

Contract Documents and Technical Specifications
for
Marina Boat Ramp Parking Lot Repair



July 2026

HDR Project No. 10465344



A black rectangular box containing a handwritten signature in white ink, which appears to be "Anthony S. Allen".



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CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

for

Marina Boat Ramp Parking Lot Repair

in

CITY OF PORT ARANSAS, TEXAS

July, 2026
HDR Project No. 10465344

HDR ENGINEERING, INC.
555 N. CARANCAHUA STREET, SUITE 1600
CORPUS CHRISTI, TX 78401
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BIDDING REQUIREMENTS



CITY OF PORT ARANSAS, TEXAS

COPA MARINA BOAT RAMP PARKING LOT REPAIR

NOTICE TO BIDDERS

NOTICE is hereby given that the City of Port Aransas, Texas, is requesting bids for **COPA Marina Boat Ramp Parking Lot Repair**. All bids must be clearly marked “**SEALED BID – COPA Marina Boat Ramp Parking Lot Repair**” to the City of Port Aransas City Secretary’s office, 710 W. Avenue A, Port Aransas, Texas prior to **Tuesday, August 18, 2026, at 3:00 p.m.**, at which time they will be publicly opened and acknowledged in the City Hall Council Chamber. Any bid delivered or received after 3:00 pm will not be considered and shall be returned unopened to the addressee. The City reserves the right to reject any or all bids.

This project will consist of 10,750 SY of asphalt pavement and base demolition and reconstruction, 12,250 SY of asphalt pavement mill and overlay, 7 new grate inlets installed on existing storm sewer boxes, and a repair to the existing storm sewer RCP.

Bidders must submit a Cashier’s or Certified Check issued by a bank satisfactory to City of Port Aransas, or a Bid Bond from a reliable surety company, payable to City of Port Aransas in an amount not less than five percent (5%) of the bid submitted as a guaranty that the Bidder will enter into a contract using the forms provided within ten (10) days after notice of award of contract to him. To obtain Construction Documents and to be added to the bidders list, email Anthony Allen, P.E. at anthony.allen@hdrinc.com. Copies of Bid/Contract Documents may also be obtained from <https://civcast.com>, search City of Port Aransas – Marina Boat Ramp Parking Lot Repair Project. Bidders must register on this website in order to view and/or download plans and specifications for this project. There is NO charge to view or download documents from the website.

Questions or requests for information relating to this request for bid may be directed to Anthony Allen, P. E., at anthony.allen@hdrinc.com no later than 4:00 P.M. CST on **Thursday, August 13, 2026**.

It shall be each bidder’s sole responsibility to inspect the site of the work and to inform itself regarding all local conditions under which the work is to be done. It shall be understood and agreed that all such factors have been thoroughly investigated and considered in the preparation of the bid submitted.

The successful Bidder must furnish PAYMENT and PERFORMANCE BONDS on the forms furnished with the PROPOSAL, in the amount of 100% of the total contract price, from a surety company holding a permit from the State of Texas to act as surety. The surety company must have a minimum Best Key Rating of "B", or if the surety company does not have such a rating due to the length of time it has existed, the surety company must be eligible to participate in the surety bond guarantee program of the Small Business Administration and must be an approved surety listed in the current U.S. Department of Treasury Circular 570, and must meet all of the related rules and regulations of the Treasury Department. The surety company and the agency or agent issuing the PAYMENT and PERFORMANCE BONDS must be authorized to issue and sign PAYMENT and PERFORMANCE BONDS in Texas in an amount equal to, or greater than, the total Contract price.

The City of Port Aransas reserves the right to reject any or all bids and to waive any informalities in the bidding. This contract will be awarded under Subchapter C, Texas Government Code Chapter 2269. In case of ambiguity or lack of clearness in stating the prices in the bids, the City of Port Aransas reserves the right to consider the most advantageous construction thereof, or to reject the bid. Unreasonable (or "unbalanced") unit prices will authorize the City of Port Aransas to reject the bid.

Bids may be held by the City of Port Aransas for a period not to exceed 60 days from the date of the bid opening for the purpose of reviewing the bids and investigating the bidder's qualifications prior to the contract award.

GENERAL INSTRUCTION TO BIDDERS

1. **SCOPE OF WORK**

The work to be done under the contract documents shall consist of the following:

Marina Boat Ramp Parking Lot Repair Project

The CONTRACTOR shall furnish all labor, superintendence, machinery, equipment and all materials necessary to complete this project in accordance with the contract documents.

2. **COMPLIANCE WITH CONTRACT DOCUMENTS**

All work covered by this Contract shall be done in accordance with the contract documents as described in the General Conditions.

All bidders shall be thoroughly familiar with all of the requirements set forth in the contract documents for the construction of this project and shall be responsible for the satisfactory completion of all work contemplated by said contract documents.

3. **PLANS FOR USE BY BIDDERS**

It is the intent of the OWNER that all parties interested in submitting a bid on the project covered by the contract documents be given a reasonable opportunity to examine the documents and prepare a bid. The contract documents may be examined and downloaded electronically without charge as noted in the Notice to Bidders. Any party wishing to print a hard copy of the contract documents, including all plans and specifications, may do so at their own expense.

4. **INTERPRETATION OF TECHNICAL SPECIFICATIONS, PLANS AND OTHER DOCUMENTS**

Bidders desiring additional information or clarification of technical specifications, plans or other documents must make written requests for such information to the ENGINEER as the OWNER's representative prior to seven (7) days before the deadline specified for receipt of bids. Answers to all such requests will be given in writing, in addendum form, to all bidders, and all addenda will be bound with and become a part of the contract documents. No written or oral explanation or interpretation except that which is provided by the addenda prepared by the ENGINEER will be considered official or binding. If the bidder should find discrepancies in or omissions from the technical specifications or plans, or should some doubt exist as to their meaning, the bidder shall notify the ENGINEER in writing so that a written addendum may be sent to all bidders. It is the responsibility of the bidders to know if they have received all such addenda. A complete file on all addenda issued will be maintained at the ENGINEER's office. In the event a bidder shall fail to seek clarification or interpretation of any part or portions of the technical specifications, plans or other documents, such bidder shall be presumed to have full knowledge of the interpretation by the ENGINEER.

5. CONDITIONS OF WORK/INSPECTION OF SITE

Each bidder shall fully inform himself of the construction and working conditions under which the work will be performed. Bidders shall inspect the site and thoroughly familiarize themselves with the full bid documents including technical specifications and plans. Failure to do so will not relieve a successful bidder of his obligation to perform the work in accordance with contractual requirements. It is understood that the bid prices shall include the furnishing of all superintendence, labor, material, machinery, equipment, tools, transportation, services and other means of construction, including parts, incidentals and appurtenances, as necessary to complete the work in accordance with the contract documents, technical specifications and plans.

Bidder should carefully examine the bidding documents and the site to determine the actual conditions under which work will be done. Data in the bidding documents pertaining to existing conditions is for convenience only and does not supplant obtaining firsthand information at the site. Submission of a bid constitutes acceptance by the bidder of existing site conditions as part of the requirements of this work.

6. SUBSURFACE INFORMATION

Any information provided in regard to subsurface data, test borings, etc., is to be considered approximate. Soil reports, if any, that the ENGINEER has obtained for this project will be provided to the bidders for their use. The interpretation of soil information, results of soil borings, etc., is in no way guaranteed.

7. OPEN SPECIFICATIONS

Where equipment or materials are specified by a trade or brand name, it is not the intention of the OWNER to discriminate against an equal product of another manufacturer but rather to set a definite standard of quality and/or performance and to establish an equal basis for the evaluation of bids. Where the words "equivalent" or "equal to" are used, they shall be understood to mean that the thing referred to shall be, in the opinion or judgment of the ENGINEER, the equivalent of or equal to the product or item specified by name. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be, in all cases, fully equivalent to approved samples. Notwithstanding that the words "equivalent", "equal to" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the material, article or process specifically designated shall be used unless a substitute shall be approved in writing by the ENGINEER. The ENGINEER has the right to require the use of such specifically designated materials, articles or processes.

8. PREPARATION OF BID PROPOSAL

Unless otherwise directed in the Notice to Bidders, bids shall be submitted in duplicate upon forms furnished by the OWNER or copies thereof. All bids shall be prepared in compliance with the requirements of the Notice to Bidders, these instructions and any instructions printed on the prescribed forms. All blank spaces in the form shall be correctly filled in for which he

proposes to do the work contemplated or to furnish the materials required. Such prices shall be written in ink, distinctly and legibly, or typewritten. Amounts shall be extended and totaled, and no change shall be made in the phraseology of the form or of the bid items thereon. If optional items are shown on the bid form and the bidder elects not to bid on such optional items, then "No Bid" must be entered in the blank spaces provided. If a space is left blank on the bid form, the OWNER will interpret such blank as a "No Bid".

The bidder must sign the bid proposal in ink in the space provided on the bid form; unsigned bids will not be accepted. If the proposal is submitted by an individual, his name must be signed by him or his duly authorized agent. A bid submitted by a sole proprietorship must be signed by the proprietor and must clearly set out the name under which the proprietor is conducting business. If the proposal is submitted by a firm, association or partnership, then the name and address of the firm, association or partnership must be shown together with the name and address of each member, and the proposal must be signed by a member of the firm, association or partnership or other person duly authorized.

