STRUCTURES

PART 1   GENERAL

1.01 SECTION INCLUDES

A. Waterstops and similar joints in concrete structures intended to retain water or withstand hydrostatic pressure.

1.02 UNIT PRICES

A. No separate payment will be made for joints under this Section. Include payment in unit price for structural concrete.

1.03 DEFINITIONS

A. The following definitions refer to concrete joints in water-retaining structures. Unless otherwise indicated, all such joints shall have a waterstop or sealant groove to prevent water penetration at the joint.

B. Construction Joint: The joint or surface between two concrete pours, produced by placing fresh concrete in contact with a hardened concrete surface.

1. A bond breaker may or may not be used, as indicated.

2. Reinforcing steel is continuous through the joint, unless otherwise indicated.

C. Contraction Joint: A joint similar to a construction joint, but intended to accommodate concrete shrinkage and similar movement.

1. A bond breaker is always used.

2. Reinforcing steel is held back 4-1/2 inches from the joint surface, and sleeved dowels are used so pours can move apart, unless otherwise indicated.

D. Expansion Joint: A joint similar to a construction or contraction joint, but intended to accommodate both expansion and contraction.

1. Compressible joint filler is placed against the hardened concrete, to form and separate the second pour so pours can move together or apart.

2. A centerbulb waterstop and joint sealant are used to fill the gap, unless otherwise indicated.

3. Reinforcing steel is held back, and sleeved dowels are used to allow and control movement, unless otherwise indicated.
E. Control Joint: A groove cut or formed in the face of a single pour, producing a weaker plane more likely to crack; used in an attempt to control locations of normal shrinkage cracks.

1. Joint sealant is used to fill the groove.

2. Reinforcing steel is continuous, since the pour is monolithic.

1.04 SUBMITTALS

A. Submit under provisions of all provisions and sections of these specifications.

B. Product Data: Information sufficient to indicate compliance with Contract Documents, including manufacturer's descriptive literature and specifications.

C. Shop Drawings: Indicate type, size and location of each joint in each structure, and installation details.

D. Samples: For extrusions, submit 6-inch lengths. For molded or fabricated items, submit whole items. Submit 6-inch beads for sealants and 6-inch square samples for coatings, on appropriate substrates.

E. Quality Control Submittals: Submit manufacturer's instructions and recommendations for storage, handling and installation including material safety data sheets, and, where specified, test reports certified by an independent testing laboratory or the manufacturer, and manufacturer's certification that products furnished comply with Contract Documents.

1.05 QUALITY ASSURANCE

A. Waterstop Inspection: Notify the Owner's Representative to schedule inspection at least 24 hours prior to work involving waterstop installation or fabrication of waterstop field joints.

B. Defects include but are not limited to the following:

1. Offsets at joints greater at any point than 1/16 inch or 15 percent of material thickness, whichever is less.

2. Exterior cracks at joints due to incomplete bond, which are deeper at any point than 1/16 inch or 15 percent of material thickness, whichever is less.

3. At any point, any combination of offsets or exterior cracks resulting in a net reduction in the cross-sectional area of the waterstop greater than 1/16 inch or 15 percent of material thickness at any point, whichever is less.

4. Misalignment of joint resulting in misalignment of the waterstop in excess of 1/2 inch in 10 feet.

5. Porosity in the welded joint as evidenced by visual inspection.
6. Bubbles or inadequate bond which can be detected with a penknife. If, while probing the joint with the point of a penknife, the knife breaks through the outer portion of the weld into a bubble, the joint is defective.

C. Field Joint Samples: Prior to use of the waterstop material in the field, fabricate and submit for review a sample of a fabricated mitered cross and a tee constructed of each size or shape of material to be used. Fabricate samples so material and workmanship represent fittings to be furnished. Field samples of fabricated fittings (crosses, tees, etc.) will be selected at random by the Owner for testing by a laboratory at Owner's expense; they shall have a tensile strength across the joints equal to at least 600 psi when tested in accordance with ASTM D638. Contractor shall pay cost of failed tests and retesting required by failures.

D. Construction Joint Sealant: Prepare adhesion and cohesion test specimens, as specified, at intervals of 5 working days while sealants are being installed.

E. Sealant material shall show no signs of adhesive or cohesive failure when tested in accordance with the following procedure in laboratory and field tests:

1. Prepare sealant specimen between 2 concrete blocks (1 inch by 2 inches by 3 inches); spacing between the blocks shall be 1 inch. Use coated spacers (2 inches by 1-1/2 inches by 1/2 inch) to ensure sealant cross-sections of 1/2 inch by 2 inches with a width of 1 inch.

2. Cast and cure sealant according to manufacturer's recommendations except that curing period shall be not less than 24 hours.

3. Following curing period, widen the gap between blocks to 1-1/2 inches. Use spacers to maintain this gap for 24 hours prior to inspection for failure.

F. Sealant Installer: A competent waterproofing specialty contractor, approved by sealant manufacturer, having a record of successful performance in similar installations. Before beginning work, sealant manufacturer's representative shall instruct installer's crew in proper method of application.

1.06 WARRANTY

A. Provide a written warranty covering entire sealant installation against faulty and incompatible materials and workmanship, and agreeing to repair or replace defective work at no additional cost to the Owner, for a period of 5 years.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials in accordance with manufacturer's printed instructions.

B. Store waterstops to permit free circulation of air around waterstop material.

PART 2 P R O D U C T S
2.01 EPA POTABLE CLASSIFICATION

A. All joint materials shall be materials that reach acceptability for use in potable water systems no later than 30 days after installation, as classified by the Environmental Protection Agency.

2.02 PVC WATERSTOPS

A. Extrude from virgin polyvinyl chloride elastomer. Use no reclaimed or scrap material. Submit waterstop manufacturer's current test reports and manufacturer's written certification that the material furnished meets or exceeds Corps of Engineers Specification CRD-C572 and other specified requirements.

B. Flat Strip and Center-Bulb Waterstops: As detailed, and as manufactured by: Kirkhill Rubber Co., Brea, California; Water Seals, Inc., Chicago, Illinois; Progress Unlimited, Inc., New York, New York; Greenstreak Plastic Products Co., St. Louis, Missouri; or equal acceptable to the Owner’s Representative, provided that at no place shall waterstop thickness be less than 3/8 inch.

C. Multi-Rib Waterstops: As detailed, and as manufactured by Water Seals, Inc., Chicago, Illinois; Progress Unlimited, Inc., New York, New York; Greenstreak Plastic Products Co., St. Louis, Missouri; or equal acceptable to the Owner’s Representative. Use prefabricated joint fittings at intersections of ribbed-type waterstops.

D. Other Waterstops: When types of waterstops not listed above are indicated on the Drawings, they are subject to these specifications.

E. Waterstop Properties: When tested in accordance with specified standards, waterstop material shall meet or exceed the following requirements:

<table>
<thead>
<tr>
<th>Physical Property, Sheet Material</th>
<th>Value</th>
<th>ASTM Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength-min (psi):</td>
<td>1750</td>
<td>D638, Type IV</td>
</tr>
<tr>
<td>Ultimate Elongation-min (percent):</td>
<td>350</td>
<td>D638, Type IV</td>
</tr>
<tr>
<td>Low Temp Brittleness-max (degrees F):</td>
<td>-35</td>
<td>D746</td>
</tr>
<tr>
<td>Stiffness in Flexure-min (psi):</td>
<td>400</td>
<td>D747</td>
</tr>
</tbody>
</table>

Accelerated Extraction (CRD-C572) -
Tensile Strength-min (psi): 1500  D638, Type IV
Ultimate Elongation-min (percent): 300  D638, Type IV

Effect of Alkalies (CRD-C572) -
Change in Weight (percent): +0.25/−0.10  ------
Change in Durometer, Shore A: +5  D2240

Finished Waterstop -
Tensile Strength-min (psi): 1400  D638, Type IV
Ultimate Elongation-min (percent): 280  D638, Type IV
2.03 JOINT SEALANT

A. Material: Polyurethane polymer designed for bonding to concrete which is continuously submerged in water. Use no material with an unsatisfactory history of bond or durability when used in joints of liquid-retaining structures.

B. Sealant Properties at 73 degrees F, 50 percent relative humidity:

- Work Life: 45 - 180 minutes
- Time to Reach 20 Shore A Hardness (at 77 degrees F, 200 gr quantity): 24 hours, maximum
- Ultimate Hardness (ASTM D2240): 20 - 45 Shore A
- Tensile Strength (ASTM D412): 200 psi, minimum
- Ultimate Elongation (ASTM D412): 400 percent, minimum
- Tear Resistance (Die C ASTM D624): 75 pounds per inch of thickness, minimum
- Color: Light Gray

C. Polyurethane Sealants for Waterstop Joints in Concrete:

1. Sealant: 2-part polyurethane; when cured, sealant shall meet or exceed ANSI/ASTM C920 or Federal Specification TT-S-0227 E(3) for 2-part material.

2. Vertical and overhead horizontal joints: Use only "non-sag" compounds meeting ANSI/ASTM C920, Class 25, Grade NS, or Federal Specification TT-S-0227 E(3), Type II, Class A.

3. Plane horizontal joints: Self-leveling compounds meeting ANSI/ASTM C920, Class 25, Grade P, or Federal Specification TT-S-0227 E(3), Type I. For joints subject to either pedestrian or vehicular traffic, use a compound providing non-tracking characteristics and having a Shore A hardness range of 35 to 45.

4. Primer: Use only compatible materials manufactured or recommended for the application by the sealant manufacturer, in accordance with the printed instructions and recommendations of the sealant manufacturer.


E. Sealants for non-waterstop joints: Conform to Section 07920 - Sealants and Caulking.

2.04 MISCELLANEOUS MATERIALS

A. Bearing Pad: ASTM D2000 neoprene, Grade 2 or 3, Type BC, tensile strength 1450 psi, 60 durometer hardness, unless otherwise indicated.

B. Neoprene Sponge: ASTM D1056, Type 2C3-E1 closed-cell expanded neoprene.
C. Preformed Joint Filler: ASTM D1752 Type I non-extruding type; neoprene sponge or polyurethane of firm texture, except as otherwise specified. Bituminous fiber type will not be permitted.

D. Control Joint Former: Continuous plastic insert strips with anchorage ribs located at the bottom and an enlarged upper portion that is readily removable without damage to the concrete, and is sized to form sealant groove. Size to extend to at least 1/4 slab depth.

E. Backing Rod: Extruded closed-cell polyethylene foam rod, compatible with joint sealant materials used, with a tensile strength not less than 40 psi, and compression deflection approximately 25 percent at 8 psi. Size: 1/8-inch larger in diameter than joint width, except use one-inch diameter rod for 3/4-inch wide joints.

F. Bond Breaker: "Super Bond Breaker" manufactured by Burke Company, San Mateo, California; "Select Cure CRB", manufactured by Select Products Co., Upland, California, or equal acceptable to the Owner’s Representative. Bond breaker shall contain a fugitive dye so areas of application will be readily distinguishable.

G. Slip Dowels: Smooth epoxy-coated bars conforming to ASTM A775.

H. PVC Tubing: ASTM D2241, Schedule SDR 13.5.

2.05 RESILIENT WATERSTOP

A. Resilient waterstop, where called for on the Drawings, shall be either a bentonite or adhesive type material.

B. Bentonite Waterstop:

1. Material: 75 percent bentonite, mixed with butyl rubber-hydrocarbon containing less than 1.0 percent volatile matter, and free of asbestos fibers or asphaltics.

2. Manufacturer’s rated temperature ranges: For application, 5 to 125 degrees F; in service, -40 to 212 degrees F.


4. Provide with adhesive backing capable of producing excellent adhesion to concrete surfaces.

C. Adhesive Waterstop:

1. Adhesive waterstop shall be at least 2 inches in diameter and shall be Synko-Flex preformed plastic adhesive waterstop by Synko-Flex Products, Inc., or equal. The waterstop shall meet or exceed requirements of Federal Specification SS-S-210A.
2. The adhesive waterstop shall be supplied wrapped completely by a two part protective paper.

3. The adhesive waterstop material shall have independent laboratory tests verifying that the material seals joints in concrete against leakage when subjected to a minimum of 30 psi water pressure for at least 72 hours.

4. Primer, to be used on hardened concrete surfaces, shall be provided by the same manufacturer as the waterstop material.

PART 3  E X E C U T I O N

3.01  I N S T A L L A T I O N

A. Embed waterstops in concrete across joints as shown. Waterstops shall be continuous for the extent of the joint; make splices necessary to provide such continuity in accordance with manufacturer's instructions. Support and protect waterstops during construction operations; repair or replace waterstops damaged during construction.

B. Install waterstops in concrete on one side of joints, leaving other side exposed until the next pour. When a waterstop will remain exposed for 2 days or more, shade and protect the exposed waterstop from direct rays of the sun during the entire exposure and until the exposed portion of the waterstop is embedded in concrete.

3.02  S P L I C E S  I N  W A T E R S T O P S

A. Splice waterstops by heat-sealing adjacent waterstop sections in accordance with the manufacturer's printed instructions.

1. Do not damage material by heat sealing.

2. Splice tensile strength: At least 60 percent of unspliced material tensile strength.


B. Butt end-to-end joints of 2 identical waterstop sections may be made in the forms during placement of waterstop material.

C. Prior to placement in formwork, prefabricate all waterstop joints involving more than 2 ends to be joined together, an angle cut, an alignment change, or the joining of 2 dissimilar waterstop sections, allowing not less than 24-inch long strips of waterstop material beyond the joint. Upon inspection and approval by the Owner’s Representative, install prefabricated waterstop joint assemblies in formwork, and butt-weld ends of the 24-inch strips to the straight-run portions of waterstop in the forms.

D. Where a center bulb waterstop intersects and is joined to a non-center bulb waterstop, take care to seal the end of the center bulb, using additional PVC material if needed.
3.03 JOINT CONSTRUCTION

A. Setting Waterstops:

1. Correctly position waterstops during installation. Support and anchor waterstops during progress of the work to ensure proper embedment in concrete. Locate symmetrical halves of waterstops equally between concrete pours at joints, with center axis coincident with joint openings. Thoroughly work concrete in joint vicinity for maximum density and imperviousness.

2. Flat-strip waterstop: Prevent folding over by concrete during placement. Unless otherwise shown, hold waterstops in place with wire ties on 12-inch centers passed through the waterstop edge and tied to reinforcing steel.
   a. Horizontal waterstops (with flat face in vertical plane): Hold in place by fastening upper waterstop edge to continuous supports.
   b. Horizontal waterstops (with flat face in horizontal plane): Work concrete under waterstops by hand to eliminate air and rock pockets.

3. Place center bulb waterstops in expansion joints centered on joint filler material.

4. Where a waterstop in a vertical wall joint does not connect with any other waterstop, and is not intended to be connected to a waterstop in a future concrete placement, terminate the waterstop 6 inches below the top of the wall.

B. Joint Location: Unless specifically noted otherwise, provide construction joints at 25-foot maximum spacing for concrete construction. Where joints are shown spaced greater than 40 feet apart, provide additional joints to maintain the 25-foot maximum spacing. Submit joint locations for review by the Owner’s Representative.

C. Joint Preparation: Prepare surfaces in accordance with Section 03310 - Structural Concrete. Unless otherwise indicated, bonding is required at horizontal concrete joints in walls. Except on horizontal wall construction joints, wall-to-slab joints, or where otherwise shown or specified, at joints where waterstops are required, coat the joint face of the first pour with bond breaker as specified.

D. Replacement of Defective Field Joints: Replace waterstop field joints showing evidence of misalignment, offset, porosity, cracks, bubbles, inadequate bond or other defects with products and joints complying with Contract Documents.

E. Construction Joint Sealant:

1. In water-bearing floor slabs and elsewhere where indicated, provide construction joints with tapered grooves filled with construction joint sealant. Leave groove-forming material in place until time grooves are cleaned and filled with joint sealant. After removing groove forms, remove laitance and fins and sandblast the grooves. Allow grooves to dry thoroughly, then blow...
out, immediately prime surfaces, place bond-breaker tape in bottom of groove and fill with construction joint sealant. Use no sealant without a primer. Completely fill sealant grooves. Thoroughly clean areas designated to receive sealant, as specified for tapered grooves, prior to sealant application.

2. Mix and install primer and sealant in accordance with manufacturer's printed instructions and recommendations. Do not coat sides of sealant groove with bond breaker, curing compound or other substance which would interfere with proper sealant bond. Allow at least 7 days for sealant to achieve final cure before filling structure with water.

3. Thoroughly and uniformly mix 2-part catalyst-cured material.

4. Remove and replace improperly cured sealants after the manufacturer's recommended curing time; thoroughly sandblast the groove to remove all traces of uncured or partially-cured sealant and primer, then re-prime and re-seal with specified sealant.

F. Resilient Waterstop:

1. Install resilient waterstop in accordance with manufacturer's instructions and recommendations except as otherwise indicated and specified.

2. When requested by the Owner’s Representative, provide technical assistance by manufacturer's representative in the field at no additional cost to the Owner.

3. Use resilient waterstop only where complete confinement by concrete is provided; do not use in expansion or contraction joints.

4. Where resilient waterstop is used in combination with PVC waterstop, lap resilient waterstop over PVC waterstop a minimum of 6 inches and place in contact with the PVC waterstop. Where crossing PVC at right angles, melt PVC ribs to form a smooth joining surface.

5. At the free top of walls without connecting slabs, stop the resilient waterstop and grooves (where used) 6 inches from the top in vertical wall joints.

6. Bentonite Waterstop:

7. Locate bentonite waterstop as near as possible to the center of the joint and extend continuous around the entire joint. Minimum distance from edge of waterstop to face of member: 5 inches.

a. Where thickness of the concrete member to be placed on the bentonite waterstop is less than 12 inches, place waterstop in grooves at least 3/4 inch deep and 1-1/4 inches wide formed or ground into the concrete. Minimum distance from edge of waterstop placed in groove to face of member: 2.5 inches.
b. Do not place bentonite waterstop when waterstop material temperature is below 40 degrees F. Waterstop material may be warmed so that it remains above 40 degrees F during placement but means used to warm it shall in no way harm the material or its properties. Do not install waterstop where air temperature falls outside manufacturer's recommended range.

c. Place bentonite waterstop only on smooth and uniform surfaces; grind concrete smooth if necessary to produce satisfactory substrate, or bond waterstop to irregular surfaces using an epoxy grout which completely fills voids and irregularities beneath the waterstop material. Prior to installation, wire brush the concrete surface to remove laitance and other substances that may interfere with bonding of epoxy.

d. In addition to the adhesive backing provided with the waterstop, secure bentonite waterstop in place with concrete nails and washers at 12-inch maximum spacing.

8. Adhesive Waterstop:

a. Thoroughly clean the concrete surface on which the waterstop is to be placed with a wire brush and coat with primer.

b. If the surface is too rough to allow the waterstop to form a complete contact, grind to form an adequately smooth surface.

c. Install the waterstop with the top protective paper left in place. Overlap joints between strips a minimum of 1 inch and cover back over with the protective paper.

d. Do not remove protective paper until just before final formwork completion. Concrete shall be placed immediately. The time that the waterstop material is uncovered prior to concrete placement shall be minimized and shall not exceed 24 hours.

G. Control Joints:

1. Where indicated, form in slabs by sawcutting, preformed plastic inserts or other means acceptable to the Owner’s Representative. Minimum insert or sawcut: 1/4 slab depth.

2. Perform sawcutting during the curing period as soon as possible after concrete has reached its final set, has attained sufficient strength to support sawcutting operations without damage, and while it remains fully saturated.

3. Leave the removable portion of plastic inserts in place and protect sawcuts against damage and intrusion of foreign material until the end of the curing period and until concrete has dried sufficiently to allow sealant installation.
4. Sealant Installation: Blow foreign material from formed or sawcut space. Insert a foam backer rod to form a sealant depth equal to the width of the space but not less than 3/8 inch. Install sealant as specified elsewhere in the Contract Documents.

END OF SECTION
SECTION 03310

STRUCTURAL CONCRETE

PART 1  G E N E R A L

1.01 SECTION INCLUDES

A. Cast-in-place normal-weight structural concrete and mass concrete.

1.02 UNIT PRICES

A. Measurement for structural concrete is on lump-sum basis for each structure as bid. Payment includes related work performed on these structures in accordance with related sections of these Specifications.

B. Measurement for extra structural concrete is on cubic-yard basis. Payment includes related work performed in accordance with related sections.

1.03 DEFINITIONS

A. Mass Concrete: Concrete sections 4 feet or more in least dimension.

B. Hot Weather: Any combination of high air temperature, low relative humidity and wind velocity tending to impair quality of fresh or hardened concrete or otherwise resulting in abnormal properties.

C. Cold Weather: Period when, for more than 2 successive days, mean daily temperature is below 40 degrees F.

1.04 SUBMITTALS

A. Conform to all provisions and sections of these specifications.

B. Mill Certificates: Required for bulk cement.

C. Design Mixes:

1. Submit test data on proposed design mixes for each type of concrete in the Work, including each class, and variations in type, source or quantity of material. Include type, brand and amount of cementitious materials; type, brand and amount of each admixture; slump; air content; aggregate sources, gradations, specific gravity and absorption; total water (including moisture in aggregate); water/cement ratio; compressive strength test results for 7 and 28 days; and shrinkage tests for Class C and D concrete at 21 or 28 days of drying.

2. Submit abrasion loss and soundness test results for limestone aggregate.
3. Testing of aggregates, including sieve analysis, shall be performed by a certified independent testing laboratory. Tests shall have been performed no earlier than 3 months before Notice to Proceed.

4. Provide standard deviation data for plant producing concrete. Data shall include copies of laboratory test results and standard deviation calculated in accordance with ACI 318, Item 5.3.1. Laboratory tests shall have been performed within past 12 months. When standard deviation data is not available, comply with ACI 318, Table 5.3.2.2.

5. Review and acceptance of mix design does not relieve Contractor of responsibility to provide concrete of quality and strength required by these Specifications.

D. Admixtures: Submit manufacturer's technical information, including following:

1. Air-Entraining Admixture: Give requirements to control air content under all conditions, including temperature variations and presence of other admixtures.

2. Chemical Admixtures: Give requirements for quantities and types to be used under various temperatures and job conditions to produce uniform, workable concrete mix. Submit evidence of compatibility with other admixtures and cementitious materials proposed for use in design mix.

E. High-Range Water Reducer (Superplasticizer): When proposed for use, submit manufacturer's technical information and instructions for use of superplasticizer. State whether superplasticizer will be added at ready-mix plant or job site. When superplasticizer will be added at job site, submit proposed plan for measuring and adding superplasticizer to concrete mix at job site, and establish dosing area on site with holding tanks and metering devices. When superplasticizer is to be added at ready-mix plant, submit contingency plans for adding additional superplasticizer at job site when required due to delay in placing concrete. Identify portions of Work on which superplasticizer is proposed for use.

F. Hot and Cold Weather Concreting: Submit, when applicable, proposed plans for hot and cold weather concreting. Review and acceptance of proposed procedure will not relieve Contractor of responsibility for quality of finished product.

G. Project Record Drawings: Accurately record actual locations of embedded utilities and components which are concealed from view.

1.05 QUALITY ASSURANCE

A. Provide necessary controls during evaluation of materials, mix designs, production and delivery of concrete, placement and compaction to assure that the Work will be accomplished in accordance with Contract Documents. Maintain records of concrete placement. Record dates, locations, quantities, air temperatures, and test samples taken.
B. Code Requirements: Concrete construction for buildings shall conform to ACI 318. Concrete construction for water and wastewater treatment and conveying structures shall conform to ACI 318 with modifications by ACI 350R, Item 2.6. Where this Specification conflicts with ACI 318 or ACI 350R, this Specification governs.

C. Testing and Other Quality Control Services:

1. Concrete testing required in this section, except concrete mix design, limestone aggregate test data, and testing of deficient concrete, will be performed by an independent commercial testing laboratory employed and paid by the Owner in accordance with Section 01410 - Testing Laboratory Services.

2. Provide material for and cooperate fully with Owner’s testing laboratory technician in obtaining samples for required tests.

3. Standard Services: The following testing and quality control services will be provided by Owner in accordance with Section 01410, Testing Laboratory Services:

   a. Verification that plant equipment and facilities conform to NRMCA "Certification of Ready-Mix Concrete Production Facilities".

   b. Testing of proposed materials for compliance with this Specification.

   c. Review of proposed mix design submitted by Contractor.

   d. Obtaining production samples of materials at plants or stockpiles during work progress and testing for compliance with this Specification.

   e. Strength testing of concrete according to following procedures:

      (1). Obtaining samples for field test cylinders from every 100 cubic yards and any portion less than 100 cubic yards for each mix design placed each day, according to ASTM C172, with each sample obtained from a different batch of concrete on a representative, random basis. Selecting test batches by any means other than random numbers chosen before concrete placement begins is not allowed.

      (2). Molding four specimens from each sample according to ASTM C31, and curing under standard moisture and temperature conditions as specified in Sections 7(a) and (b) of ASTM C31.

      (3). Testing two specimens at 7 days and two specimens at 28 days according to ASTM C39, reporting test results averaging strengths of two specimens. However, when one specimen evidences improper sampling, molding or testing, it will be
discarded and remaining cylinder considered test result. When high-early-strength concrete is used, specimens will be tested at 3 and 7 days.

f. Air content: For each strength test, determination of air content of normal weight concrete according to ASTM C231.

g. Slump: For each strength test, and whenever consistency of concrete appears to vary, conducting slump test in accordance with ASTM C143.

h. Temperature: For each strength test, checking concrete temperature in accordance with ASTM C1064.

i. Lightweight concrete: For each strength test, or more frequently when requested by the Owner’s Representative, determination of air content by ASTM C567 and unit weight by ASTM C567.

j. Monitoring of current and forecasted climatic conditions to determine when rate of evaporation, as determined by Figure 2.1.5 of ACI 305R, will produce loss of 0.2 pounds of water, or more, per square foot per hour. Testing lab representative will advise Contractor to use hot weather precautions when such conditions will exist during concrete placement, and note on concrete test reports when Contractor has been advised that hot weather conditions will exist.

k. Class A and D Concrete Shrinkage Tests: Performance of drying shrinkage tests for trial batches as follows:

   (1). Preparation and Testing of Specimens: Compression and drying shrinkage test specimens will be taken in each case from the same concrete sample; shrinkage tests will be considered a part of the normal compression tests for the project. 4-inch by 4-inch by 11-inch prisms with an effective gage length of 10 inches, fabricated, cured, dried and measured in accordance with ASTM C157, modified as follows:

   (2). Wet curing: Remove specimens from molds at an age of 23 hours 1 hour after trial batching and immediately immerse in water at 70 degrees F 3 degrees F for at least 30 minutes;

   (a). Measure within 30 minutes after first 30 minutes of immersion to determine original length (not to be confused with "base length");

   (b). Then submerge in saturated limewater, at 73 degrees F 3 degrees F, for 7 days;
c. Then measure at age 7 days to establish "base length" for drying shrinkage calculations ("zero" days drying age);

d. Calculate expansion (base length expressed as a percentage of original length);

e. Immediately store specimens in a temperature- and humidity-controlled room maintained at 73 degrees F, +3 degrees F and 50 percent +4 percent relative humidity, for the remainder of the test.

f. Measure to determine shrinkage, expressed as percentage of base length. Compute the drying shrinkage deformation of each specimen as the difference between the base length (initial length of specimen when created) and the length after drying at each test age. Compute the average drying shrinkage deformation of the specimens to the nearest 0.0001 inch at each test age. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004 inch, disregard the results obtained from that specimen. Report results of shrinkage tests to the nearest 0.001 percent of shrinkage.

g. Report shrinkage separately for 7, 14, 21, and 28 days of drying after 7 days of moist curing.