If the proposal is submitted by a company or corporation, the company or corporate name and business address, the name of the registered agent, the address of the registered office, and the names, addresses and offices of each corporate officer, must be given. Bids submitted by a corporation must be signed by an officer of the corporation having the authority to execute such documents for the corporation, which authority is granted either by the corporate charter, the by-laws of the corporation or a resolution of the board of directors of the corporation, and shall specify under what authority the proposal is signed; the proposal shall be attested to by the secretary or an assistant secretary of the corporation, and the corporate seal shall be affixed thereto.

Powers of attorney authorizing agents or others to sign proposals must be properly certified and must be in writing and submitted with the proposal.

Each bid proposal shall be enclosed in a sealed envelope and submitted in duplicate, addressed as specified in the Notice to Bidders and bearing the bidder's name and the notation "Marina Boat Ramp Parking Lot Repair Project."

9. QUESTIONS

Submit questions about bidding documents in writing to the ENGINEER. Inquiries are permitted until one (1) week prior to bid opening. Necessary replies will be issued to bidders of record as addenda, which become a part of the bidding documents. Oral instructions do not form a part of the bidding documents. Bidders should contact the ENGINEER not less than 48 hours before bid opening to secure any addenda that may affect bidding.

10. BID BOND REQUIRED

Each bidder is required to submit a bid bond in the amount of 5% of the bid issued by an acceptable surety. A certified check or cashier's check payable to the OWNER may be submitted in lieu of the Bid Bond. This shall act as a guarantee that the bidder will enter into a contract and execute all necessary bonds (if required) within thirty (30) days after notice of

award of the contract to him. Bids without the required bid bond or check will not be considered.

11. LIST OF SUBCONTRACTORS AND MAJOR SUPPLIERS

With the bid, submit a list of subcontractors for major portions of the work and major suppliers. Give the names and addresses of the selected subcontractors and major suppliers listed in the bid proposal. Include on the list all “local” subcontractors and major suppliers. “Local” shall be defined as those subcontractors and major suppliers whose principal business location is in Nueces County.

12. STATEMENT OF QUALIFICATIONS

Each bid must be accompanied by a statement of the qualifications of the Bidder to properly execute the work. No bid will be considered unless such a statement is submitted. Include in the statement of qualifications a list of ten (10) references minimum. The references shall consist of projects of similar nature, cost of the project, OWNER's name, ENGINEER or prime contact and telephone number.

Before being awarded the Contract, the apparent low, responsive and responsible bidder must identify the foreman intended to be assigned on the project. Once approved by the OWNER, the foreman may not be removed from the project unless approved in writing by the OWNER. This specifically precludes the foreman supervising more than one jobsite and specification requires that the foreman be on the jobsite 100% of the time when work is being performed. If the foreman leaves the jobsite for any reason, work must cease.

13. All Bidders are required to submit the following with their bid:

- a. Bid Proposal (in duplicate)
- b. Bid Bond
- c. List of Subcontractors and Major Suppliers
- d. Statement of Qualifications Form
- e. Financial Statement
- f. Conflict of Interest Questionnaire

Note to Bidders: The amount of experience on projects similar in type, size and complexity as this project which the bidders and key subcontractors have and the degree of success on such projects may affect the award.

It is the OWNER's desire that the successful bidder and his key subcontractors be qualified and experienced in providing successful projects; that such successful bidder and key subcontractors have recent successful experience on several projects of similar size and nature as this project. Failure to demonstrate satisfactory experience may result in rejection of the bid even if the bid is the lowest bid.

14. FINANCIAL STATEMENT

Each bid must be accompanied by a financial statement of the bidder as reflected by his most recently prepared statement; the financial statement submitted must be current and shall not have been prepared prior to twelve (12) months immediately preceding the date specified for receipt of bids. The financial statement shall be submitted in a sealed envelope, properly identified as to contents and project description. The bidder's financial statement will be examined only if the bid submitted is actively considered for award; otherwise, it will be returned unopened after the execution of the Contract.

15. DELIVERY OF BIDS

It is the bidder's responsibility to deliver his bid in accordance with the instructions contained in the Notice to Bidders. Bids dispatched but not received by the date and time specified will be returned unopened upon receipt.

16. BID MODIFICATIONS

At any time prior to the deadline set for receipt of bids, a bid may be withdrawn and resubmitted by submitting a written request to do so to the person who holds the bid, but no proposal may be altered after the closing time set for receipt of bids. In addition, bidder may not modify or withdraw its bid by verbal, facsimile, or electronic means.

17. WITHDRAWAL OF BID

At any time prior to the time set for opening of the bids, a bid proposal may be withdrawn by submitting a written request to do so to the person who holds the bid.

18. REJECTION OF IRREGULAR OR IMPROPER BID

Any bid which contains any omission, alteration, erasure, addition or change of any nature, or which does not include prices for each and every bid item (excluding optional items) may, at the option of OWNER, be deemed irregular. In order for any such bid to be considered, any alteration, erasure or other change must be initialed by the bidder prior to submission of the bid. In addition, any bid in which the prices are obviously unbalanced or which fails in any manner to conform to the bidding procedures as set forth may be considered irregular. Any bid proposal which is deemed irregular may be rejected and returned to the bidder without being considered.

Further, any proposal containing any conditions which provide for changes in the stated bid price due to increases or decreases in the cost of materials, labor or other items required for the project will be rejected and returned to the bidder without being considered.

19. OWNER'S RIGHT TO REQUIRE ADDITIONAL INFORMATION

The OWNER reserves the right, after the bids have been opened and before the contract has been awarded, to conduct such investigations as the OWNER deems necessary to assist in the evaluation of the bids and to establish the responsibility, qualifications and financial ability of bidders, proposed subcontractors, suppliers and other persons and organizations to perform the work in accordance with the Contract Documents; and to require of a bidder additional information to aid in the evaluation of the bid and the bidders qualifications including but not limited to the following information:

- (a) The experience record of the bidder and key subcontractors, suppliers and other persons showing completed jobs of similar scope and work requirements to the one covered by the proposed Contract and all work in progress with bond amounts and percentage completed;
- (b) A sworn statement of the current financial condition of the bidder, key subcontractors and suppliers
- (c) An equipment schedule.

20. AWARD OF CONTRACT

Unless all bids are rejected, the OWNER will award the Contract as promptly as possible, consistent with the time required for a thorough analysis of the bids submitted. However, the OWNER reserves the right to delay award for sixty (60) days after receipt of bids. If no award is made within sixty (60) days after receipt of bids, a bidder may withdraw his bid without prejudice to himself by submitting a written request for its withdrawal to the person who holds the bid. The Contract will be awarded to the lowest responsible bidder as provided by Texas Government Code Chapter 2269, Subchapter C. In determining the award of the Contract, the OWNER may consider:

- the purchase price;
- the reputation of the bidder and of the bidder's goods or services (including subcontractors);
- the quality of the bidder's goods or services (including subcontractors);
- the extent to which the goods or services meet the OWNER's needs;
- the bidder's past relationship with the OWNER;
- the impact on the ability of the OWNER to comply with laws and rules;
- relating to contracting with historically underutilized businesses and non-profit organizations employing persons with disabilities;
- the total long- term cost to the OWNER to acquire the bidder's goods or services; and
- any relevant criteria specifically listed in the request for bids.

The OWNER reserves the right to reject any or all bids and to waive bid irregularities as the interest of the OWNER may require. Also, the OWNER reserves the right to reject the bid of any bidder if the OWNER believes that it would not be in the best interest of the Project to make an award to that bidder, whether because the bid is not responsive or the bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the OWNER. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated

sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sums.

21. DEFAULT

The failure of the successful Bidder to execute an Agreement within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the OWNER may grant, based upon reasons determined sufficient by the OWNER shall constitute a default, and the OWNER may either award the Contract to the next lowest responsible Bidder or re-advertise for Bids, and may charge the defaulting Bidder the amount of the Bid Bond. If a more favorable Bid is received by re-advertising, the defaulting Bidder shall have no claim against the OWNER for a refund.

22. PERFORMANCE AND PAYMENT BONDS

The successful Bidder must furnish PERFORMANCE and PAYMENT BONDS on the forms furnished with the PROPOSAL, in the amount of 100% of the total contract price, from a surety company holding a permit from the State of Texas to act as surety. The surety company must have a minimum Best Key Rating of "B", or if the surety company does not have such a rating due to the length of time it has existed, the surety company must be eligible to participate in the surety bond guarantee program of the Small Business Administration and must be an approved surety listed in the current U.S. Department of Treasury Circular 570, and must meet all of the related rules and regulations of the Treasury Department. The surety company and the agency or agent issuing the PAYMENT and PERFORMANCE BONDS must be authorized to issue and sign PAYMENT and PERFORMANCE BONDS in Texas in an amount equal to, or greater than, the total Contract price.