4. Additional Testing and Quality Control Services: The following will be performed by an independent commercial testing laboratory employed and paid by the Owner in accordance with Section 01410, Testing Laboratory Services, when requested by the Owner’s Representative.

a. Checking of batching and mixing operations.

b. Review of manufacturer's report of each cement shipment and conducting laboratory tests of cement.

c. Molding and testing reserve 7-day cylinders or field cylinders.

d. Conducting additional field tests for slump, concrete temperature and ambient temperature.

e. Alkalinity Tests: For concrete used in sanitary structures, one test for each structure. Perform alkalinity tests on concrete covering reinforcing steel on the inside of the pipe or structure in accordance with "Encyclopedia of Industrial Chemical Analysis," Vol. 15, page 230.
5. Contractor shall provide the following testing and quality control services:
   
a. Employ an independent commercial testing laboratory, acceptable to Owner, to prepare and test design mix for each class of concrete for which material source has been changed.
   
b. Notify commercial testing laboratory employed by Owner 24 hours prior to placing concrete.

6. Testing of deficient concrete in place:
   
a. When averages of three consecutive strength test results fail to equal or exceed specified strength, or when any individual strength test result falls below specified strength by more than 500 psi, strength of concrete shall be considered potentially deficient and core testing, structural analysis or load testing may be required by the Owner’s Representative.
   
b. When concrete in place proves to be deficient, Contractor shall pay costs, including costs due to delays, incurred in providing additional testing and analysis services provided by the Owner’s Representative, or the independent commercial testing laboratory selected by the Owner.
   
c. Replace concrete work judged inadequate by core tests, structural analysis or load tests at no additional cost to the Owner.
   
d. Core Tests:
      
1. Obtain and test cores in accordance with ASTM C42. Where concrete in structure will be dry under service conditions, air-dry cores (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for 7 days before test; test dry. Where concrete in structure will be more than superficially wet under service conditions, test cores after moisture conditioning in accordance with ASTM C42.
   
2. Take at least three representative cores from each member or area of concrete in place that is considered potentially deficient. Location of cores shall be determined by the Owner’s Representative so as to least impair strength of structure. When, before testing, one or more cores shows evidence of having been damaged during or after removal from structure, replace the damaged cores.
   
3. Concrete in area represented by core test will be considered adequate when average strength of cores is equal to at least 85 percent of specified strength, and when no single core is less than 75 percent of specified strength.
(4). Patch core holes in accordance with Section 03345 - Concrete Finishing.

e. Structural Analysis: When core tests are inconclusive or impractical to obtain, the Owner’s Representative may perform additional structural analysis at Contractor's expense to confirm safety of structure.

f. Load Tests: When core tests and structural analysis do not confirm safety of structure, load tests may be required, and their results evaluated, in accordance with ACI 318.

g. Testing by impact hammer, sonoscope, probe penetration tests (Windsor probe), or other nondestructive device may be permitted by the Owner’s Representative to determine relative strengths at various locations in structure, to evaluate concrete strength in place, or for selecting areas to be cored. However, such tests, unless properly calibrated and correlated with other test data, shall not be used as basis for acceptance or rejection of structure's safety.

1.06 STORAGE AND HANDLING OF MATERIALS

A. Cement: Store cement in weathertight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set. When there is any doubt as to expansive potential of shrinkage-compensating cements because of method or length of storage and exposure, laboratory test cement before use.

B. Aggregate: Arrange and use aggregate stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3 feet in thickness. Complete each layer before next is started.

C. Fine Aggregate: Before using, allow fine aggregate to drain until uniform moisture content is reached.

D. Admixtures: Store admixtures to avoid contamination, evaporation or damage. For those used in form of suspensions or unstable solutions, provide suitable agitating equipment to assure uniform distribution of ingredients. Protect liquid admixtures from freezing and other temperature changes which would adversely affect their characteristics.

E. Lightweight Aggregates: Uniformly predampen lightweight aggregates as necessary to prevent excessive variations in moisture content. Allow predampened aggregates to remain in stockpiles, under continuous fog spray, for minimum of 24 hours before use. Provide adequate drainage in stockpile areas to eliminate excess water and accumulation of contaminated fines.
A. Cement:
   1. Use same brand of cement used in concrete mix design. Use only one brand of each type in each structure, unless otherwise indicated on Drawings.
   2. Portland Cement: ASTM C150, Type I or Type II, gray in color. Use Type III only when specifically authorized by the Owner’s Representative in writing. Use Type II, including the requirements of Table 2, in construction of liquid-containing structures and cooling towers, unless shown otherwise on Drawings.

B. Admixtures:
   1. Do not use calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions.
   2. Air-Entraining Admixtures: ASTM C260, compatible with other admixtures used.
   3. Chemical Admixtures: Polymer type, nonstaining, chloride-free admixtures conforming to ASTM C494, Type A, C, D or E.
   4. High-Range Water Reducer (Superplasticizer): ASTM C494, Type F or G, compatible with and by the same manufacturer as other admixtures.

C. Mixing Water: Use clean, potable water, free from harmful amounts of oils, acids, alkalis or other deleterious substances, meeting requirements of ASTM C94.

D. Aggregates: Use coarse aggregate from only one source, and fine aggregate from only one source, for exposed concrete in any single structure.
   1. Coarse Aggregate: Gravel, crushed gravel or crushed limestone conforming to ASTM C33.
   2. Fine Aggregate: Natural sand complying with ASTM C33.
   3. Limestone aggregate shall conform to ASTM C33 and the following additional requirements: Clean, hard, strong and durable particles free of chemicals and coatings of silt, clay, or other fine materials that may affect hydration and bond of cement paste. Select crushed limestone: High-calcium limestone (minimum 95 percent CaCO$_3$ and maximum 3.5 percent MgCO$_3$) with maximum Los Angeles Abrasion loss of 38 percent, when tested in accordance with ASTM C131 or ASTM C535. Test aggregate for soundness in accordance with ASTM C88; maximum loss shall not exceed 18 percent after 5 cycles of magnesium sulfate test.
   4. Maximum size of coarse aggregate:
      a. Normal weight concrete, except as noted below: 1-1/2 inches.
b. Formed members 6 inches or less in least dimension: 1/5 least dimension.

c. Slabs: 1/3 depth of slab.

d. Drilled shafts: 1/3 clearance between reinforcing steel, but not greater than 3/4 inch.

e. Concrete fill, seal slabs and bonded concrete topping in clarifiers: 3/8 inch.


6. Abrasive Aggregate: Conform to requirements of Section 03345 - Concrete Finishing.

E. Calcium Chloride: Not permitted.

F. Evaporation Retardant: Masterbuilders "Confilm", Euclid "Eucobar", or equal.

G. Miscellaneous Materials:


2. Vapor barrier: 6 mil clear polyethylene film of type recommended for below-grade application.

3. Non-shrink grout: premixed compound consisting of non-metallic aggregate, cement and water-reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

2.02 CONCRETE MIX

A. Objective: Select proportions of ingredients to produce concrete having proper placability, durability, strength, appearance and other specified properties.

B. Mix Design: Employ and pay an independent commercial testing laboratory, acceptable to Owner, to prepare and test mix designs for each type of concrete specified. Proportion mix design ingredients by weight. Submit mix designs and test results for approval.

1. During the trial batches, aggregate proportions may be adjusted by the testing laboratory using two coarse aggregate size ranges to obtain the required properties. If one size range produces an acceptable mix, a second size range need not be used. Such adjustments shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor. Concrete shall conform to the requirements of this Section, whether the aggregate proportions are from the Contractor's preliminary mix design, or
whether the proportions have been adjusted during the trial batch process. Prepare trial batches using the aggregates, cement and admixtures proposed for the project. Make trial batches large enough to obtain 3 drying shrinkage test specimens and 6 compression test specimens from each batch. Shrinkage testing is required only for Class A and D concrete.

2. Determine compressive strength by testing 6-inch diameter by 12-inch high cylinders, made, cured and tested in accordance with ASTM C192 and ASTM C39. Test 3 compression test cylinders at 7 days and 3 at 28 days. Average compressive strength for the 3 cylinders tested at 28 days for any given trial batch shall be not less than 125 percent of the specified compressive strength.

3. Perform sieve analysis of the combined aggregate for each trial batch according to of ASTM C136. Report percentage passing each sieve.

4. In mix designs for Class A and D concrete, fine aggregate shall not exceed 41 percent of total aggregate by weight.

C. Shrinkage Limitations, Class A and D Concrete

1. Maximum concrete shrinkage for specimens cast in the laboratory from the trial batch: 0.036 percent as measured at 21-day drying age, or 0.042 percent at 28-day drying age. Use for construction only mix designs that meet trial batch shrinkage requirements. Shrinkage limitations apply only to Class A and D concrete.

2. Maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.

3. If the required shrinkage limitation is not met during construction, take any or all of the following actions, at no additional cost to the Owner, for securing the specified shrinkage requirements: Changing the source or aggregates, cement or admixtures; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or its effects.

D. Selecting Ingredient Proportions for Concrete:

1. Proportion concrete mix according to ACI 301, Chapter 3.

2. Establish concrete mix design by laboratory trial batches prepared by independent testing laboratory, or on basis of previous field experience in accordance with provisions of ACI 318, Item 5.3; however, minimum cement content for each class of concrete shall not be less than specified.

3. Concrete mix design data submitted for review shall have average 28-day compressive strength calculated in accordance with ACI 318, Item 5.3.2.1. When data is not available to determine standard deviation in accordance with
ACI 318, Item 5.3.1, average 28-day strength of mix design shall conform to ACI 318, Table 5.3.2.2.

E. Water-Cement Ratios:

1. Maximum allowable water-cement ratios shall be as follows:
   a. Concrete for liquid-containing structures: 0.45.
   b. Concrete subjected to brackish water, salt spray or deicers: 0.40.
   c. All other concrete: 0.55.

2. Superplasticizer may be added to maintain specified maximum water-cement ratios. Include free water in aggregate in water-cement ratio computations.

F. Adjustment of Mix Proportions: After sufficient data becomes available during construction, mix may be adjusted upon approval of the Owner’s Representative, in accordance with ACI 318, Item 5.5; however, minimum cement content for each class of concrete shall not be less than specified.

G. Entrained Air: Air-entrain all concrete except drilled shafts. Total air content in accordance with ASTM C173: 4 to 6 percent.

H. Consistency, Workability, and Slump:

1. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce concrete which can be worked properly into place without segregation, and which can be compacted by vibratory methods as specified, to give the desired strength, density, impermeability and smoothness of surface. Change the quantity of water as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. Determine the consistency of the concrete in successive batches by slump tests in accordance with ASTM C143. Slumps shall be as follows:

<table>
<thead>
<tr>
<th>Concrete Type</th>
<th>Minimum Slump</th>
<th>Maximum Slump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland Cement Concrete</td>
<td>2&quot;</td>
<td>4&quot;</td>
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<tr>
<td>Concrete to be dosed with superplasticizer:</td>
<td>1&quot;</td>
<td>3&quot;</td>
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<tr>
<td>Normal Weight Concrete after dosing with superplasticizer:</td>
<td>4&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Lightweight Concrete after dosing with superplasticizer:</td>
<td>4&quot;</td>
<td>7&quot;</td>
</tr>
<tr>
<td>Drilled Shaft Concrete:</td>
<td>4&quot;*</td>
<td>8&quot;</td>
</tr>
</tbody>
</table>

* Minimum slump where drilled shafts are cast in temporary casings: 5 inches.
2. Specified slump shall apply at time when concrete is discharged at job site. Perform slump tests to monitor uniformity and consistency of concrete delivered to job site; however, do not use as basis for mix design. Do not exceed water-cement ratios specified.

I. Admixtures: Proportion admixtures according to manufacturer's recommendations. Use of accelerator is permitted when air temperature is less than 40 degrees F. Use of retarder is permitted when temperature of placed concrete exceeds 65 degrees F.

J. High-Range Water Reducers (Superplasticizers): Use superplasticizer to improve workability of concrete or delay hydration of cement, in accordance with requirements and recommendations of product manufacturer and approved submittals.

K. Concrete Classification and Strength:

1. Strength: Conform to values for class of concrete indicated on Drawings for each portion of Work. Requirements are based on 28-day compressive strength. If high early-strength concrete is allowed, requirements are based on 7-day compressive strength.

2. Classification:

<table>
<thead>
<tr>
<th>Class (Normal-weight)</th>
<th>Minimum 28-Day Compressive Strength (psi)</th>
<th>Minimum Cement Content Pounds per CubicYard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete for Structures Containing Water or Wastewater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>4000</td>
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<td>B</td>
<td>1500</td>
<td>329 (3-1/2 Sacks)</td>
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<td>C</td>
<td>3000</td>
<td>470 (5 Sacks)</td>
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<td>Concrete for Buildings, Slabs on Grade and Miscellaneous Structures</td>
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<tr>
<td>BB</td>
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</tr>
<tr>
<td>CB</td>
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<tr>
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### Class of Concrete

<table>
<thead>
<tr>
<th>Class</th>
<th>Minimum 28-Day Compressive Strength (psi)</th>
<th>Minimum Cement Content Pounds per Cubic Yard</th>
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</thead>
<tbody>
<tr>
<td>E</td>
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</tr>
<tr>
<td>F</td>
<td>4000</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>G</td>
<td>5000</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>


4. When required strength is not obtained with minimum cement content as specified, add cement, lower water-cement ratio or provide other aggregates as necessary.

5. In addition to conforming to specified strength, lightweight concrete must be within specified unit weight limits. Maximum air-dry unit weight is 118 pounds per cubic foot; minimum is 110 pounds per cubic foot unless shown otherwise on Drawings. Determine air-dry unit weight in accordance with ASTM C567. Correlate air-dry unit weight with fresh unit weight of the same concrete as a basis for acceptance during construction.

L. Use of Classes of Concrete:

1. Use classes of concrete as indicated on the Drawings and in other specifications.

2. Liquid-containing structures: If not otherwise indicated, use the following classes for structures containing water or wastewater and for utility applications in the locations described:
   a. Class A: All reinforced concrete and where not otherwise defined.
   b. Class B: Un-reinforced concrete used for plugging pipes, seal slabs, thrust blocks and trench dams, unless indicated otherwise.
   c. Class H: Fill and topping. Where concrete fill thickness exceeds 3 inches in the majority of a placement and is not less than 1.5 inches thick, Class A concrete may be used.

3. All other structures: If not otherwise indicated, use the following classes in the locations described:
   a. Class AB: All reinforced concrete and where not otherwise defined.
   b. Class CB: Duct banks; see section 16402 - Underground Duct Banks for additional requirements.