23. INSURANCE

The CONTRACTOR shall not commence work under this Contract until it has obtained all insurance as required in the Insurance Requirements and Acknowledgement Form, set forth in the contract documents, from an underwriter authorized to do business in the State of Texas and satisfactory to the OWNER. Proof of coverage shall be furnished to the OWNER and written notice of cancellation or any material change shall be provided to the OWNER not less than thirty (30) days in advance of cancellation or change. All policies shall contain an agreement on the part of the insurer waiving the right to subrogation.

The insurance certificates furnished shall name the OWNER, HDR Engineering, Inc., their agents and employees, as an additional insured and shall further state that all subcontractors are named as additional insured or, in the alternative, shall be accompanied by a statement from the CONTRACTOR to the effect that no work on this particular project shall be subcontracted.

24. BOUND COPIES OF CONTRACT DOCUMENTS

The Agreement, Bonds and all related contract documents will be prepared and signed in not less than **five (5)** multiple original counterparts. Each set of contract documents shall be bound and shall include all documents made available to bidder for his inspection in accordance with the Contract.

The OWNER will furnish the CONTRACTOR with **two (2)** sets of conforming contract documents, technical specifications and plans free of charge. Additional sets, if needed, can be obtained by the CONTRACTOR at its own expense. Plans and specifications for use during construction will only be furnished directly to the CONTRACTOR. The CONTRACTOR shall then distribute copies of plans and specifications to suppliers, subcontractors or others as required for proper prosecution of the work contemplated by the CONTRACTOR.

25. TIME AND ORDER FOR COMPLETION

The construction covered by the contract documents shall commence within ten (10) days after written Notice to Proceed shall have been given by the ENGINEER and be completed within **120 calendar days** from the date specified in the Notice to Proceed.

Failure of the CONTRACTOR to complete the work within the contract time, including any extensions granted shall entitle the OWNER to deduct from the money due to the CONTRACTOR an amount equal to **\$500** for each calendar day of delay in completion of the work, not as a penalty, but as liquidated damages and added expense for supervision.

The CONTRACTOR will be permitted to prosecute the work in the order of his own choosing unless stated otherwise in the Contract Documents, provided, however, the OWNER reserves the right to require the CONTRACTOR to submit a progress schedule of the work contemplated by the contract documents. In the event the OWNER requires a progress schedule to be submitted and it is determined by the OWNER that the progress of the work is not in accordance with such schedule, the OWNER may direct the CONTRACTOR to take such action as the OWNER deems necessary to insure completion of the project within the time specified.

26. WAGE RATES

The CONTRACTOR must abide by the Wage and Hour Laws of the State of Texas and must pay not less than the legally prescribed rate for Nueces County.

27. TEXAS STATE SALES TAX

This Contract is issued by an organization that qualifies for exemption provisions pursuant to provisions of Tex. Tax Code §§ 151.301, 151.307, 151.309 and 151.311.

The CONTRACTOR must obtain a limited sales, excise and use tax permit or exemption certificate which shall enable him to buy the materials to be incorporated into the work without paying the tax at the time of purchase.

28. CONTRACTORS REPRESENTATIVE

The successful bidder shall be required to have a responsible local representative available at all times while the work is in progress under this Contract. The successful bidder shall be required to furnish the name, address and telephone number where such local representative may be reached during the time that the work contemplated by this Contract is in progress.

29. WORKING HOURS

All construction work under this contract shall be performed between the hours of 6:00 a.m. to 7:00 p.m., Monday through Saturday and 8 a.m. to 5:00 p.m. on Sunday, unless specific authorization is granted by the project representative after obtaining OWNER's concurrence, or unless extension of working hours is necessary either to avoid lengthy interruption of utility service to the OWNER's customers, or due to an emergency situation.

Construction work under this Contract requiring an on-site project representative will not be performed on weekends or holidays unless the following conditions exist:

- (a) The project being constructed is essential to the OWNER's ability to provide the necessary service to its citizens; or
- (b) Delays in construction are due to factors outside the control of the CONTRACTOR. The CONTRACTOR is approaching the penalty provisions of the Contract and can show that he has made a diligent effort to complete the Contract within the allotted time.

Before construction work requiring an on-site project representative is to be performed on weekends or holidays, the CONTRACTOR must notify the OWNER's representative not less than three (3) full working days prior to the weekend or holiday he desires to do work and obtain written permission from the OWNER's representative to do such work. The final decision on whether to allow construction work requiring an on-site project representative on weekends or holidays will be made by the OWNER's representative in coordination with the OWNER.

The CONTRACTOR is made aware that no work shall be permitted on legal holidays.

Construction work requiring an on-site representative will be any work where excavation, installation of pipes, materials, backfill or paving surface material installation is occurring and any work where investigation processes or testing processes are occurring or are required.

In any event, if a condition should occur or arise at the site of this project or from the work being done under this Contract which is hazardous or dangerous to property or life, the CONTRACTOR shall immediately commence work, regardless of the day of the week or the time of day, to correct or alleviate such condition so that it is no longer dangerous to property or life.

30. MATERIALS AND WORKMANSHIP

The intent of these contract documents is that only materials and workmanship of the best quality and grade will be furnished. The fact that the specifications may fail to be sufficiently complete in some detail will not relieve the CONTRACTOR of full responsibility for providing materials of high quality and for protecting them adequately until completion of the project and acceptance by the OWNER. The presence or absence of a representative of the OWNER on the construction site will not relieve the CONTRACTOR of full responsibility for complying with this provision. The specifications for materials and methods set forth in the contract documents provide minimum standards of quality which the OWNER believes necessary to procure a satisfactory project.

31. GUARANTEES

All equipment and materials incorporated in the project and all construction shall be guaranteed against defective materials and workmanship. Prior to final acceptance, the CONTRACTOR shall furnish the OWNER with a written general guarantee which shall provide that the CONTRACTOR shall remedy any defects in the work, at no cost to the OWNER, and pay for any and all damages of any nature whatsoever resulting from such defects when such defects appear as a result of defective materials or workmanship within one (1) year from the date of final acceptance of the work. Upon notice from OWNER, his agent or assigns, repair defects in all construction, which develop during specific period at no cost to OWNER or his assigns. Neither final acceptance nor final payment nor any provision in Contract Documents relieves CONTRACTOR of above guarantee. Notice of observed defects upon notice entitles OWNER or his assigns to repair or replace it and recover reasonable cost therefrom from CONTRACTOR and/or his surety. This guarantee does not include damage due to improper operation and maintenance by the OWNER, provided the CONTRACTOR provides the following:

- The CONTRACTOR furnish the OWNER with written operational and maintenance instructions on all items.
- During the warranty period, the CONTRACTOR makes trips to the project site at six (6) months and eleven (11) months and inspects the items for proper operation and maintenance.
- After each inspection trip, the CONTRACTOR shall submit his findings in writing to the OWNER and the ENGINEER.

Failure to fulfill any one or all of these conditions will make the CONTRACTOR liable for repairing damage (at no cost to the OWNER) to items under warranty, even if in his opinion, it was due to improper operation and/or maintenance by the OWNER.

32. PROTECTION OF THE WORK

The CONTRACTOR shall be responsible for the care, preservation, conservation and protection of all materials, supplies, machinery, equipment, tools, apparatus, accessories, facilities and all means of construction, and any and all parts of the work, whether the

CONTRACTOR has been paid, partially paid or not paid for such work until the date the OWNER issues its certificate of completion to the CONTRACTOR.

33. PROTECTION OF SUBSURFACE LINES AND STRUCTURES

It shall be the CONTRACTOR's responsibility to prosecute the work contemplated by the contract documents in such a way as to exercise due care to locate and prevent damage to all underground pipelines, utility lines, conduits or other underground structures which might or could be damaged by CONTRACTOR during the construction of the project contemplated by these contract documents. The OWNER will furnish CONTRACTOR with the approximate information of utility lines of which it has knowledge. However, such fact shall not relieve the CONTRACTOR of his responsibilities aforementioned; the location and depth of utilities shown on any drawings must be regarded as approximate, and it shall be the responsibility of the CONTRACTOR to determine for himself the exact location and depth of any utilities which exist in the project site. All such underground lines or structures cut or damaged by CONTRACTOR during the prosecution of the work contemplated by this Contract shall be repaired immediately by CONTRACTOR, at CONTRACTOR's expense, to the satisfaction of the OWNER.

34. BARRICADES AND SAFETY MEASURES

The CONTRACTOR shall, at its own expense, furnish and erect such barricades, fences, lights and danger signals, and shall take such other precautionary measures for the protection of persons, property and the work as may be necessary.

The CONTRACTOR will be held responsible for all damage to the work due to failure of barricades, signs and lights to protect it; and when damage is incurred, the damaged portion shall be immediately removed and replaced by CONTRACTOR at his own cost and expense.

The CONTRACTOR's responsibility for maintenance of barricades, signs and lights shall not cease until the date of issuance to CONTRACTOR of the OWNER's certificate of acceptance of the project.

The CONTRACTOR will be held responsible for all damage to the work which may occur prior to final acceptance by the OWNER regardless of the adequacy of protective barricades and lighting, and when damage is incurred, the damaged portion shall be immediately removed and replaced by CONTRACTOR at its own cost and expense.

35. EXPLOSIVES

The use of explosives will not be permitted.

36. PAYMENT OF EMPLOYEES

The CONTRACTOR and each of his subcontractors agree to pay all employees engaged in work on the project under this Contract in full (less mandatory legal deductions), and further

agree that no such employees shall look to the OWNER for payment of wages or compensation earned by reason of such work.

37. PAYMENT TO CONTRACTOR

All payments due to CONTRACTOR shall be made in accordance with the provisions of the General Conditions of Agreement of the contract documents.

38. AFFIDAVITS OF BILLS PAID

The OWNER reserves the right, prior to final acceptance of this project and with the project's pay estimate submitted each month, to require the CONTRACTOR to execute an affidavit certifying that all bills for labor, materials and incidentals incurred in the construction of the improvements contemplated by the contract documents have been paid in full and that there are no claims pending of which the CONTRACTOR has been notified.

39. TEC FORM 1295

The CITY OF PORT ARANSAS may not enter into this Contract unless the CONTRACTOR submits a disclosure of interested parties to the OWNER at the time the Contractor submits the signed Contract to the OWNER. The CONTRACTOR agrees to submit such disclosure as required by Section 2252.908 of the Texas Government Code on form 1295, prescribed by the Texas Ethics Commission, unless the CONTRACTOR is a publicly traded entity or a wholly owned subsidiary of same, in which case no disclosure is required. The CONTRACTOR agrees to access the Texas Ethics Commission website and complete the form 1295, receive a confirmation number and a PDF version of the completed form 1295, execute and notarize a hard copy version of the completed form 1295, and submit it, along with the confirmation number, to the OWNER.

40. HOUSE BILL 89 FORM

Verification No Boycott Israel. As required by Texas Government Code Chapter 2270, Subtitle F, the Bidder hereby verifies that it does not boycott Israel and will not boycott Israel through the term of this Agreement. For purposes of this verification, "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. The OWNER will require the successful bidder to complete "The State of Texas – House Bill 89 Verification" Form prior to contract award.

41. HOUSE BILL 1196 FORM

Verification No Undocumented Workers. As required by Texas Government Code Chapter 2264, Subtitle F, the Bidder hereby verifies that it does not and will not knowingly employ an undocumented worker. If, after receiving a public subsidy, the Bidder is convicted of a

violation under 8 U.S.C. Section 1324a(f), the Bidder shall repay the amount of the public subsidy with interest at a rate of five percent (5%), and according to the other terms provided by an agreement under Section 2264.053, not later than the 120th day after the date the OWNER notifies the above-named company of the violation. The OWNER will require the successful bidder to complete “The State of Texas – House Bill 1196 Verification” Form prior to contract award.

42. SENATE BILL 252 FORM

Verification Foreign Terrorist Organization Prohibition. As required by Texas Government Code Chapter 2252, Subtitle F, and Chapters 806 and 807, the Bidder hereby verifies that it does not engage in business with Iran, Sudan or any foreign terrorist organization. The term “foreign terrorist organization” as used in this section means an organization designated as a foreign terrorist organization by the United States secretary of state as authorized by 8 U.S.C. Section 1189. The OWNER will require the successful bidder to complete “The State of Texas – Senate Bill 252 Verification” Form prior to contract award.

43. SENATE BILL 13 FORM

Verification No Boycott Energy Companies. As required by Texas Government Code Chapter 2274, Subtitle F, the Bidder hereby verifies that it does not boycott energy companies currently and will not boycott energy companies during the term of this Agreement. The OWNER will require the successful bidder to complete “The State of Texas – Senate Bill 13 Verification” Form prior to contract award.

44. SENATE BILL 19 FORM

Verification No Discrimination Against Firearm Entity or Firearm Trade Association. As required by Texas Government Code Chapter 2274, Subtitle F, the Bidder hereby verifies that it does not have a practice, policy, guidance, or directive that discriminates against firearm entity or firearm trade associations currently and will not discriminate against a firearm entity or fire trade association during the term of this Agreement. The OWNER will require the successful bidder to complete “The State of Texas – Senate Bill 19 Verification” Form prior to contract award.

45. SENATE BILL 2116 FORM

Verification Critical Infrastructure: Not Owned or Controlled by China, Iran, North Korea, Russia or a Designated Country. As required by Texas Government Code Chapter 2274, Subtitle F, the Bidder hereby verifies that it will not grant direct or remote access to or control of critical infrastructure in this State, excluding access specifically allowed by the governmental entity for product warranty and support purposes and is not owned by or the majority of stocks or other ownership interest of the company is held or controlled by (i) individuals who are citizens of China, Iran, North Korea, Russia or a designated country; or (ii) a company or other entity, including a government entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or

a designated country. The OWNER will require the successful bidder to complete “The State of Texas – Senate Bill 2116 Verification” Form prior to contract award.

END OF GENERAL INSTRUCTIONS TO BIDDERS

SUBCONTRACTORS AND MAJOR SUPPLIERS FORM

SUBCONTRACTORS AND TYPE OF WORK TO BE PERFORMED

LOCAL SUBCONTRACTORS

(PRINCIPAL BUSINESS LOCATION IN NUECES COUNTY)

MAJOR SUPPLIERS

LOCAL MAJOR SUPPLIERS

(PRINCIPAL BUSINESS LOCATION IN NUECES COUNTY)

**BID PROPOSAL
BID FOR UNIT PRICE CONTRACT**

DATE: _____

Proposal of

(Hereinafter called "Bidder")

TO: THE MAYOR AND MEMBERS OF CITY COUNCIL
CITY OF PORT ARANSAS
(Hereinafter called "Owner")

The Bidder, in compliance with your invitation for bids for the construction of:

**Marina Boat Ramp Parking Lot Repair Project
HDR Project No. 10465344**

having carefully examined the plans, specifications, instructions to bidders, notice to bidders and all other related contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies and to construct the project in accordance with the plans, specifications and contract documents, within the time set forth therein and at the prices stated in Exhibit "A" attached hereto.

The Bidder binds himself, upon acceptance of his proposal, to execute a contract and any required bonds, according to the accompanying forms, for performing and completing the said work within the time stated and for the prices stated in Exhibit "A" of this proposal.

Bidder hereby agrees to commence the work on the above project on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within 120 **consecutive calendar** days thereafter as stipulated in the specifications and other contract documents. Bidder hereby further agrees to pay to Owner as liquidated damages the sum of \$ 500 for each consecutive calendar day in excess of the time set forth hereinabove for completion of this project, all as more fully set forth in the General Conditions of the contract documents.

The following unit prices are bid and shall be complete compensation as measured in place for all materials, labor, overhead, profits and any other cost that is necessary to complete the job to the Engineers specifications and satisfaction. It is also understood that the quantities shown are only an estimate of the work to be done. No re-negotiation of prices bid will be made for overruns or underruns of quantities.

Bidder understands and agrees that this bid proposal shall be completed and submitted in accordance with the General Instructions to Bidders.

Bidder understands that the Owner reserves the right to reject any or all bids, use deductible bid items and to waive any formality in the bidding.

Bidder agrees that this bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

Bidder acknowledges receipt of the following addenda:

The undersigned Bidder hereby declares that he has visited the site of the work and has carefully examined the plans, specifications and contract documents pertaining to the work covered by this bid, and he further agrees to commence work on or before the date specified in the written notice to proceed and to substantially complete the work on which he has bid, as provided in the contract documents.

Enclosed with this proposal is a cashier's check or certified check for:

_____ Dollars (\$_____)

or a bid bond in the sum of:

_____ Dollars (\$_____)

which it is agreed shall be collected and retained by the Owner as liquidated damages in the event the proposal is accepted by the Owner and the undersigned fails to execute the necessary contract documents and the required bonds (if any) with the Owner within ten (10) days after the date of receipt of written notification of acceptance of said proposal; otherwise said check or bond shall be returned to the undersigned upon demand.

Unit Prices are to be shown in Figures. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

The unit prices shall include all labor, materials, dewatering, shoring, removal, overhead, incidental costs, fees, profit, insurance, etc., to cover the finished work of the several kinds called for.

The undersigned Bidder hereby declares to fully comply with the prevailing wage rates for Nueces County, and that he and their Subcontractors will pay not less than those for each craft or type of "Laborer", "Workman" or "Mechanic" employed on this project.

Bidder understands and agrees that the contract to be executed by Bidder shall be bound and include all contract documents made available to him for his inspection in accordance with the Notice to Bidders.