2.03 MIXING NORMAL WEIGHT CONCRETE

A. Conform to ACI 301, Chapter 7.

B. Ready-Mixed Concrete:

1. Measure, batch, mix and transport ready-mixed concrete according to ASTM C94. Plant equipment and facilities shall conform to NRMCA "Certification of Ready Mixed Concrete Production Facilities".

2. Provide batch tickets with information specified in ASTM C94. Deliver batch ticket with concrete and give to Owner's on-site testing laboratory representative.

C. Admixtures:

1. Charge air-entraining and chemical admixtures into mixer as solution using automatic dispenser or similar metering device. Measure admixture to accuracy within +3 percent. Do not use admixtures in powdered form.

2. Two or more admixtures may be used in same concrete, provided that admixtures in combination retain full efficiency and have no deleterious effect on concrete or on properties of each other. Inject admixtures separately during batching sequence.

3. Add retarding admixtures as soon as practicable after addition of cement.

D. Temperature Control:

1. When ambient temperature falls below 40 degrees F, keep as-mixed temperature above 55 degrees F to maintain concrete above minimum placing temperature.

2. When water or aggregate has been heated, combine water with aggregate in mixer before cement is added. Do not add cement to mixtures of water and aggregate when temperature of mixture is greater than 100 degrees F.

3. In hot weather, maintain temperature of concrete below maximum placing temperature. When necessary, temperature may be lowered by cooling ingredients, cooling mixer drum by fog spray, using chilled water or well-crushed ice in whole or part for added water, or arranging delivery sequence so that time of transport and placement does not generate unacceptable temperatures.

4. Submit hot weather and cold weather concreting plans for approval.

2.04 MIXING LIGHTWEIGHT CONCRETE
A. Determining Absorption of Aggregates: Mixing procedures vary according to total absorption by weight of lightweight aggregates. Determine total absorption by weight before predamping in accordance with ASTM C127.

B. Ten Percent or Less Absorption: Follow same requirements as for mixing normal-weight concrete when preparing concrete made with low-absorptive lightweight aggregates having 10 percent or less total absorption by weight. To be low absorptive, aggregates must absorb less than 2 percent additional water in first hour after mixing.

C. More Than 10 Percent Absorption: Batch and mix concrete made with lightweight aggregates having more than 10 percent total absorption by weight, as follows:

1. Place approximately 80 percent of mixing water in mixer.

2. If aggregates are pre-dampened, add air-entraining admixture and all aggregates. Mix for minimum of 30 seconds, or 5 to 10 revolutions of truck mixer.

3. When aggregates have not been predampened, mix aggregates and water for minimum of 1 minute and 30 seconds, or 15 to 30 revolutions of truck mixer. Then add air-entraining admixture and mix for additional 30 seconds.

4. Then, in the following sequence, add specified or permitted admixtures (other than air-entraining agent), all cement, and mixing water previously withheld.


2.05 MASS CONCRETE

A. Do not use high early-strength cement (Type III) or accelerating admixtures.

B. Use high-range water-reducing admixture (superplasticizer) to minimize water content and cement content.

C. Specified water-reducing retarding admixture may be required to prevent cold joints when placing large quantities of concrete, to permit revibration of concrete, to offset effects of high temperature in concrete or weather, and to reduce maximum temperature or rapid temperature rise.

2.06 EQUIPMENT

A. Select equipment of size and design to ensure continuous flow of concrete at delivery end. Conform to following equipment and operations requirements.

B. Truck mixers, agitators and manner of operation: Conform to ASTM C94. Use of non-agitating equipment for transporting concrete is not permitted.
C. Belt conveyors: Configure horizontally, or at a slope causing no segregation or loss. Use approved arrangement at discharge end to prevent separation. Discharge long runs without separation into hopper.

D. Chutes: Metal or metal-lined (other than aluminum). Arrange for vertical-to-horizontal slopes not more than 1 to 2 nor less than 1 to 3. Chutes longer than 20 feet or not meeting slope requirements may be used if concrete is discharged into hopper before distribution.

E. Do not use aluminum or aluminum-alloy pipe or chutes for conveying concrete.

PART 3 EXECUTION

3.01 SPECIAL CONSIDERATIONS

A. Concreting Under Water: Not permitted except where shown otherwise on Drawings or approved by the Owner’s Representative. When shown or permitted, deposit concrete under water by methods acceptable to the Owner’s Representative so fresh concrete enters mass of previously placed concrete from within, causing water to be displaced with minimum disturbance at surface of concrete.

B. Protection from Adverse Weather: Unless adequate protection is provided or the Owner’s Representative’s approval is obtained, do not place concrete during rain, sleet, snow or freezing weather. Do not permit rainwater to increase mixing water or to damage surface finish. If rainfall occurs after placing operations begin, provide adequate covering to protect Work.

3.02 PREPARATION OF SURFACES FOR CONCRETING

A. Earth Surfaces:

1. Under interior slabs on grade, install vapor barrier. Lap joints at least 6 inches and seal watertight with tape, or sealant applied between overlapping edges and ends. Repair vapor barrier damaged during placement of reinforcing and inserts with vapor barrier material; lap over damaged areas at least 6 inches and seal watertight.

2. Other Earth Surfaces: Thoroughly wet by sprinkling prior to placing concrete, and keep moist by frequent sprinkling up to time of placing concrete thereon. Remove standing water. Surfaces shall be free from standing water, mud and debris at the time of placing concrete.

B. Construction Joints:

1. Definition: Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been interrupted so that, in the judgment of the, Owner’s Representative new concrete cannot be incorporated integrally with that previously placed.
2. **Interruptions:** When placing of concrete is to be interrupted long enough for the concrete to take a set, use forms or other means to shape the working face to secure proper union with subsequent work. Make construction joints only where acceptable to the Owner’s Representative.

3. **Preparation:** Give horizontal joint surfaces a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, clean joint surfaces of laitance, loose or defective concrete and foreign material by hydroblasting or sandblasting (exposing aggregate), roughen surface to expose aggregate to a depth of at least 1/4 inch and wash thoroughly. Remove standing water from the construction joint surface before new concrete is placed.

4. After surfaces have been prepared cover approximately horizontal construction joints with a 3-inch lift of a grout mix consisting of Class A concrete batched without coarse aggregate; place and spread grout uniformly. Place wall concrete on the grout mix immediately thereafter.

C. **Set and secure reinforcement,** anchor bolts, sleeves, inserts and similar embedded items in the forms where indicated on Contract Drawings, shop drawings and as otherwise required. Obtain the Owner’s Representative's acceptance before concrete is placed. Accuracy of placement is the sole responsibility of the Contractor.

D. **Place no concrete until at least 4 hours after formwork, inserts, embedded items, reinforcement and surface preparation have been completed and accepted by the Owner’s Representative.** Clean surfaces of forms and embedded items that have become encrusted with grout or previously placed concrete before placing adjacent concrete.

E. **Casting New Concrete Against Old:** Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), thoroughly clean and roughen the surface of the old concrete by hydro-blasting or sandblasting (exposing aggregate). Coat joint surface with epoxy bonding agent following manufacturer’s written instructions, unless indicated otherwise. Unless noted otherwise, this provision does not apply to vertical wall joints where waterstop is installed.

F. **Protection from Water:** Place no concrete in any structure until water entering the space to be filled with concrete has been properly cut off or diverted and carried out of the forms, clear of the work. Deposit no concrete underwater. Do not allow still water to rise on any concrete until concrete has attained its initial set. Do not allow water to flow over the surface of any concrete in a manner and at a velocity that will damage the surface finish of the concrete. Pumping, dewatering and other necessary operations for removing ground water, if required, are subject to the Owner’s Representative's review.

G. **Corrosion Protection:** Position and support pipe, conduit, dowels and other ferrous items to be embedded in concrete construction prior to placement of concrete so there is at least a 2 inch clearance between them and any part of the concrete reinforcement. Do not secure such items in position by wiring or welding them to the reinforcement.
H. Where practicable, provide for openings for pipes, inserts for pipe hangers and brackets, and setting of anchors during placing of concrete.

I. Accurately set anchor bolts and maintain in position with templates while they are being embedded in concrete.

J. Cleaning: Immediately before concrete is placed, thoroughly clean dirt, grease, grout, mortar, loose scale, rust and other foreign substances from surfaces of metalwork to be in contact with concrete.

3.03 HANDLING, TRANSPORTING AND PLACING CONCRETE

A. Conform to applicable requirements of Chapter 8 of ACI 301 and this Section. Use no aluminum materials in conveying concrete.

B. Rejected Work: Remove concrete found to be defective or non-conforming in materials or workmanship. Replace rejected concrete with concrete meeting requirements of Contract Documents, at no additional cost to the Owner.

C. Unauthorized Placement: Place no concrete except in the presence of the Owner’s Representative. Notify the Owner’s Representative in writing at least 24 hours before placement of concrete.

D. Placement in Wall Forms:
   1. Do not drop concrete through reinforcing steel.
   2. Do not place concrete in any form so as to leave an accumulation of mortar on form surfaces above the concrete.
   3. Pump concrete or use hoppers and, if necessary, vertical ducts of canvas, rubber or metal (other than aluminum) for placing concrete in forms so it reaches the place of final deposit without separation. Free fall of concrete shall not exceed 4 feet below the ends of pump hoses, ducts, chutes or buggies. Uniformly distribute concrete during depositing.
   4. Do not displace concrete in forms more than 6 feet in horizontal direction from place where it was originally deposited.
   5. Deposit in uniform horizontal layers not deeper than 2 feet; take care to avoid inclined layers or inclined construction joints except where required for sloping members.
   6. Place each layer while the previous layer is still soft. Rate of placement shall not exceed 5 feet of vertical rise per hour.
   7. Provide sufficient illumination in form interior so concrete at places of deposit is visible from the deck or runway.
E. Conveyors and Chutes: Design and arrange ends of chutes, hopper gates and other points of concrete discharge in the conveying, hoisting and placing system so concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyors, if used, shall be of a type acceptable to the Owner’s Representative. Do not use chutes longer than 50 feet. Slope chutes so concrete of specified consistency will readily flow. If a conveyor is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyors and chutes shall be covered.

F. Placement of Slabs: In hot or windy weather, conducive to plastic shrinkage cracks, apply evaporation retardant to slab after screeding in accordance with manufacturer's instructions and recommendations. Do not use evaporation retardant to increase water content of the surface cement paste. Place concrete for sloping slabs uniformly from the bottom of the slab to the top, for the full width of the placement. As work progresses, vibrate and carefully work concrete around slab reinforcement. Screed the slab surface in an up-slope direction.

G. When adverse weather conditions affect quality of concrete, postpone concrete placement. Do not mix concrete when the air temperature is at or below 40 degrees F and falling. Concrete may be mixed when temperature is 35 degrees F and rising. Take temperature readings in the shade, away from artificial heat. Protect concrete from temperatures below 32 degrees F until the concrete has cured for a minimum of 3 days at 70 degrees F or 5 days at 50 degrees F.

When concrete temperature is 85 degrees F or above, do not exceed 60 minutes between introduction of cement to the aggregates and discharge. When the weather is such that the concrete temperature would exceed 90 degrees F, employ effective means, such as pre-cooling of aggregates and mixing water, using ice or placing at night, as necessary to maintain concrete temperature, as placed, below 90 degrees F.

H. No placing concrete when temperature is over 3.04

3.04 PUMPING OF CONCRETE

A. If pumped concrete does not produce satisfactory results, in the judgement of the Owner’s Representative, discontinue pumping operations and proceed with the placing of concrete using conventional methods.

B. Pumping Equipment: Use a 2-cylinder pump designed to operate with only one cylinder if one is not functioning, or have a standby pump on site during pumping.

C. The minimum hose (conduit) diameter: Comply with ACI 304.2R.

D. Replace pumping equipment and hoses (conduits) that do not function properly.

E. Do not use aluminum conduits for conveying concrete.

F. Field Control: Take samples for slump, air content and test cylinders at the placement (discharge) end of the line.
3.05 CONCRETE PLACEMENT SEQUENCE

A. Place concrete in a sequence acceptable to the Owner’s Representative. To minimize effects of shrinkage, place concrete in units bounded by construction joints shown. Place alternate units so each unit placed has cured at least 7 days for hydraulic structures, or 3 days for other structures, before contiguous unit or units are placed, except do not place corner sections of vertical walls until the 2 adjacent wall panels have cured at least 14 days for hydraulic structures and 7 days for other structures.

B. Level the concrete surface whenever a run of concrete is stopped. To ensure straight and level joints on the exposed surface of walls, tack a wood strip at least 3/4-inch thick to the forms on these surfaces. Carry concrete about 1/2 inch above the underside of the strip. About one hour after concrete is placed, remove the strip, level irregularities in the edge formed by the strip with a trowel and remove laitance.

3.06 TAMPPING AND VIBRATING

A. Thoroughly settle and compact concrete throughout the entire depth of the layer being consolidated, into a dense, homogeneous mass; fill corners and angles, thoroughly embed reinforcement, eliminate rock pockets and bring only a slight excess of water to the exposed surface of concrete during placement. Use ACI 309R Group 3 immersion-type high-speed power vibrators (8,000 to 12,000 rpm) in sufficient number and with sufficient (at least one) standby units. Use Group 2 vibrators only when accepted by the Owner’s Representative for specific locations.

B. Use care in placing concrete around waterstops. Carefully work concrete by rodding and vibrating to make sure air and rock pockets have been eliminated. Where flat-strip type waterstops are placed horizontally, work concrete under waterstops by hand, making sure air and rock pockets have been eliminated. Give concrete surrounding the waterstops additional vibration beyond that used for adjacent concrete placement to assure complete embedment of waterstops in concrete.

C. Concrete in Walls: Internally vibrate, ram, stir, or work with suitable appliances, tamping bars, shovels or forked tools until concrete completely fills forms or excavations and closes snugly against all surfaces. Do not place subsequent layers of concrete until previously placed layers have been so worked. Provide vibrators in sufficient numbers, with standby units as required, to accomplish the results specified within 15 minutes after concrete of specified consistency is placed in the forms. Keep vibrating heads from contact with form surfaces. Take care not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.07 PLACING MASS CONCRETE

A. Observe the following additional restrictions when placing mass concrete.

1. Use specified superplasticizer.

2. Maximum temperature of concrete when deposited: 70 degrees F.
3. Place in lifts approximately 18 inches thick. Extend vibrator heads into previously placed layer.