Respectfully submitted,

Bidder (Company Name)

Name of
Person Signing:_____

Signature

Office Held:_____

Bidder's
Address:_____

(If Bidder is a Corporation)

Attest:

Secretary

(Corporate Seal)

EXHIBIT-A
BID PROPOSAL
CITY OF PORT ARANSAS, TEXAS
MARINA BOAT RAMP PARKING LOT REPAIR

A. GENERAL ITEMS

ITEM	ITEM DESCRIPTION	UNIT	QTY.	UNIT PRICE	TOTAL AMOUNT
1	Mobilization, Demobilization, Bonds and Insurance (max 3% of general items and storm sewer repair items, excluding this item)	L.S.	1	\$ _____	\$ _____
2	Topographic Survey, Grading Verification, and Final As-Built Survey by Texas RPLS	L.S.	1	\$ _____	\$ _____
3	Traffic Control and Regulation, including traffic control plan, signs, barricades, channelizing devices, pedestrian access, and maintenance of access	MO.	4	\$ _____	\$ _____
4	Silt Fence	L.F.	2,150	\$ _____	\$ _____
5	Inlet Protection Barrier	EA.	7	\$ _____	\$ _____
6	4" Yellow Parking Stall Striping	L.F.	9,700	\$ _____	\$ _____
7	4" Yellow Accessible Parking Striping and Access Aisle Hatching	L.F.	500	\$ _____	\$ _____
8	Accessible Parking Symbol and Sign Assembly, including thermoplastic accessible parking symbol, accessible parking sign, post, foundation, and all appurtenances	EA.	7	\$ _____	\$ _____
9	12" White Crosswalk Markings, thermoplastic material	L.F.	300	\$ _____	\$ _____
10	24" White Crosswalk Markings, thermoplastic material	L.F.	150	\$ _____	\$ _____
11	Detectable Warning Surface	EA.	3	\$ _____	\$ _____
12	Concrete Wheel Stops	EA.	35	\$ _____	\$ _____
13	Bulkhead Cap Repair, including sawcut, concrete repair, rebar cleaning, bonding agent	L.S.	1	\$ _____	\$ _____
SUBTOTAL GENERAL ITEMS (A)					\$ _____

B. STORM SEWER REPAIR ITEMS

14	Storm Sewer Repair at Sinkhole, All Sizes and Depths, including uncovering two joints of storm sewer for inspection and providing storm sewer repair per storm sewer repair detail on Sheet C04	EA.	1	\$ _____	\$ _____
15	Grate Inlet Modification, including new grate and frame, cast-in-place top, grate adjustment to provide positive drainage, and reset existing permeable pavers	EA.	7	\$ _____	\$ _____
SUBTOTAL STORM SEWER REPAIR ITEMS (B)					\$ _____

C. PHASE 1 PAVING ITEMS (FULL DEPTH RECONSTRUCTION)

16	Mobilization, Demobilization, Bonds and Insurance (max 3% of the applicable section total, excluding this item)	L.S.	1	\$ _____	\$ _____
17	Mill 2" Existing HMAC Pavement, including hauling and proper disposal	S.Y.	10,368	\$ _____	\$ _____
18	Concrete Paving Demolition	S.Y.	145	\$ _____	\$ _____
19	8" Base using Recycled pulverized base cement stabilized 11%, including compacted subgrade, 2" aggregate & Hauloff of Excess Base Material to meet final grade	S.Y.	10,514	\$ _____	\$ _____
20	Prime Coat	GAL	3,154	\$ _____	\$ _____
21	2" HMAC Type D	S.Y.	10,514	\$ _____	\$ _____

EXHIBIT-A
 BID PROPOSAL
 CITY OF PORT ARANSAS, TEXAS
 MARINA BOAT RAMP PARKING LOT REPAIR

SUBTOTAL PHASE 1 PAVING ITEMS (C)	\$ _____
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D. PHASE 2 PAVING ITEMS (MILL/OVERLAY)

22	Mobilization, Demobilization, Bonds and Insurance (max 3% of the applicable section total, excluding this item)	L.S.	1	\$ _____	\$ _____
23	Mill 2" Existing HMAc Pavement, including hauling and proper disposal	S.Y.	11200	\$ _____	\$ _____
24	8" Base using Recycled pulverized base cement stabilized 11%, including compacted subgrade, 2" aggregate & Hauloff of Excess Base Material to meet final grade	S.Y.	140	\$ _____	\$ _____
25	Tack Coat	GAL	1474	\$ _____	\$ _____
26	2" HMAc Type D	S.Y.	11340	\$ _____	\$ _____
SUBTOTAL PHASE 2 PAVING ITEMS (D)					\$ _____

TOTAL BASE BID ((A) + (B) + (C)):	\$ _____
--	-----------------

TOTAL PHASE 2 PAVING ITEMS (D)	\$ _____
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TOTAL BASE BID WITH PHASE 2 PAVING ITEMS [GENERAL ITEMS (A) + STORM SEWER REPAIR ITEMS (B) + PHASE 1 PAVING ITEMS (C) + PHASE 2 PAVING ITEMS (D)]	\$ _____
--	-----------------

BID BOND

STATE OF TEXAS

SURETY'S NO. _____

COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS; THAT WE THE UNDERSIGNED,
_____, as Principal (the "PRINCIPAL"), and the other
subscriber hereto, _____, as Surety (the "SURETY"),
do hereby acknowledge ourselves to be held and firmly bound to the City of Port Aransas, Nueces
County, Texas (the "OWNER"), in the penal sum of _____ (\$_____) in
lawful money of the United States, for the payment of which sum, well and truly to be made to the
OWNER, its successors and assigns, PRINCIPAL and SURETY to bind themselves, their heirs,
executors, administrators, successors and assigns, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the PRINCIPAL has submitted the Accompanying Bid for the construction of

Marina Boat Ramp Parking Lot Repair Project

NOW THEREFORE, the condition of this obligation is such that if the said PRINCIPAL
shall faithfully enter into such written Contract, then this obligation shall be void but otherwise, shall
remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said PRINCIPAL should
withdraw its Bid at any time after such Bid is opened but before official rejection of such Bid or, if
successful in securing the award thereof, said PRINCIPAL should fail to enter into the Contract and
furnish satisfactory Payment Bond and Performance Bond, if required, the OWNER, 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 be filed upon this Bond, venue shall lie in Nueces
County, Texas.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY do sign and seal this instrument this _____ day of _____, 20____ and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)

Witness: (if not a corporation)

By: _____

Name: _____

Title: _____

Name of Principal

By: _____

Name: _____

Title: _____

(SEAL)

Full Name of Surety

Address of Surety for Notice

Telephone Number of Surety:

ATTEST/SURETY WITNESS:

By: _____

Name: _____

Title: _____

By: _____

Name: _____

Title: Attorney in Fact

City of Port Aransas, Texas
Marina Boat Ramp Parking Lot Repair

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 he desires.

Name of Bidder (Legal Name): _____ Date Organized: _____

Address: _____ Date Incorporated: _____

Federal ID Number: _____ No. of Years in contracting business under present name: _____

List all other names under which your business has operated in the last 10 years:

CONTRACTS ON HAND (ATTACH PAGES AS REQUIRED):

Contract	Amount \$	Completion Date
----------	-----------	-----------------

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 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 similar projects most recently completed by your firm (attach pages as required):

Project	Amount \$	Mo/Yr Completed
---------	-----------	-----------------

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.)

City of Port Aransas, Texas
Marina Boat Ramp Parking Lot Repair

Bank References

Bank Name: _____ Contact Name: _____

Bank Address: _____

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.

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner and/or Owner's Representative in verification of the recitals comprising this Statement of Bidder's Qualifications.

Executed this _____ day of _____, 20_____.

By: (Signature) _____ (Print Name) _____

Company Name _____ Title: _____

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 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.

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

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

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

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

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

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

- (2) the vendor:

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

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

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

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

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

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

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

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

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

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

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

- (1) the date that the vendor:

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

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

- (2) the date the vendor becomes aware:

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

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

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

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

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

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

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

OFFICE USE ONLY

Date Received

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

2 ☐ Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

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

Name of Officer

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

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

☐ Yes ☐ No

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

☐ Yes ☐ No

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

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

7

Name of signatory

Signature

Date

CONTRACT

FORMS

STANDARD FORM OF AGREEMENT

STATE OF TEXAS

COUNTY OF NUECES

THIS CONTRACT, made and entered into this, the ____ day of _____, A.D. 20____, by and between the City of Port Aransas, of the County of Nueces and State of Texas, acting by and through the undersigned City Manager thereunto duly authorized to do so, hereinafter referred to as “OWNER”, and _____, a corporation duly authorized to do business and existing under the laws of the State of Texas, acting by and through a duly authorized officer thereof as attested to by the Secretary of said corporation of the City of _____, County of _____, State of _____, hereinafter referred to as “CONTRACTOR”.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, and under the conditions expressed in the bond(s) bearing even date herewith (if any), the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction of certain improvements described as follows:

Marina Boat Ramp Parking Lot Repair Project

and all necessary work of every kind or nature, including all extra work in connection therewith necessary to complete said improvements, under the terms as stated in the contract documents, including the General Conditions of Agreement, and, at its own proper cost and expense, to furnish all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance and other accessories and services necessary to complete the said construction in accordance with the conditions and prices stated in the Proposal attached hereto, and in accordance with the Bidding Documents (Notice to Bidders, General Instructions to Bidders, Bid Bond, etc.), General and Supplementary Conditions of Agreement, Special Conditions, Plans and other drawings and printed or written explanatory matter thereof, and the Specifications and addenda therefore, as prepared by HDR Engineering, Inc., hereinafter called “ENGINEER”, each of which has been identified by the CONTRACTOR and the ENGINEER, together with CONTRACTOR’s written Proposal, the General Conditions of Agreement and the

Payment and Performance Bonds hereto attached, all of which are made a part hereof and collectively evidence and constitute the entire Contract.