3.08 REPAIRING SURFACE DEFECTS AND FINISHING
   A. Conform to Section 03345 - Concrete Finishing.

3.09 CURING
   A. Conform to Section 03370 - Concrete Curing.

3.10 PROTECTION
   A. Protect concrete against damage until final acceptance by the Owner.
   B. Protect fresh concrete from damage due to rain, hail, sleet or snow. Provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.
   C. Do not backfill around concrete structures or subject them to design loadings until all components of the structure needed to resist the loading are complete and have reached the specified 28-day compressive strength, except as authorized otherwise by the Owner’s Representative.

END OF SECTION
SECTION 03311

SEAL SLABS

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Concrete seal slabs.

1.02 PRICES
A. Measurement for seal slabs is incidental to pay item.

1.03 SUBMITTALS
A. Conform to all provisions and sections of these specifications.
B. Submit design mix and test data, prepared by a certified independent testing laboratory employed and paid by the Contractor, for each type and strength of concrete in the project. Include manufacturer's technical information for each type of admixture proposed for use on the project.

PART 2  PRODUCTS

2.01 MATERIALS
A. Concrete: Class B concrete with a minimum compressive strength at 28 days of 1500 psi, conforming to Section 03305 - Concrete for Utility Construction, or 03310 - Structural Concrete.

PART 3  EXECUTION

3.01 PLACEMENT OF SEAL SLABS
A. Place seal slabs at locations indicated on Drawings or as directed by the Owner’s Representative.
B. Excavate trench or other excavation to depth required for pipe or other installation, plus depth of seal slab. Do not over-excavate.
C. Place seal slabs within 4 hours of excavation to final grade.

END OF SECTION
SECTION 03345
CONCRETE FINISHING

PART 1  G E N E R A L

1.01 SECTION INCLUDES

A. Concrete finishing for structures and basins and includes:
   1. Repairing surface defects.
   2. Finishing concrete surfaces including both formed and unformed surfaces.
   4. Installation of concrete fill and installation of concrete topping in bottoms of clarifiers and thickeners.

B. Section does not cover concrete paving finishing as covered in Section 2521 – Concrete Paving.

1.02 UNIT PRICES

A. No separate payment will be made for concrete finishing under this Section. Include payment in unit price for structural concrete.

1.03 SUBMITTALS

A. Conform to all provisions and sections of these specifications.

B. Submit manufacturer's technical literature on the following products proposed for use. Include manufacturer's installation and application instructions and, where specified, manufacturer's certification of conformance to requirements and suitability for use in the applications indicated.
   1. Floor hardener.
   2. Sealer.
   3. Epoxy floor topping.
   4. Epoxy penetrating sealer.
   5. Latex bonding agent.
   7. Abrasive aggregate.
8. Evaporation retardant.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sealer/Dustproofer (VOC Compliant): Water-based acrylic sealer; non-yellowing under ultraviolet light after 200-hour test in accordance with ASTM D4587. Conform to local, state and federal solvent emission requirements.

B. Epoxy Floor Topping: Two-component epoxy resin meeting ASTM C881 Type III, resistant to wear, staining and chemical attack, blended with granite, sand, trap rock or quartz aggregate, trowel-applied over concrete floor. Topping thickness, 1/8 inch; color, gray.

C. Abrasive Aggregate for Non-slip Finish: Fused aluminum oxide grit, or crushed emery aggregate containing not less than 40 percent aluminum oxide and not less than 25 percent ferric oxide. Material shall be factory graded, packaged, rustproof and non-glazing, and unaffected by freezing, moisture and cleaning materials.

D. Epoxy Penetrating Sealer: Low-viscosity, two-component epoxy system designed to give maximum penetration into concrete surfaces. Sealer shall completely seal concrete surfaces from penetration of water, oil and chemicals; prevent dusting and deterioration of concrete surfaces caused by heavy traffic; and be capable of adhering to floor surfaces subject to hydrostatic pressure from below. Color, transparent amber or gray; surface, non-slip.

E. Latex Bonding Agent: Non-redispersable latex base liquid conforming to ASTM C1059. When used in water and wastewater treatment structures, bonding agent shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required.

F. Bonding Grout: Prepare bonding grout by mixing approximately one part cement to one part fine sand meeting ASTM C144 but with 100 percent passing No. 30 mesh sieve. Mix with water to consistency of thick cream. At Contractor's option, a commercially prepared bonding agent used in accordance with manufacturer's recommendations and instructions may be used. When used in water and wastewater treatment structures, bonding agent shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required. Submit manufacturer's technical information on proposed bonding agent.

G. Patching Mortar:

1. Make patching mortar of same materials and of approximately same proportions as concrete, except omit coarse aggregate. Substitute white Portland cement for part of gray Portland cement on exposed concrete in order to match color of surrounding concrete. Determine color by making trial patch. Use minimum amount of mixing water required for handling and placing. Mix patching mortar in advance and allow to stand. Mix frequently...
with trowel until it has reached stiffest consistency that will permit placing. Do not add water.

2. Proprietary compounds for adhesion or specially formulated cementitious repair mortars may be used in lieu of or in addition to foregoing patching materials provided that properties of bond and compressive strength meet or exceed the foregoing and color of surrounding concrete can be matched where required. Use such compounds according to manufacturer's recommendations. When used in water and wastewater treatment structures, material shall be suitable for use under continuously submerged conditions. Conformance and suitability certification by manufacturer is required.

H. Epoxy Adhesive: Two-component, 100 percent solids, 100 percent reactive compound developing 100 percent of strength of concrete, suitable for use on dry or damp surfaces. Epoxy used to inject cracks and as a binder in epoxy mortar shall meet ASTM C881, Type VI. Epoxy used as a bonding agent for fresh concrete shall meet ASTM C881, Type V.

I. Non-shrink Grout: See Section 03600 - Structural Grout.

J. Spray-Applied Coating: Acceptable products are Thoro System Products "Thoroseal Plaster Mix" or equal. Color: Gray.

K. Concrete Topping: Class H concrete with 3/8-inch maximum coarse aggregate size, as specified in Section 03310 - Structural Concrete.

L. Concrete Fill: Class H concrete with 3/8-inch maximum coarse aggregate size, (Class C where fill thickness exceeds 3 inches throughout a placement), as specified in Section 03310 - Structural Concrete.

M. Evaporation Retardant: Confilm, manufactured by Master Builders; Eucobar, manufactured by Euclid Chemical Company; or equal.

PART 3 EXECUTION

3.01 AGGREGATE CONCEALMENT

A. Unless indicated otherwise on Drawings or approved by the Owner’s Representative, all surfaces to be finished shall be free of exposed aggregate.

3.02 REPAIRING SURFACE DEFECTS

A. Defective Areas: Repair immediately after removal of forms and obtaining approval by the Owner’s Representative. Remove honeycombed and other defective concrete down to sound concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to concrete surface. Thoroughly work bonding grout into the surface with a brush as that the entire surface is covered. Alternatively, a proprietary bonding agent may be used. Use bonding agent in accordance with manufacturer's instructions. While bonding coat is still tacky, apply premixed patching mortar.
Thoroughly consolidate mortar into place and strike off to leave patch slightly higher than surrounding surface. To permit initial shrinkage, leave undisturbed for at least 1 hour before final finishing. Keep patched area damp for 7 days. Alternatively, a proprietary cementitious repair mortar may be used and placed in accordance with manufacturer's instructions. Do not use metal tools in finishing patches in formed walls which will be exposed.

B. Tie Holes: Patch holes immediately after removal of forms. After cleaning and roughening with a wire brush on a rotary drill, thoroughly dampen tie hole and fill solid with patching mortar. Taper tie holes shall have the plug, specified in 03100 - Concrete Formwork, driven into the hole to the center of the wall before grouting. Completely fill taper tie holes with patching mortar except that non-shrink grout shall be used for all walls in contact with soil or liquid. On wall faces exposed to view, fill the outer 2 inches of the taper tie hole with patching mortar blended to match adjacent concrete.

C. Cracks: Repair cracks in excess of 0.01 inch by pressure injection of moisture-insensitive epoxy-resin system. Submit proposed material and method of repair for approval by Owner’s Representative prior to making repairs.

D. Structural Repair: When required, make structural repairs after prior approval of the Owner’s Representative as to method and procedure, using specified epoxy adhesive or approved epoxy mortar.

3.03 FINISHING OF FORMED SURFACES

A. Unfinished Surfaces: Finish is not required on surfaces concealed from view in completed structure by earth, ceilings or similar cover, unless indicated otherwise on Drawings.

B. Rough Form Finish:

1. No form facing material is required on rough form finish surfaces.


3. Rough form finish may be used on concrete surfaces which will be concealed from view by earth in completed structure, except concealed surfaces required to have smooth form finish, as shown on Drawings.

C. Smooth Form Finish:

1. Form facing shall produce smooth, hard, uniform texture on concrete. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.

2. Patch tie holes and defects. Rub fins and joint marks with wooden blocks to leave smooth, unmarred finished surface.
3. Provide smooth form finish on the wet face of formed surfaces of water-holding structures, and of other formed surfaces not concealed from view by earth in completed structure, except where otherwise indicated on Drawings. Walls that will be exposed after future construction, at locations indicated on Drawings, shall have smooth form finish. Smooth form finish on exterior face of exterior walls shall extend 2 feet below final top of ground elevation. Exterior face of all perimeter grade beams shall have smooth form finish for full depth of grade beam.

D. Rubbed Finish:

1. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.

2. Remove forms as soon as practicable, repair defects, wet surfaces, and rub with No. 16 carborundum stone or similar abrasive. Continue rubbing sufficiently to bring surface paste, remove form marks and fins, and produce smooth, dense surface of uniform color and texture. Do not use cement paste other than that drawn from concrete itself. Spread paste uniformly over surface with brush. Allow paste to reset, then wash surface with clean water.

3. Use rubbed finish at locations indicated on Drawings, except where rubbed finish is indicated for a wall which will be containing a liquid, use spray-applied coating.

E. Spray-applied Coating: At Contractor's option, in lieu of rubbed finish, spray-applied coating may be applied after defects have been repaired and fins removed. Remove form oil, curing compound and other foreign matter that would prevent bonding of coating. Apply coating in uniform texture and color in accordance with coating manufacturer's instructions.

F. Related Unformed Surfaces: Tops of piers, walls, bent caps, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed. Float unformed surfaces to texture reasonably consistent with that of formed surfaces. Continue final treatment on formed surfaces uniformly across unformed surfaces.

G. Provide color and finish uniformity to be determined by the Owner’s Representative.

H. Color of concrete pours should be consistent. If not consistent, Contractor shall submit plan for remedying the inconsistency.

3.04 HOT WEATHER FINISHING

A. When hot weather conditions exist, as defined by Section 03310 - Structural Concrete and as judged by the Owner’s Representative, apply evaporation retardant to the surfaces of slabs, topping and concrete fill placements immediately after each step in the finishing process has been completed.
3.05 FINISHING SLABS AND SIMILAR FLAT SURFACES TO CLASS A, B AND C TOLERANCES

A. Apply Class A, B and C finishes at locations indicated on Drawings.

B. Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. See Section 03100 - Concrete Formwork for edge forms and screeds.

C. Consolidation and Leveling: Concrete to be consolidated shall be as stiff as practicable. Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not permit manipulation of surfaces prior to finishing operations.

D. Tolerances for Finished Surfaces: Check tolerances by placing straightedge of specified length anywhere on slab. Gap between slab and straightedge shall not exceed tolerance listed for specified class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Straightedge Length in Feet</th>
<th>Tolerance in Inches</th>
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<tbody>
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<td>A</td>
<td>10</td>
<td>1/8</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>1/4</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>1/4</td>
</tr>
</tbody>
</table>

E. Raked Finish: After concrete has been placed, struck off, consolidated and leveled to Class C tolerance, roughen surface before final set. Roughen with stiff brushes or rakes to depth of approximately 1/4 inch. Notify the Owner’s Representative prior to placing concrete requiring initial raked surface finish so that acceptable raked finish standard may be established for project. Protect raked, base-slab finish from contamination until time of topping. Provide raked finish for following:

1. Surfaces to receive bonded concrete topping or fill.
2. Steep ramps, as noted on Drawings.
3. Additional locations as noted on Drawings.

F. Float Finish:

1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.
2.  After initial floating, re-check tolerance of surface with 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots to Class B tolerance. Immediately re-float slab to a uniform, smooth, granular texture.

3.  Provide float finish at locations not otherwise specified and not otherwise indicated on Drawings.

G.  Trowel Finish:

1.  Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional troweling by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.

2.  Produce finished surface free of trowel marks, uniform in texture and appearance and conforming to Class A tolerance. On surfaces intended to support floor coverings, remove defects which might show through covering by grinding.

3.  Provide trowel finish for floors which will receive floor covering and additional locations indicated on Drawings.

H.  Broom or Belt Finish:

1.  Apply float finish as previously specified. Immediately after completing floated finish, draw broom or burlap belt across surface to give coarse transverse scored texture.

2.  Provide broom or belt finish at locations indicated on Drawings.

3.06  FINISHING SLABS AND SIMILAR FLAT SURFACES TO "F-NUMBER SYSTEM" FINISH

A.  Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. Edge forms and screeds: Conform to Section 03100 - Concrete Formwork.

B.  Consolidation and Leveling: Concrete to be consolidated shall be as dry as practicable. Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not manipulate surfaces prior to finishing operations.

C.  Tolerances for Finished Surfaces: Owner’s Representative may check floor flatness and levelness in accordance with Paragraph 3.12, Field Quality Control.
D. Float Finish:

1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.

2. Check tolerance of surface after initial floating with a 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots. Immediately refloat slab to uniform, smooth, granular texture to \( F_{20}/F_{17} \) tolerance, unless shown otherwise on Drawings.

3. Provide "F-Number System" float finish at locations indicated on Drawings.

E. Trowel Finish:

1. Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional trowelings by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.