The CONTRACTOR hereby agrees to commence work within ten (10) days after the date written notice to do so shall have been given to it and to complete the same within the time specified in the contract documents, subject to such extensions of time as shall be specified in the General and Supplementary Conditions or shall have been specifically agreed to in writing by the parties hereto, which writing shall be attached to this Contract as a part hereof.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the Contract in accordance with the Proposal submitted therefor, which forms a part of this Contract, subject to additions and deductions as provided in the contract documents, and to make payment on account thereof as provided therein.

The undersigned persons executing this Contract and all other documents executed simultaneously herewith, do certify and attest that they are executing the same in their capacity and that they have authority to do so under the terms of the Charter, By-laws, ordinances, resolutions, and other applicable laws and regulations governing the OWNER and CONTRACTOR.

IN WITNESS WHEREOF, the City Manager has executed this Contract in the year and date first above written, under the authority granted to them by the City of Port Aransas.

CITY MANAGER, City of Port Aransas

ATTEST:

SECRETARY, City of Port Aransas

IN WITNESS WHEREOF, the undersigned officers of the corporation, whose names are hereinafter set out, do certify and attest that they have executed this Contract in their capacities as herein stated, for and on behalf of said corporation, and that they have authority to do so under specific authorization granted to them under the Charter or By-laws of said corporation or, if said Charter and By-laws are silent, then under authority granted to them under a resolution duly adopted by the Board of Directors of said corporation, as set out in the official minute book of said corporation, and an excerpt of said resolution is herein previously set out.

CONTRACTING CORPORATION (CONTRACTOR)

Officer

Office Held

ATTEST:

Secretary

PERFORMANCE BOND

STATE OF TEXAS

COUNTY OF NUECES

KNOW ALL MEN BY THESE PRESENTS THAT WE, _____,
as Principal, (the “CONTRACTOR”), and the other subscriber hereto, _____,
as Surety (the “SURETY”), do hereby acknowledge ourselves to be held and firmly bound to the City
of Port Aransas (the “OWNER”), of the County of Nueces and State of Texas, in the penal sum of
_____ (\$ _____) in lawful money of the United
States, for the payment of which sum, well and truly to be made to the OWNER, its successors and
assigns, CONTRACTOR and SURETY to bind themselves, their heirs, executors, administrators,
successors and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the CONTRACTOR has executed a Contract in writing with the OWNER on the
day as specified in the Agreement for

Marina Boat Ramp Parking Lot Repair Project

all of such work to be done as set out in full in said Contract Documents therein referred to and adopted
by the OWNER, all of which are made a part of this instrument as fully and completely as if set out in
full herein.

NOW THEREFORE, if the said CONTRACTOR shall faithfully and strictly perform the
Contract in all its terms, provisions, and stipulations in accordance with its true meaning and effect,
and in accordance with the Contract Documents referred to therein and shall comply strictly with each
and every provision of the Contract and with this Bond, then this obligation shall become null and
void and shall have no further force and effect; otherwise the same is to remain in full force and effect.
Should the CONTRACTOR fail to faithfully and strictly perform the Contract in all its terms,
including but not limited to the indemnifications thereunder, the SURETY shall be liable for all
damages, losses, expenses and liabilities that the OWNER may suffer in consequence thereof, as more
fully set forth herein.

IT IS FURTHER PROVIDED herein that pursuant to this undertaking, the CONTRACTOR hereof and the SURETY shall both be bound for such period of warranty as shall be expressed and set out in the General Conditions and Supplemental Conditions of Agreement, under the terms and conditions thereof for a period of one (1) year as is provided for in Chapter 2253, Texas Government Code, as amended.

It is further understood and agreed that the SURETY does hereby relieve the OWNER or its representatives from the exercise of any diligence whatever in securing compliance on the part of the CONTRACTOR with the terms of the Contract, and the SURETY agrees that it shall be bound to take notice of and shall be held to have knowledge of all acts or omissions of the CONTRACTOR in all matters pertaining to the Contract. The SURETY understands and agrees that the provision in the Contract that the OWNER will retain certain amounts due the CONTRACTOR until the expiration of 30 days from the acceptance of the Work is intended for the OWNER's benefit, and the OWNER will have the right to pay or withhold such retained amounts or any other amount owing under the Contract without changing or affecting the liability of the SURETY hereon in any degree.

It is further expressly agreed by SURETY that the OWNER or its representatives are at liberty at any time, without notice to the SURETY, to make any change in the Contract Documents and in the Work to be done thereunder, as provided in the Contract, and in the terms and conditions thereof, or to make any extension of time, any change in, addition to, or deduction from the Work to be done thereunder; and that such changes, if made, shall not in any way vitiate the obligation in this Bond and undertaking or release the SURETY therefrom.

It is further expressly agreed and understood that the CONTRACTOR and SURETY will fully indemnify, defend and save harmless the OWNER from any liability, loss, cost, expense, or damage arising out of CONTRACTOR's performance of the Contract.

If the OWNER gives SURETY notice of CONTRACTOR's default, SURETY shall, within 45 days, take one of the following actions:

1. Arrange for CONTRACTOR, with consent to the OWNER, to perform and complete the Contract; or
2. Take over and assume completion of the Contract itself, through its agents or through independent contractors, and become entitled to the payment of the balance of the Contract Price.

If the SURETY fails to take either of the actions set out above, it shall be deemed to have waived its right to perform and complete the Contract and receive payment of the balance of the Contract Price and the OWNER shall be entitled to enforce any remedies available at law, including but not limited to completing the Contract itself and recovering any cost in excess of the Original Contract price from the SURETY.

This Bond and all obligations created hereunder shall be performable in Nueces County, Texas. This Bond is given in compliance with the provisions of Chapter 2253, Texas Government Code, as amended, which is incorporated herein by this reference.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other Party at the address prescribed in the Contract Documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

IN WITNESS THEREOF, the said CONTRACTOR and SURETY have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)

Witness: (if not a corporation)

By: _____

Name: _____

Title: _____

Name of Contractor

By: _____

Name: _____

Title: _____

Date: _____

(SEAL)

Full Name of Surety

Address of Surety for Notice

ATTEST/SURETY WITNESS:

Telephone Number of Surety:

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: Attorney in Fact

Date: _____

PAYMENT BOND

STATE OF TEXAS

COUNTY OF NUECES

KNOW ALL MEN BY THESE PRESENTS THAT WE, _____,
as Principal, (the “CONTRACTOR”), and the other subscriber hereto, _____,
as Surety (the “SURETY”), do hereby acknowledge ourselves to be held and firmly bound to the City
of Port Aransas (the “OWNER”), of the County of Nueces and State of Texas, in the penal sum of
_____ (\$ _____) in lawful money of the United
States, for the payment of which sum, well and truly to be made to the OWNER, its successors and
assigns, CONTRACTOR and SURETY to bind themselves, their heirs, executors, administrators,
successors and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the CONTRACTOR has executed a Contract in writing with the OWNER on the
day as specified in the Agreement for

Marina Boat Ramp Parking Lot Repair Project

all of such work to be done as set out in full in said Contract Documents therein referred to and adopted
by the OWNER, all of which are made a part of this instrument as fully and completely as if set out in
full herein.

NOW, THEREFORE, if the said CONTRACTOR shall pay all claimants supplying labor
and materials to him or a Subcontractor in the prosecution of the Work provided for in the Contract,
then, this obligation shall be void; otherwise the same is to remain in full force and effect;

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

IN WITNESS THEREOF, the said CONTRACTOR and SURETY have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)

Witness: (if not a corporation)

By: _____

Name: _____

Title: _____

Name of Contractor

By: _____

Name: _____

Title: _____

Date: _____

(SEAL)

Full Name of Surety

Address of Surety for Notice

ATTEST/SURETY WITNESS:

Telephone Number of Surety:

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: Attorney in Fact

Date: _____

Implementation of House Bill 1295

Certificate of Interested Parties (Form 1295):

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The law applies only to a contract of a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least \$1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

The Texas Ethics Commission was required to adopt rules necessary to implement that law, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's website. The commission adopted the Certificate of Interested Parties form (Form 1295) on October 5, 2015. The commission also adopted new rules (Chapter 46) on November 30, 2015, to implement the law. The commission does not have any additional authority to enforce or interpret House Bill 1295.

Filing Process:

Starting on January 1, 2016, the commission will make available on its website a new filing application that must be used to file Form 1295. A business entity must use the application to enter the required information on Form 1295 and print a copy of the completed form, which will include a certification of filing that will contain a unique certification number. An authorized agent of the business entity must sign the printed copy of the form and have the form notarized. The completed Form 1295 with the certification of filing must be filed with the governmental body or state agency with which the business entity is entering into the contract.

The governmental entity or state agency must notify the commission, using the commission's filing application, of the receipt of the filed Form 1295 with the certification of filing not later than the 30th day after the date the contract binds all parties to the contract. The commission will post the completed Form 1295 to its website within seven business days after receiving notice from the governmental entity or state agency.

Information regarding how to use the filing application will be available on this site starting on January 1, 2016.

Additional Information:

HB 1295

Certificate of Interested Parties (Form 1295)

New Chapter 46, Ethics Commission Rules:

46.1. Application

46.3. Definitions

46.5. Disclosure of Interested Parties Form

CERTIFICATE OF INTERESTED PARTIES**FORM 1295****OFFICE USE ONLY**

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 Check only if there is **NO** Interested Party. ☐

6 UNSWORN DECLARATION

My name is _____, and my date of birth is _____.

My address is _____, _____, _____, _____, _____.
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20____.
(month) (year)

Signature of authorized agent of contracting business entity
(Declarant)

ADD ADDITIONAL PAGES AS NECESSARY

STATE OF TEXAS – HOUSE BILL 89 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify the above-named company, under the provisions of **Subtitle F, Title 10, Texas Government Code Chapter 2270:**

- 1. Does not boycott Israel currently; and**
- 2. Will not boycott Israel during the term of the contract for goods or services with the above-named Company, business or individual with the City of Port Aransas.**

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

Position/Title

Signature of Company Representative

STATE OF TEXAS – HOUSE BILL 1196 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify the above-named company, under the provisions of **Subtitle F, Title 10, Texas Government Code Chapter 2264:**

1. Does not and will not knowingly employ an undocumented worker; and
2. That if, after receiving a public subsidy, the above-named company is convicted of a violation under 8 U.S.C. Section 1324a(f), the above-named company shall repay the amount of the public subsidy with interest at a rate of five percent (5%), and according to the other terms provided by an agreement under Section 2264.053, not later than the 120th day after the date the Owner notifies the above-named company of the violation.

Pursuant to Section 2264.001, Texas Government Code:

1. *"Undocumented Worker" means an individual who, at the time of employment, is not:*
 - (A) *lawfully admitted for permanent residence to the United States; or*
 - (B) *authorized under law to be employed in that manner in the United States.*
2. *"Public Subsidy" means a public program or public benefit or assistance of any type that is designed to stimulate the economic development of a corporation, industry, or sector of the state's economy or to create or retain jobs in this state. The term includes grants, loans, loan guarantees, benefits relating to an enterprise or empowerment zone, fee waivers, land price subsidies, infrastructure development and improvements designed to principally benefit a single business or defined group of businesses, matching funds, tax refunds, tax rebates, or tax abatements.*

Date

Position/Title

Signature of Company Representative

STATE OF TEXAS – SENATE BILL 13 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify the above-named company, under the provisions of **Subtitle F, Title 10, Texas Government Code Chapter 2274:**

- 1. Does not boycott energy companies currently; and**
- 2. Will not boycott energy companies during the term of the contract for goods or services.**

Pursuant to Section 2274.001, Texas Government Code:

- 1. "Boycott Energy Companies" means, without an ordinary business purpose, 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 with a company because the company:*
 - a. engages in the exploration, production, utilization, transportation, sale, or manufacturing of fossil fuel-based energy and does not commit or pledge to meet environmental standards beyond applicable federal and state law; or*
 - b. does business with a company described by Paragraph (a) above; 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

Position/Title

Signature of Company Representative

STATE OF TEXAS – SENATE BILL 19 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify the above-named company, under the provisions of **Subtitle F, Title 10, Texas Government Code Chapter 2274:**

- 1. Does not have a practice, policy, guidance, or directive that discriminates against firearm entity or firearm trade associations currently; and**
- 2. Will not discriminate against a firearm entity or fire trade association during the term of the contract for goods or services.**

Pursuant to Section 2274.001, Texas Government Code:

- 1. "Firearm entity" means:*
 - a. a firearm, firearm accessory, or ammunition manufacturer, distributor, wholesaler, supplier, or retailer; and*
 - b. a sport shooting range as defined by Section 250.001, Local Government Code.*
- 2. "Firearm trade association" means any person, corporation, unincorporated association, federation, business league, or business organization that:*
 - a. is not organized or operated for profit and for which none of its net earnings inures to the benefit of any private shareholder or individual;*
 - b. has two or more firearm entities as members; and*
 - c. is exempt from federal income taxation under Section 501(a), Internal Revenue Code of 1986, as an organization described by Section 501(c) of that code.*
- 3. "Ammunition" means a loaded carriage case, primer, bullet, or propellant powder with or without a projectile.*
- 4. "Firearm" means a weapon that expels a projectile by the action of explosive or expanding gases.*

5. *"Firearm accessory" means a device specifically designed or adapted to enable an individual to wear, carry, store, or mount a firearm on the individual or on a conveyance and an item used in conjunction with or mounted on a firearm that is not essential to the basic function of the firearm. The term includes a detachable firearm magazine.*
6. *"Discriminate against a firearm entity or firearm trade association"*
- a. *means, with respect to the entity or association, to:*
 - i. *refuse to engage in the trade of any goods or services with the entity or association based solely on its status as a firearm entity or firearm trade association;*
 - ii. *refrain from continuing an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; or*
 - iii. *terminate an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; and*
 - b. *does not include:*
 - i. *the established policies of a merchant, retail seller, or platform that restrict or prohibit the listing or selling of ammunition, firearms, or firearm accessories; and*
 - ii. *a company's refusal to engage in the trade of any goods or services, decision to refrain from continuing an existing business relationship:*
 - 1. *to comply with federal, state, or local law, policy, or regulations or a directive by a regulatory agency; or*
 - 2. *for any traditional business reason that is specific to the customer or potential customer and not based solely on an entity's or association's status as a firearm entity of firearm trade association.*
7. *"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

Position/Title

Signature of Company Representative

STATE OF TEXAS – SENATE BILL 252 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify on behalf of the above-named company, under the provisions of **Subtitle F, Texas Government Code Chapter 2252, and Chapters 806 and 807 of the Texas Government Code:**

Foreign Terrorist Organization.

- 1. Neither the Company, nor any wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of the Company (i) engages in business with Iran, Sudan or any foreign terrorist organization as described in Chapters 806 or 807 of the Texas Government Code, or Subchapter F of Chapter 2252 of the Texas Government Code.**
2. The term “foreign terrorist organization” as used in this section means an organization designated as a foreign terrorist organization by the United States secretary of state as authorized by 8 U.S.C. Section 1189.

Date

Position/Title

Signature of Company Representative

STATE OF TEXAS – SENATE BILL 2116 VERIFICATION

I, _____, the undersigned representative of
(Person Name)

(Company or Business Name)

hereby referred to as company, being an adult over the age of eighteen (18) years of age, do hereby certify the above-named company, under the provisions of **Subtitle F, Title 10, Texas Government Code Chapter 2274:**

1. **Will not grant direct or remote access to or control of critical infrastructure in this State, excluding access specifically allowed by the governmental entity for product warranty and support purposes; and**
2. **Is not owned by or the majority of stocks or other ownership interest of the company is held or controlled by:**
 - a. **individuals who are citizens of China, Iran, North Korea, Russia or a designated country; or**
 - b. **a company or other entity, including a government entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or a designated country.**

regardless of whether the company's or its parent company's securities are publicly traded or the company or its parent company is listed on a public stock exchange as a Chinese, Iranian, North Korean, or Russian company or a company of a designated country.

Pursuant to Section 2274.0101, Texas Government Code:

1. *"Critical infrastructure" means a communication infrastructure system, cybersecurity system, electric grid, hazardous waste treatment system, or water treatment facility.*
2. *"Cybersecurity" means the measures taken to protect a computer, computer network, computer system, or other technology infrastructure against unauthorized use or access.*

3. *"Designated country" means a country designated by the governor as a threat to critical infrastructure under Section 2274.0103.*
4. *"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

Position/Title

Signature of Company Representative

INSURANCE REQUIRED FOR THIS CONTRACT

TYPE OF INSURANCE	MINIMUM INSURANCE COVERAGE
• COMMERCIAL GENERAL LIABILITY 1. Commercial Broad Form 2. Premises – Operations 3. Underground Hazard 4. Products/Completed Operations 5. Contractual Liability 6. Independent Contractors 7. Personal and Advertising Injury Explosion, Collapse and Underground property damage hazards included. Products and Completed Operations Liability, Mobile Equipment Liability, Personal Injury Offenses and Contractual Liability shall be included. The policy will include the Per Project General Aggregate endorsement. This General Liability coverage will be primary and noncontributory to any policies written for the benefit of the Owner and HDR Engineering, Inc. Additional Insured and Waiver of Subrogation clauses in favor of the Owner and HDR Engineering, Inc..	\$1,000,000 Per Occurrence \$2,000,000 Annual Aggregate Limits
• AUTOMOBILE LIABILITY POLICY Coverage is to include all cars and trucks owned, rented, borrowed, hired, or leased, and others of non-ownership nature used by employees. Additional Insured and Waiver of Subrogation clauses in favor of the Owner and HDR Engineering, Inc.	\$1,000,000 Combined Single Limit
• WORKERS' COMPENSATION Statutory including Employer's Liability. Persons providing services on the project ("subcontractor") – includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to a project. Workers' Compensation and Occupational Disease Insurance in accordance with applicable laws. Must include Waiver of Subrogation.	Statutory
• BUSINESS UMBRELLA LIABILITY The Umbrella policy will provide coverage over the General Liability, Products Liability, Completed Operations Liability, Automobile Liability and Employers' Liability coverages. The Umbrella Liability policy will be following form to all primary policies' coverages.	\$1,000,000 Per Claim \$1,000,000 Annual Aggregate
• POLLUTION LIABILITY CONTRACTOR shall obtain and maintain coverage to include exposure of long-term environmental impact.	\$1,000,000 Aggregate Per Claim \$1,000,000 Limits
• BUILDER'S RISK Adequate to fully cover the insurable portion of the project. (Only applicable if there is a building on the project).	☐ Required ☒ Not Required