2. Produce finished surface free of trowel marks, uniform in texture and appearance and conforming to an \( F_{25}/F_{20} \) tolerance for slabs on grade and \( F_{25}/F_{17} \) for elevated slabs, unless shown otherwise on Drawings. On surfaces intended to support floor coverings, remove defects, which might show through covering, by grinding.

3. Provide "F-Number System" trowel finish at locations indicated on Drawings.

3.07 BONDED CONCRETE TOPPING AND FILL

A. Surface Preparation:

1. Protect raked, base-slab finish from contamination until time of topping. Mechanically remove oil, grease, asphalt, paint, clay stains or other contaminants, leaving clean surface.

2. Prior to placement of topping or fill, thoroughly dampen roughened slab surface and leave free of standing water. Immediately before topping or fill is placed, scrub coat of bonding grout into surface. Do not allow grout to set or dry before topping or fill is placed.

B. Concrete Fill:
1. Where concrete fill intersects a wall surface at an angle steeper than 45 degrees from vertical, provide a 1.5-inch deep keyway in the wall at the point of intersection; size keyway so that no portion of the concrete fill is less than 1.5 inches thick. Form keyway in new walls; create by saw cutting the top and bottom lines and-chipping in existing walls.

2. Apply wood float finish to surfaces of concrete fill.

3. Provide concrete fill at locations shown on Drawings.

C. Bonded Concrete Topping in Bottom of Clarifiers and Thickeners:

1. Minimum thickness of concrete topping: 1 inch. Maximum thickness when swept in by clarifier and thickener equipment: 3 inches.

2. Compact topping and fill by rolling or tamping, bring to established grade, and float. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. Coat surface with evaporation retardant as needed between finishing operations to prevent plastic shrinkage cracks.

3. Screed topping to true surface using installed equipment. Protect equipment from damage during sweeping-in process. Perform sweeping-in process under supervision of equipment manufacturer’s factory representative. After topping has been screeded, apply wood float finish. During finishing, do not apply water, dry cement or mixture of dry cement and sand to the surface.

4. As soon as topping or fill finishing is completed, coat surface with curing compound. After the topping is set and sufficiently hard in clarifiers and where required by the Owner’s Representative, fill the tank with sufficient water to cover the entire floor for 14 days.

5. Provide bonded concrete topping in bottom of all clarifiers and thickeners.

3.08 EPOXY PENETRATING SEALER

A. Surfaces to receive epoxy penetrating sealer: Apply wood float finish. Clean surface and apply sealer in compliance with manufacturer’s instructions.

B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: Apply minimum 2-inch-high coverage of floor coating on vertical surface.

C. Mask walls, doors, frames and similar surface to prevent floor coating contact.

D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.

E. Provide epoxy-penetrating sealer at locations indicated on Drawings.
3.09 EPOXY FLOOR TOPPING

A. Surfaces to receive epoxy floor topping: Apply wood float finish unless recommended otherwise by epoxy floor topping manufacturer. Clean surface and apply epoxy floor topping in compliance with manufacturer's recommendations and instructions. Thickness of topping: 1/8 inch.

B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: apply 2-inch-high coverage of floor coating on vertical surface.

C. Mask walls, doors, frames and similar surfaces to prevent floor coating contact.

D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.

E. Finished surface shall be free of trowel marks and dimples.

F. Provide epoxy floor topping at locations indicated on Drawings.

3.10 SEALER/DUSTPROOFER

A. Where sealer or sealer/dustproofer is indicated on Drawings, just prior to completion of construction, apply coat of specified clear sealer/dustproofing compound to exposed interior concrete floors in accordance with manufacturer's instructions.

3.11 NONSLIP FINISH

A. Apply float finish as specified. Apply two-thirds of required abrasive aggregate by method that ensures even coverage without segregation and re-float. Apply remainder of abrasive aggregate at right angles to first application, using heavier application of aggregate in areas not sufficiently covered by first application. Re-float after second application of aggregate and complete operations with troweled finish. Perform finishing operations in a manner that will allow the abrasive aggregate to be exposed and not covered with cement paste.

B. Provide non-slip finish at locations indicated on Drawings.

3.12 FIELD QUALITY CONTROL

A. Flatness and levelness of slabs and similar flat surfaces that are indicated on Drawings to receive "F-Number System" finish will be checked by independent testing laboratory employed by Owner in accordance with Section 01410 - Testing Laboratory Services.

B. Tolerances for "F-Number System" finished surfaces:

1. Floor tolerance shall be determined in accordance with ASTM E1155.
2. Floor flatness and levelness tolerances:
   a. $F_F$ defines maximum floor curvature allowed over 24 inches. Computed on the basis of successive 12-inch elevation differentials, $F_F$ is commonly referred to as the "flatness F-Number."

   $\frac{4.57}{F_F} = \text{Maximum difference in elevation, in decimal inches, between successive 12" elevation differences.}$

   b. $F_L$ defines relative conformity of floor surface to horizontal plane as measured over 10-foot distance. $F_L$ is commonly referred to as "levelness F-number."

   $\frac{12.5}{F_L} = \text{Maximum difference in elevation, in inches, between two points separated by 10 feet.}$

3. Achieve specified overall slab tolerance. Minimum local tolerance (1/2 bay, unless otherwise designated by the Owner’s Representative): 2/3 of specified tolerance.

4. Tolerance for floated finish: $F_F20/F_L17$, unless otherwise shown on Drawings.

5. Tolerance for troweled finish: $F_F25/F_L20$ for slabs on grade, and $F_F25/F_L17$ for elevated slabs, unless otherwise shown on Drawings.

3.13 CURING

A. Conform to requirements of Section 03370 - Curing Concrete.

END OF SECTION
SECTION 03370

CONCRETE CURING

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A.  Curing of structural concrete.

1.02  UNIT PRICES

A.  No separate payment will be made for concrete curing under this Section. Include payment in unit price for structural concrete.

1.03  DEFINITIONS

A.  Mass Concrete: Concrete sections 4 feet or more in least dimension.

1.04  SUBMITTALS

A.  Conform to all provisions and sections of these specifications.

B.  Product Data: Submit description of proposed curing method for concrete. When use of membrane-forming compound is proposed, submit manufacturer’s technical information including material specifications, installation instructions and recommendations, and evidence that compound is satisfactory for intended application. State locations where curing compound will be used.

C.  When membrane-forming compounds are to be used, submit certification by the manufacturer of compliance with specified requirements and compatibility with toppings, coatings, finishes, and adhesives to be applied.

PART 2  P R O D U C T S

2.01  MATERIALS

A.  Membrane-forming Curing Compound: Conform to ASTM C309, Type 1D, and following requirements.

1.  Minimum solids content: 30 percent.

2.  Compound shall not permanently discolor concrete. When used for liquid-containing structures, curing compound shall be white-pigmented.

3.  When used in areas that are to be coated, or that will receive topping or floor covering, material shall not reduce bond of coating, topping, or floor covering
to concrete. Curing compound manufacturer's technical information shall state conditions under which compound will not prevent bond.

4. Conform to local, state and federal solvent emission requirements.

B. Clear Curing and Sealing Compound (VOC Compliant): Conform to ASTM C309, Type 1, Class B, and the following requirements: 30 percent solids content minimum; non-yellowing under ultraviolet light after 500-hour test in accordance with ASTM D4587. Sodium silicate compounds are not permitted. Conform to local, state and federal solvent emission requirements.

C. Sheet Material for Curing Concrete: ASTM C171; waterproof paper, polyethylene film or white burlap-polyethylene sheeting.

D. Curing Mats (for use in Curing Method 2): Heavy shag rugs or carpets, or cotton mats quilted at 4 inches on center; 12 ounce per square yard minimum weight when dry.

E. Water for curing: Clean and potable.

PART 3 EXECUTION

3.01 CURING PROCEDURES

A. Comply with ACI 308 and the requirements specified herein. Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures. Maintain minimal moisture loss and relatively constant temperature during time necessary for hydration of cement and proper hardening of concrete.

B. Unformed Surfaces: For concrete surfaces not in contact with forms, use one of following procedures immediately after completion of placement and finishing.

1. Ponding or continuous sprinkling.

2. Absorptive mat or fabric kept continuously wet.

3. Sand or other covering kept continuously wet.

4. Continuous steam bath (not exceeding 150 degrees F at surface of concrete).

5. Vapor mist bath.

6. Membrane-forming curing compound applied according to manufacturer's recommendations. After the curing compound has dried, wet slab surfaces and cover with waterproof paper, polyethylene film, or white burlap-polyethylene sheeting after the application of the curing compound. Tape sheet seams together and provide sufficient weights to keep the sheeting in
place. Wet the slab surface again if the sheeting becomes dislodged, and replace the sheeting.

7. Other moisture-retaining coverings as approved by the Owner’s Representative.

C. Restrictions on Use of Curing Compounds: Unless curing compound manufacturer certifies that curing compound will not prevent bond to cured surface, do not use curing compound on surfaces that will be rubbed or receive additional concrete, mortar, topping, terrazzo or other cementitious finishing materials, on slabs under resilient floors or built-up roofing, or on surfaces to be waterproofed, sealed, hardened or painted.

D. Curing and Sealing Compounds: At locations indicated, cure exposed interior slabs and troweled slabs receiving mastic-applied adhesives with specified clear curing and sealing compound in accordance with manufacturer’s recommendations. Do not store materials directly on curing membranes. Use plywood to protect curing membrane from damage. Immediately repair membranes damaged by foot traffic or other operations.

E. Duration of Curing: Continue curing until cumulative number of days or fractions of days during which ambient temperature is above 50 degrees F has totaled 7. Continue curing of water-retaining structures for a total of 14 days. When high-early-strength concrete has been used, continue curing for total of 3 days. Prevent rapid drying at end of curing period.

F. Formed Surfaces: During the curing period keep wet steel forms heated by sun and wood forms in contact with concrete. When forms are to be removed during curing period, employ curing materials or methods immediately. Continue such curing for remainder of curing period.

G. Temperature:

1. Cold Weather: When mean daily temperature of atmosphere is less than 40 degrees F, maintain temperature of concrete between 50 and 70 degrees F for required curing period. When necessary, make arrangements for heating, covering, insulating or housing concrete work in advance of placement to maintain required temperature and moisture conditions. Prevent damage or injury due to concentration of heat. When combustion heaters are necessary in enclosed or protected area where concrete slabs are being placed, vent heaters.

2. Hot Weather: In advance of placement make arrangements for shading, fog spraying, sprinkling, ponding or installation of windbreaks or wet covering of light color. Take such protective measures as quickly as concrete hardening and finishing operations will allow.
3. Temperature Changes: Control so rate of change in temperature of concrete is as uniform as possible. Do not permit temperature change to exceed 5 degrees F in any one hour or 50 degrees F in any 24-hour period.

H. Protection from Mechanical Injury: During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water. Do not load self-supporting structures in a way that over stresses concrete.

3.02 CURING MASS CONCRETE

A. Observe the following additional restrictions when curing mass concrete.

1. Minimum curing period: 2 weeks.

2. When ambient air temperature falls below 32 degrees F, protect surface of concrete against freezing.

3. Do not use steam or other curing methods that will add heat to concrete.

4. Keep forms and exposed concrete continuously wet for at least the first 48 hours after placing, and whenever surrounding air temperature is above 90 degrees F during final curing period.

5. During 2-week curing period, provide necessary controls to prevent ambient air temperature immediately adjacent to concrete from falling more than 30 degrees F in 24 hours.

END OF SECTION
SECTION 03411

STRUCTURAL PRECAST CONCRETE

PART 1  G E N E R A L

1.01  SECTION INCLUDES

A. Precast concrete for wet wells, junction structures, valve vaults, and meter vaults as shown on the Drawings. Also includes supporting and connecting devices necessary for proper installation and embedded items shown on the Drawings.

1.02  DESIGN REQUIREMENTS

A. Design structural precast concrete members in accordance with ACI 350R.

B. For members exposed to weather, design for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic, day/night temperature ranges.

C. Design system to accommodate construction tolerances, deflection of other building structural members, and clearances of intended openings.

1.03  SUBMITTALS

A. Conform to all provisions and sections of these specifications.

B. Shop Drawings: Indicate layout, unit locations, fabrication details, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials and design calculations signed and sealed by a Professional Structural Engineer licensed in the State of Texas.

1.04  QUALITY ASSURANCE

A. Perform work in accordance with the requirements of PCI MNL-116 and ACI 301.

1.05  QUALIFICATIONS

A. Fabricator: Company specializing in manufacturing precast concrete components with minimum 5 years documented experience.

B. Erector: Company specializing in erecting precast concrete components with 5 years documented experience and approved by manufacturer.

C. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS 1.4.

03411-1
D. Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of structural precast concrete components and licensed in the State of Texas.

1.06 REGULATORY REQUIREMENTS

A. Conform to ACI 318 and ACI 350R for design load and construction requirements applicable to work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store, protect, and handle products at the site under provisions of Section 01500 - Temporary Facilities and Controls.

B. Handle precast members in position consistent with their shape and design. Lift and support only from support points.

C. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.

D. Protect members to prevent staining, chipping, or spalling of concrete.

E. Mark each member with date of production and final position in structure.

PART 2 PRODUCTS

2.01 CEMENT, GRAY PORTLAND, CONFORMING TO ASTM C 150 TYPE II.

A. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116 and Section 03310 - Structural Concrete.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615 Grade 60, deformed steel bars.

B. Welded Steel Wire Fabric: ASTM A 497 Welded Deformed Type; in flat sheets; unfinished.

2.03 ACCESSORIES

A. Connecting and Supporting Devices: ASTM A 666 stainless steel plates, angles, items cast into concrete.

B. Grout: Non-shrink, non-metallic, minimum compressive strength of 7000 psi at 28 days conforming to Section 03600 - Structural Grout.
2.04 FABRICATION
   A. Fabrication procedure to conform to PCI MNL-116 and ACI 318.
   B. Maintain plant records and quality control program during production of precast members. Make records available upon request.
   C. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.
   D. Provide required openings with a dimension larger than 10 inches and embed accessories, provided by other Sections, at indicated locations.

2.05 FINISHES
   A. Finish members to PCI MNL-116 Commercial Finish A grade.

2.06 FABRICATION TOLERANCES
   A. Conform to PCI MNL-116.
   B. Maximum Out-of-Square: 1/8 inch/10 feet, non-cumulative.
   C. Maximum Out of-Round: 1/8 inch/10 feet diameter, non-cumulative.
   D. Maximum Misalignment of Anchors, Inserts, Openings: 1/8 inch.

2.07 SOURCE QUALITY CONTROL AND TESTS
   A. Test samples in accordance with applicable ASTM standard and as required by Section 03310 - Structural Concrete.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that site conditions are ready to receive work and field measurements are as shown as on shop drawings.

3.02 PREPARATION
   A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.
   B. Prepare a means of protection of PVC liner and embeds from damage during construction, transportation, and erection.

3.03 ERECTION
A. Erect members without damage to structural capacity, shape or finish. Replace or repair damaged members.

B. Align and maintain uniform horizontal and vertical joints, as erection progresses.

C. Provide continuous resilient waterstop or ASTM C 443 rubber gasket to obtain watertight joint between precast units.

D. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.

E. Grout joints between precast units before caisson sinking proceeds.

F. Secure units in place with connection plates before caisson sinking proceeds.

G. Perform welding in accordance with AWS D1.1.

3.04 ERECTION TOLERANCES

A. Erect members level and plumb within allowable tolerances.

B. Conform to PCI MNL-116.

3.05 PROTECTION

A. Protect members from damage caused by field welding or erection operations.

B. Provide non-combustible shields during welding operations.

3.06 CLEANING

A. Clean weld marks, dirt, or blemishes from surface of exposed members.

END OF SECTION
SECTION 03600

STRUCTURAL GROUT

PART 1  GENERAL

1.01  SECTION INCLUDES

A.  Non-shrink grout used wherever grout is shown in the Documents, unless another type is specifically referenced. Two classes of non-shrink grout (Class I and II) and areas of application are specified.

1.02  UNIT PRICES

A.  Include the cost for grout in the lump sum for each structure in which it will be used. No separate payment will be made for grout.

B.  Measurement for extra grout (Class I and II) is on cubic foot basis. Payment includes associated work performed in accordance with related sections included in the Contract Documents.

1.03  SUBMITTALS

A.  Conform to all provisions and sections of these specifications.

B.  Quality Control:

   1.  The Contractor shall submit manufacturer's literature certifying compliance with the specified properties for Class I and II grouts.

   2.  The Contractor shall submit manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

C.  The Contractor shall submit manufacturer's written warranty as specified.

1.04  QUALITY ASSURANCE

A.  Field Tests:

   1.  Compression test specimens will be taken during construction from the first placement of each type of grout, and at intervals thereafter as selected by the Owner’s Representative to ensure continued compliance with these Specifications. The specimens will be made by the Owner’s Representative or its representative.

   2.  Compression tests and fabrication of specimens for non-shrink grout will be performed as specified in ASTM C109 at intervals during construction as
selected by the Owner’s Representative. A set of three specimens will be made for testing at 7 days, 28 days, and each additional time period as appropriate.

3. Grout already placed which fails to meet the requirements of these Specifications is subject to removal and replacement no additional cost to the Owner.

4. The cost of laboratory tests on grout will be borne by the Owner, but the Contractor shall assist the Owner’s Representative obtaining specimens for testing. However, the Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the Specifications. The Contractor shall supply materials necessary for fabricating the test specimens.

B. Warranty:

1. Provide 1-year warranty for work provided under this Section.

2. Manufacturer's warranty shall not contain a disclaimer limiting responsibility to only the purchase price of products or materials furnished.

3. Manufacturer shall warrant participation with Contractor in replacing or repairing grout found to be defective due to faulty materials, as determined by industry standard test methods.

PART 2 PRODUCTS

2.01 APPLICATION

A. The following is a listing of typical applications and the corresponding type of grout which is to be used. Unless indicated otherwise, grouts shall be provided as listed below whether or not called for on the Drawings.

<table>
<thead>
<tr>
<th>Application:</th>
<th>Type of Grout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural member base plates</td>
<td>Non-shrink Class II</td>
</tr>
<tr>
<td>Storage tanks and other equipment</td>
<td>Non-shrink Class I</td>
</tr>
<tr>
<td>Filling blockout spaces for</td>
<td>Non-shrink Class II (Class I where placement time exceeds 15 minutes)</td>
</tr>
<tr>
<td>embedded items such as railing</td>
<td></td>
</tr>
<tr>
<td>posts, gate guide frames, etc.</td>
<td></td>
</tr>
<tr>
<td>Under precast concrete elements</td>
<td>Non-shrink Class I</td>
</tr>
</tbody>
</table>
Toppings and concrete fill less than 3 inches thick
Concrete Topping per Section 03310 and Section 03345

Toppings and concrete fill greater than 3 inches thick
Concrete Fill per Section 03310 and Section 03345

Any application not listed above, where grout is called for on the Drawing.
Non-shrink Class I, unless noted otherwise

2.02 PREPACKAGED GROUTS

A. Basic Requirements for Cementitious Non-Shrink Grout

1. Provide prepackaged non-shrink grout that is inorganic, flowable, non-gas-liberating, non-metallic, and cement-based, requiring only the addition of water.

2. Deliver grout in original packaging with manufacturer's instructions printed on each container.

3. Select the specific formulation for each class of non-shrink grout specified to conform to that recommended by the manufacturer for the particular application.

4. Compressive strength at 28 days: 7000 psi minimum.

5. Do not use a grout for which the non-shrink property is based on a chemically generated gas or gypsum expansion.

B. Class I Non-Shrink Grout:

1. Supply Class I Grout conforming to these specifications and to CRD-C621 and ASTM C1107 Grade C and B (as modified below) when tested using the amount of water needed to achieve the following properties:

   a. Fluid consistency (20 to 30 seconds) per CRD-C611 at initial testing.

   b. Fluid consistency (45 seconds) per CRD-C611 at 30 minutes after mixing.

   c. At temperatures of 45, 73.4, and 95 degrees F.
2. To satisfy non-shrink requirements, the length change from placement to time of final set shall not have a shrinkage greater than the amount of expansion measured after final set at 3 and 14 days. The expansion at 3 and 14 days shall not exceed the 28-day expansion.

3. Fluid grout shall pass through the flow cone, with a continuous flow, 1 hour after mixing.

4. Demonstrate in tests that grout maintains contact with the base plate to provide an minimum effective bearing area of 95 percent of the gross contact area after final set.

5. The grout packaging shall list weight, maximum amount of mixing water to be used, maximum usable working time (pot life) at flowable consistency, and temperature restrictions for preparation and placement within which grout will meet specified requirements.

C. Class II Non-Shrink Grout:

1. Supply Class II Grout confirming to ASTM C1107 and the following requirements when tested using the amount of water needed to achieve the following properties:
   
   a. Flowable consistency: 140 percent flow on ASTM C230, five drops in 30 seconds.
   
   b. Fluid working time: 15 minutes, minimum.
   
   c. Flowable duration: 30 minutes, minimum.

2. When tested, the grout shall not bleed at maximum allowed water.

2.03 CURING MATERIALS

A. Curing materials: As specified in Section 03370 - Concrete Curing and as recommended by the manufacturer of prepackaged grouts.

2.04 CONSISTENCY

A. Mix grouts to the consistency necessary to completely fill the space to be grouted. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

PART 3 EXECUTION

3.01 PREPARATION
A. Verify that base concrete or masonry has attained design strength before grout is placed.

B. When cementitious grouts are used on concrete surfaces, saturate the concrete surface with water for 24 hours prior to placement of cement-based grout. Upon completion of saturation period remove excess water prior to grouting.

3.02 GROUTING PROCEDURES

A. Prepackaged Grouts: Perform mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts according to the written instructions of the manufacturer. Use prepackaged materials in the quantities and proportions as directed by the manufacturer unless there is certified test data verifying that the specified properties are attained by modified mix.

3.03 CONSOLIDATION

A. Place grout in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

END OF SECTION
SECTION 03700

CONCRETE REPAIR AND REHABILITATION

PART 1  G E N E R A L

1.01 SECTION INCLUDES

A. Repair of cracks, holes and surface defects, and repair of deteriorated concrete surfaces.

B. Installation of embedded items into existing concrete.

1.02 UNIT PRICES

A. Measurement for repair materials is on a lump-sum basis for each structure as bid. Payment includes work performed on these structures in accordance with related sections included in the Contract Documents.

B. Measurement for extra removal of deteriorated concrete and placement of repair mortar is on a cubic-foot basis. Measurement for other repair materials is as defined in the appropriate related sections. Payment includes associated work performed in accordance with related sections included in the Contract Documents.

1.03 SUBMITTALS

A. Submittals shall conform to all provisions and sections of these specifications. Submit manufacturer's product information, installation instructions and recommendations, and certification of compliance with required properties for all repair materials.

1.04 REPAIR SCOPE

A. Patch and fill openings in existing concrete indicated to be patched or filled.

B. Patch, fill holes in and otherwise repair damage to concrete and concrete surfaces resulting from removal of penetrating pipes and other embedded items, from installation of pipes or other items embedded in or passed through concrete, and from other construction activities.

C. Crack Repair: Repair the full length of cracks in concrete members in new structures, and in existing structures as follows:

D. Deteriorated Concrete:

1. Repair interior concrete surfaces showing signs of deterioration in the following existing structures:
2. The level of deterioration of the concrete varies within each of the listed structures.

1.05 QUALITY ASSURANCE

A. Field Tests of Cement-based Grouts:
   1. Compression test specimens will be prepared during construction by the Owner’s Representative, or Owner’s Representative's authorized representative, from the first placement of each type of mortar or grout, and at intervals thereafter as determined by the Owner’s Representative, to ensure continued compliance with these specifications.
   2. Specimen preparation and compression testing for repair mortar and non-shrink grout will be performed as specified in ASTM C109. A set of three specimens will be made for testing at 7 days, 28 days, and additional testing as appropriate.
   3. Material failing to meet Contract requirements is subject to removal, and replacement with new material meeting requirements, at no additional cost to the Owner.
   4. Cost of laboratory tests on mortar and grout will be borne by the Owner, except Contractor shall pay for tests failed, and additional testing and investigation work performed because of work not meeting Contract requirements.
   5. Contractor shall supply all materials necessary for fabricating test specimens and assist the Owner’s Representative in obtaining specimens for testing.

B. Repair concrete shall be tested as required in Section 03310 - Structural Concrete.

C. Epoxy grout shall be tested as required in Section 03600 - Structural Grout.

D. Chemical Grout:
   1. Installer: A waterproofing contractor with a minimum of 3 years experience in the installation of chemical grout systems as specified herein, and shall be certified or approved by the manufacturer.
   2. Waterproofing contractor shall submit a list of 5 previous jobs successfully completed by that firm that successfully utilized the specified chemical grout system.

E. Construction Tolerances: As specified in Section 03100 - Concrete Formwork, and Section 03345 - Concrete Finishing, except as otherwise indicated.

PART 2 PRODUCTS
2.01 REPAIR MORTAR

A. Repair Mortar: Prepackaged polymer-modified cement-based product specifically formulated for repair of surface defects in concrete, having the following properties:

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Minimum Value</th>
<th>ASTM Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive Strength</td>
<td></td>
<td>C109</td>
</tr>
<tr>
<td>1 day</td>
<td>2000 psi</td>
<td></td>
</tr>
<tr>
<td>28 days</td>
<td>6000 psi</td>
<td></td>
</tr>
<tr>
<td>Bond Strength</td>
<td></td>
<td>C882 (modified)</td>
</tr>
<tr>
<td>1 day</td>
<td>1200 psi</td>
<td></td>
</tr>
<tr>
<td>7 days</td>
<td>2000 psi</td>
<td></td>
</tr>
</tbody>
</table>

B. Manufacturer and Product: Emaco by Master Builders, SR93 by Euclid Chemical Company, Sikacem by Sika Corporation, Five Star Structural Concrete by Five Star Products, Inc., or equal. Where the manufacturer offers products in formulations intended for specific application conditions such as overhead and shotcrete application, use the formulation recommended by the manufacturer for the condition required.

C. Minimum Repair Thickness: 0.50 inch.

2.02 NON-SHRINK GROUT

A. Non-shrink Grout: Comply with requirements of Section 03600 - Structural Grout.

2.03 CONCRETE MATERIALS

A. Cement: Type II portland cement, unless indicated otherwise. Where repairs are made on wall surfaces exposed to view and above normal water surface elevation, blend white Portland cement with Type II cement as needed to match the color of adjacent existing concrete surface.

B. Repair Concrete: Class A (4000 psi), (unless specified otherwise) concrete with one-inch maximum coarse aggregate, complying with Section 03310 - Structural Concrete; minimum repair thickness, 2 inches.
C. Cement Grout: Comply with Section 03600 - Structural Grout; minimum repair thickness, one inch.

D. Curing Materials, Bonding Agents and other Miscellaneous Materials: Comply with Section 03310 - Structural Concrete and Section 03370 - Concrete Curing.

2.04 AGGREGATE

A. Aggregate for Extending Repair Mortar and Non-shrink Grout Products: 3/8 inch clean, washed gravel or crushed stone complying with Section 03310 - Structural Concrete.

2.05 CHEMICAL GROUT

A. Chemical Grout: Hydrophobic urethane or polyurethane material of low viscosity suitable for pumped injection into cracks, which reacts with water to form a closed-cell foam material that completely fills and seals all cracks against leakage. Cured material shall remain elastic and maintain an expansive pressure through repeated wet-dry cycles.

B. Manufacturer and Product: Scotch Seal 5600 by the Adhesives, Coatings, and Sealers Division of 3M Products; Flex LV by De Neef America, Inc.; SikaFix by Sika Corporation; or equal. Use different formulations in the same family of materials, accelerators, and other materials necessary for installation where recommended by the manufacturer for specific application conditions.

C. Reacted and cured chemical grout shall be resistant to organic solvents, mild acids, alkali and microorganisms. Cured material shall be approved for use with potable water by the appropriate federal, state or local government agency.

2.06 EPOXY PRODUCTS

A. Epoxy Grout: Comply with Section 03600 - Structural Grout, modified as specified herein.

B. Epoxy for Crack Injection: ASTM C881, Type IV; low viscosity, moisture-insensitive material specifically formulated for that use; 2500 psi minimum bond strength when tested in accordance with ASTM C882 at 14 days, moist cured.

2.07 SEALANT

A. Sealant: 2-part polyurethane complying with Section 03250 - Joints in Concrete Structures.

2.08 FORMWORK

A. Formwork, Where Needed: Comply with Section 03100 - Concrete Formwork.
2.09 REINFORCEMENT
   A. Reinforcement, Where Required: Comply with Section 03210 - Reinforcing Steel.

2.10 SILENT WATERSTOP
   A. Resilient Waterstop: Comply with Section 03250 - Joints in Concrete Structures.

PART 3 EXECUTION

3.01 PREPARATION AND CURING
   A. Where repairs are made on wall surfaces exposed to view and above normal water surface elevation, installed repair material shall match adjacent concrete surface in color.

   B. Surface Preparation:
      1. Clean entire area to be repaired of laitance, foreign material and loose or deteriorated concrete by chipping, hydroblasting or sandblasting; further roughen surfaces as specified herein. Where non-shrink grout or repair mortar is used, perform any additional surface preparation steps recommended by the manufacturer.

      2. Where cementitious repair materials are used, maintain surfaces to be repaired in a saturated surface dry condition and prevent concrete from drying until repair operations are completed. Re-wet surfaces to be repaired by water spray on at least a daily basis. Remove standing water in areas to be repaired prior to placement of repair material. Provide means to remove excess water from the structure.

      3. Where repair material manufacturer recommends use of an epoxy-bonding agent, follow recommendations of both the repair material and epoxy bonding agent manufacturers.

   C. Fully consolidate repair material, completely filling all portions of areas to be filled.

   D. Bring repair surfaces into alignment with adjacent existing surfaces to provide uniform, even surfaces. Unless indicated otherwise, repair surfaces shall match adjacent existing surfaces in texture and receive coatings or surface treatments provided for adjacent existing surfaces.

   E. Curing:
      1. Cure repair mortar and non-shrink grout according to manufacturer's recommendations, except that minimum cure period shall be 3 days.

      2. Cure other materials in accordance with Section 03370 - Concrete Curing.
3. If manufacturer recommends use of a curing compound, use no material that would interfere with the bond of any coating or adhesive required to be applied to the surface.

3.02 TREATMENT OF SURFACE DEFECTS

A. Definition - Surface Defects: Depressions in concrete surfaces not extending all the way through a member, caused by physical damage, un-repaired rock pockets created during original placement, spalling due to corroded reinforcing steel or other embeds, or removal of embedded items or intersecting concrete members.

B. Preparation:
   1. Remove loose, damaged concrete by chipping to sound material.
   2. Where existing reinforcing bars are exposed, remove concrete at least one inch deep all around the exposed bars. If the existing bars are cut through, cracked, or cross-sectional area is reduced by more than 25 percent, notify the Owner’s Representative immediately.

C. Repair Material:
   1. Use only repair mortar to repair surface defects in members normally in contact with water or soil, and defects in interior surfaces of structures which are intended to contain water.
   2. Repair of other surface defects may be by application of repair mortar, repair concrete or cement grout, as appropriate.

3.03 PATCHING OF HOLES IN CONCRETE

A. General:
   1. Definition - Holes: For the purposes of this section, holes are defined as penetrations completely through a concrete member, with interior surfaces approximately perpendicular to the surface of the existing member. Chip interior surface areas which are inclined and do not meet this criterion as necessary to meet this requirement.
   2. Perimeter of holes at the surface shall form a regular shape composed of curved or straight line segments. Provide at least the minimum placement depth specified for the material used at all locations. Score existing concrete by sawcutting and chip as needed to meet this requirement.
   3. Roughen the interior surface of holes less than 12 inches in diameter to at least 0.125-inch amplitude. Roughen larger holes to at least 0.25-inch amplitude.
4. At holes not filled with repair mortar or non-shrink grout, and where otherwise recommended by the repair material manufacturer, coat existing surfaces to be repaired with epoxy bonding agent.

5. Where a surface of a member is exposed to view and the repair material cannot be adjusted to match the color of the existing concrete, hold back the repair material 2 inches from the surface. Fill the remaining 2 inches with color-adjusted cement grout. Roughen the surface of the repair material when placed to improve bond with the cement grout.

B. Patching Small Holes:

1. Fill holes less than 12 inches in least dimension and extending completely through concrete members with repair mortar or non-shrink grout.

2. Fill holes in members normally in contact with water or soil with Class I non-shrink grout in accordance with Section 03600 - Structural Grout.

C. Patching Large Holes:

1. Fill holes larger than 12 inches in least dimension with repair concrete, repair mortar or non-shrink grout.

2. Provide large holes normally in contact with water or soil and not filled with Class I non-shrink grout with resilient waterstop placed in a groove approximately 0.25 inch deep ground into the interior edge of the hole at the center of the wall providing a smooth surface in which to place the resilient waterstop. Alternatively, bond bentonite waterstop to the surface using an epoxy grout which completely fills all voids and irregularities beneath the waterstop material. Install waterstop in accordance with Section 03250 - Joints in Concrete Structures.

3. Provide reinforcing steel in layers matching existing reinforcement locations, except provide concrete cover required by the Contract Documents for the applicable service condition.

4. For holes smaller than 48 inches, reinforcement shall be at least #5 bars on 12 inch centers in each layer required. At all holes larger than 30 inches, drill and grout the reinforcement into the existing concrete.

5. For holes larger than 48 inches, see the drawings for reinforcement details.

3.04 PATCHING OF LINED HOLES

A. These provisions apply to openings which have embedded material over all or a portion of the inside edge. Requirements for repairing holes in concrete specified above shall apply as modified herein. The Owner’s Representative will determine when the embedded material is allowed to remain.
B. Where embedded material is allowed to remain, trim it back a minimum of 2 inches from the concrete surface. Roughen or abrade the embedded material to promote good bonding to the repair material. Completely remove any substance that interferes with good bonding.

C. Completely remove embedded items not securely and permanently anchored in the concrete.

D. Completely remove embedded items larger than 12 inches in least dimension unless composed of a metal to which reinforcing steel can be welded. Where reinforcement is required, weld it to the embedded metal.

E. Following additional requirements apply to concrete in contact with water or soil.

1. Fill lined openings less than 4 inches in least dimension with epoxy grout.

2. Coat lined openings greater than 4 inches but less than 12 inches in least dimension with an epoxy-bonding agent prior to filling with Class I non-shrink grout.

3. Coat lined openings greater than 12 inches in least dimension with an epoxy bonding agent and bond bentonite waterstop to the interior of the opening prior to filling with approved repair material.

3.05 INSTALLATION OF PIPES AND FRAMES

A. The following applies to installation of permanent pipes and frames in openings cut into existing concrete members.

B. Cut opening to a size which is a minimum of one inch and a maximum of 3 inches larger than the outside edge of the embedded item. At openings with sharp corners, take care not to sawcut beyond the opening so as to damage existing reinforcing bars. At openings which are greater than 24 inches in least dimension, chip a keyway into the center of the wall. Keyway shall be at least 1.5 inches in depth and from 3 inches to 1/3 the member thickness in width. All surfaces except at the keyway shall be perpendicular to the member surface as specified herein for patching holes.

C. Provide embedded items with a flange or other positive means of anchorage to repaired members. At members in contact with soil or water, provide continuous waterstop flanges around embeds. Where concrete pipe will be embedded, provide resilient waterstop around pipe at wall centerline.

D. Roughen the interior surface of openings to at least 1/4-inch amplitude. Sandblast the embed surface to be in contact with concrete clean to promote good bonding to the repair material.

E. Fill the space between the frame and the existing concrete with Class I non-shrink grout.
F. Where surface of a member is exposed to view and the repair material cannot be
adjusted to match the color of the existing material, hold back the repair material 2
inches from the surface. Fill the remaining 2 inches with color-adjusted cement
gROUT.

3.06 NON-FIXED INSTALLATION OF PIPES

A. The following applies to installation through existing concrete of piping to be sealed
with adjustable linked seals, resilient connectors, or packing and sealant. When more
appropriate, the Owner’s Representative may require installation of a sleeve instead
of the core-drilled hole specified herein.

B. Size core-drilled opening to permit installation of the required seal; locate to
minimize cutting of existing reinforcing steel.

C. Where linked or resilient seals are to be installed, coat the interior surface of the
opening with epoxy at least 1/8 inch thick for a smooth and even surface promoting a
good seal.

D. Where packing and sealant are required, seal exposed reinforcing bars with at least an
1/8-inch thick layer of epoxy extending 1/2 inch beyond the bars on all sides. Prepare
the surface of the cut concrete and the pipe as recommended by the sealant
manufacturer.

3.07 GENERAL CRACK REPAIR

A. Repair cracks identified by the Owner’s Representative as caused by shrinkage or
thermal movement by injection with chemical grout as specified herein.

B. Repair cracks not caused by shrinkage or thermal movement by epoxy injection or as
otherwise directed by the Owner’s Representative.

3.08 CHEMICAL GROUT CRACK REPAIR

A. Inject chemical grout into all cracks as directed by the Owner’s Representative in
those structures included in the scope of work listed herein in accordance with the
chemical grout manufacturer's installation instructions and recommendations.

B. Location of Injection Ports: Locate injection ports as recommended by the chemical
gROUT manufacturer and as needed to insure complete penetration of the joint or crack
with the grout. Spacing of injection ports shall not exceed 2 feet.

C. Drilling Ports: Drill holes for injection ports to the depth needed for proper
distribution of the chemical grout. Take care to not damage any reinforcing steel.

D. Port preparation: Clean holes for injection ports of all debris and fit with an injection
fitting as provided by the manufacturer of the chemical grout, or equal. Install
injection fittings in accordance with manufacturer’s instructions; allow fittings to
remain in place until chemical grout injection work is complete in that area. Install caps or valves at injection ports to prevent back flow of uncured chemical grout after it has been injected.

E. Chemical Grout Injection:

1. Follow instructions and recommendations of the chemical grout manufacturer and its representatives for chemical grout mixing and injection procedures.

2. Seal cracks at the surface where needed to assure complete penetration of injected chemical grout and prevent loss of material.

3. Prior to chemical grout injection, inject water into ports to provide water for the reaction process, flush out foreign matter and verify continuity between adjacent ports. Inject water into each port until it begins to flow from an adjacent or nearby port.

4. If the water injection procedure indicates the potential presence of voids within members or behind members resting against soil, notify the Owner’s Representative immediately.

5. Beginning at the lowest injection port, inject chemical grout until the grout begins to flow from an adjacent or nearby port. Repeat the process until the crack is completely filled. In general, port-to-port travel of the injection process will be from low to high in a continuous operation.

6. If port-to-port continuity does not occur at locations where continuity was verified through water injection, mark location and notify the Owner’s Representative.

7. Avoid sudden application of high pressure during the injection process.

8. After completion of the grouting operation, remove all ports and surface sealing materials leaving an undamaged surface.

3.09 EPOXY CRACK REPAIR

A. Inject epoxy into all cracks in damaged concrete as indicated by the Owner’s Representative in structures included in the scope of work listed herein. Follow installation instructions and recommendations of the epoxy manufacturer.

B. Inject cracks with sufficient pressure to ensure full penetration of epoxy but without causing further damage.

C. Location, drilling and preparation of ports for injection: As specified for chemical grout herein.

D. Epoxy Injection:
1. Follow instructions of the epoxy manufacturer and its representatives for all mixing and injection procedures.

2. Seal all cracks at the surface where needed to provide for complete penetration of the injected epoxy and to prevent loss of material.

3. Beginning at the lowest injection port, inject the epoxy until it begins to flow from an adjacent or nearby port. Repeat the process until the crack is completely filled.

4. If port-to-port continuity does not occur, mark the location and notify the Owner’s Representative.

5. Avoid sudden application of high pressure during the injection process.

6. After completion of injection operations, remove all ports and surface sealing materials to leave an undamaged surface.

3.10 REPAIR OF DETERIORATED CONCRETE

A. These provisions pertain to concrete damaged by abrasion, chemical attack or corrosion of reinforcing steel. The only material acceptable for surface repair is repair mortar as specified herein. Where the repaired surface is to be subsequently covered with a PVC liner or other protective material, coordinate finishing details with the liner material manufacturer.

B. Surface Preparation:

1. Remove loose, broken, softened and acid-contaminated concrete to sound, uncontaminated concrete.

2. Notify the Owner’s Representative when removal of deteriorated concrete is complete. Schedule two weeks for the Owner’s Representative to inspect the surface, perform testing for acid contamination, determine if additional concrete must be removed, and to develop any special repair details that may be needed. Should it be determined that additional concrete must be removed to reach sound, uncontaminated material, schedule another two-week period for further evaluation after completion of the additional removal.

3. Follow repair mortar manufacturer's instructions for additional surface preparation.

C. Repair Mortar Placement:

1. Follow manufacturer's recommendations for mixing and placement of repair mortar. After the initial mixing of the repair mortar, do not add additional water to change the consistency should the mix begin to stiffen.
2. Place repair mortar to the minimum thickness recommended by manufacturer but not less than 2 inch. Should there be areas where less than the minimum repair mortar depth of concrete is removed, Contractor may remove additional concrete to attain the minimum repair mortar thickness or may place repair mortar so as to increase the original thickness of the member. In any case, add repair mortar so that minimum cover over existing reinforcing steel is 2 inches. Do not place repair mortar so as to create locally raised areas. Where there is a transition with wall surfaces which are not in need of repair, do not feather the repair mortar at the transition. Sawcut a score line to not less than the minimum repair mortar depth and chip concrete out to it to form the transition. Take care not to cut or otherwise damage reinforcing steel.

3. Finish repair mortar in an even, uniform plane to restore the member to its original surface. Out-of-plane tolerance: No localized depressions or projections; 0.25 inch maximum gap between repair mortar surface and a 10-foot straight edge in any orientation at any location.

D. Finishing:

1. Apply a smooth magnesium float finish to repair mortar.

2. When completed: No sharp edges. Exterior corners, such as at penetrations: One-inch radius. Interior corners: Square, except 2-inch repair mortar fillet at corners to receive PVC lining.

END OF SECTION