WORKERS' COMPENSATION INSURANCE COVERAGE

A. DEFINITIONS:

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

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

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

- B. The CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for employees of the CONTRACTOR providing services on the project for the duration of the project.
- C. The CONTRACTOR must provide a certificate of coverage to the OWNER ("CITY OF PORT ARANSAS") prior to being awarded the contract.
- D. If the coverage period shown on the CONTRACTOR's current certificate of coverage ends during the duration of the project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with the OWNER showing that coverage has been extended.
- E. The CONTRACTOR shall obtain from each person providing services on a project, and provide to the OWNER:
 - (1) a certificate of coverage, prior to that person beginning work on the project, so the OWNER will have on file certificates of coverage showing coverage for all persons providing services on the project; and

- (2) no later than seven days after receipt by the CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
- F. The CONTRACTOR shall retain all required certificates of coverage for the duration of the project and for one year thereafter.
- G. The CONTRACTOR shall notify the OWNER in writing by certified mail or personal delivery, within 10 days after the CONTRACTOR knew or should have known, of any changes that materially affects the provision of coverage of any person providing services on the project.
- H. The CONTRACTOR shall post on each project site a notice, in the text, form and manner prescribed by the Texas Worker's Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

NOTICE
REQUIRED WORKER'S COMPENSATION COVERAGE

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

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

- I. The CONTRACTOR shall contractually require each person with whom it contracts to provide services on a project, to:
 - 1. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for all of its employees providing services on the project, for the duration of the project;
 - 2. provide to the CONTRACTOR, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

3. provide the CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage, showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
 4. obtain from each other person with whom it contracts, and provide to the CONTRACTOR:
 - a. a certificate of coverage, prior to the other person beginning work on the project; and
 - b. a new certificate of coverage shown extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
 5. retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
 6. notify the OWNER in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and
 7. contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.
- J. By signing this contract or providing or causing to be provided a certificate of coverage, the CONTRACTOR is representing to the OWNER that all employees of the CONTRACTOR who will provide services on the project will be covered by worker's compensation coverage for the duration of the project, that the coverage agreements will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.
- K. The CONTRACTOR's failure to comply with any of these provisions is a breach of contract by the CONTRACTOR which entitles the OWNER to declare the CONTRACTOR void if the CONTRACTOR does not remedy the breach within ten days after receipt of notice of breach from the OWNER.

Insert Contractors Insurance

CONDITIONS
OF THE
CONTRACT

STANDARD GENERAL CONDITIONS

OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS

OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
- 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 - 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 - 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 - 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 - 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 - 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 - 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 - 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 - 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 - 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 - 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
 4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 Delegation of Professional Design Services

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

- B. *Change Proposal Procedures*

- 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
- 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
 - 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
 - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 6. Expenses incurred in preparing and advancing Claims.
 - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
 - 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:* Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance:* Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS

OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms, if any, used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The paragraph address system used in these Supplementary Conditions is the same as the paragraph address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

SC-1.01.A.16 Add the following to Paragraph 1.01.A.16.:

When the Project is to be constructed under multiple direct Contracts awarded by the Owner, the term "Contractor" shall mean the appropriate prime contractor. Whenever a specific prime Contractor is referred to, terms such as "General Contractor", "Electrical Contractor", "Plumbing Contractor", "HVAC Contractor", or other appropriate Contract-indicating term will be used.

SC-1.01.A.39 Amend Paragraph 1.01.A.39. by adding the following subparagraphs:

- a. Design Specification – Whenever the term "Design Specification" is used, it shall be understood that the performance of the completed work is as designed by the Engineer, and the Contractor must follow the requirements of the drawings and specifications; follow the manufacturer's recommendations (material and equipment); follow industry standard procedures and provide top quality workmanship.
- b. Performance Specification – Whenever the term "Performance Specification" is used, it shall be understood that the performance of the completed work is the responsibility of the Contractor, provided the Owner has faithfully followed all written operational and maintenance instructions supplied by the Contractor. The Contractor is not relieved of the responsibility for improper performance of the completed work even if there was improper operation and/or maintenance by the Owner but it obviously was not the cause of improper performance. In a performance specification, the Contractor is responsible for the design of the item furnished and installed by him. It is intended that the item function properly without excessive operation and maintenance being required by the Owner. The item furnished must incorporate the features specified but still perform as intended. The materials specified are to set a minimum standard but shall not be considered a design. If the design furnished by the Contractor requires higher quality material in order to perform as intended, it shall be furnished at no increase in cost to the Contract amount. When minimum dimensions are specified, they

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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shall not be considered a design. If the design furnished by the CONTRACTOR requires larger dimensions in order to perform as intended, it shall be furnished at no increase in cost to the Contract amount.

SC-1.01.A.40 Add the following to Paragraph 1.01.A.40.:

Trucking, shipping, delivery firms, consultants, and entities performing testing or inspection retained by Contractor or any Subcontractor are considered to be Subcontractors.

SC-1.01.A.44 Add the following to Paragraph 1.01.A.44.:

Entities that rent construction equipment or machinery, but are not incorporated into the Work, are considered to be Suppliers. If such rental entity furnishes both equipment and one or more personnel to operate and maintain the equipment, such entity is a Subcontractor.

1.02 Terminology

SC-1.02 Delete Paragraph 1.02.C. in its entirety and insert the following in its place:

- C. *Calendar Day*: A "Calendar Day", as related to contract time of completion as stipulated in the Contract Documents, is any day of the calendar, including Saturdays, Sundays and Holidays, of 24 hours measured from midnight to the next midnight.

SC-1.02 Add the following new paragraph immediately after Paragraph 1.02.G.:

- H. *Special Conditions*: Whenever the term "Special Conditions" is used, it shall be understood as being those general requirements that are set out in such detail that they apply only to this Contract.

ARTICLE 2—PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

- B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.02 Copies of Documents

SC-2.02 Delete Paragraph 2.02.A. in its entirety and insert the following new paragraph in its place:

- A. Owner shall furnish to Contractor two (2) paper copies of conformed Contract Documents incorporating and integrating all Addenda and amendments, if any, negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one (1) copy in electronic portable document format (PDF). Additional paper copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

SC-3.01 Delete Paragraph 3.01.C. in its entirety and insert the following new paragraph in its place:

- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the various Contract Documents, the priority of interpretation shall be in the following order: Signed Agreement, Federal or State Requirements (if any), Addenda, Drawings, Special Conditions, Invitation for Bids, Instructions to Bidders, Supplementary Conditions, General Conditions, Technical Specifications, Proposal, Notice to Bidders and Bonds.

SC-3.01 Add the following new paragraphs immediately after Paragraph 3.01.E.:

- F. The Specifications and other verbal components of the Contract Documents may vary in form, format, and style. Some Specification sections are written in varying degrees of streamlined or declarative style and some Specifications sections may, in comparison, employ a more-narrative style. Omissions of such words and phrases as "Contractor shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined language in the Contract Documents. Omitted words and phrases are incorporated by inference. Similar types of provisions may appear in various parts of a Specifications section or elsewhere in the Contract Documents. Contractor shall not attempt to take advantage of any variation of form, format or style in Change Proposal(s) and Claim(s).
- G. Cross referencing of Specification sections in a Specifications section's heading "Related Sections includes, but are not necessarily limited to: "and elsewhere within each Specifications section is provided as an aid and convenience to Contractor. Contractor shall not rely on cross referencing indicated and is responsible for coordinating the entire Work and providing a complete Project whether or not cross referencing is provided in each Specifications section or whether or not cross referencing is complete.

3.02 *Reference Standards*

SC-3.02.A.1. Add the following to Paragraph 3.02.A.1.:

Reference to technical society, organization or body is made in specifications in accordance with the following abbreviations:

ASHO	American Association of State Highway Officials
ACI	American Concrete Institute
ASA	American Standards Association
ASTM	American Society for Testing Materials
AWWA	American Water Works Association
FS	Federal Specifications
PCA	Portland Cement Association
AIEE	American Institute of Electrical Engineers
NEC	National Electrical Code
UL	Underwriter's Laboratories

AISI	American Iron and Steel Institute
API	American Petroleum Institute
IPCEA	Insulated Power Cable Engineer's Association
NEMA	National Electrical Manufacturer's Association
AWS	American Welding Society
AISC	American Institute of Steel Construction

3.03 *Reporting and Resolving Discrepancies*

SC-3.03.A.2. Add the following to Paragraph 3.03.A.2.:

Further, it is the intent of the Contract Documents that the Contractor shall perform all work to complete the project ready for its intended use. The Contractor will not be allowed extra payment when a literal interpretation of any portion of the Contract Documents would conflict with the obvious intent of the Contract Documents. Contractor shall bear the expense of correcting any discrepancies on the drawings or specifications, which are not discovered or reported by the Contractor prior to construction and which, in the opinion of the Engineer, could have been discovered by reasonable diligence on the part of the Contractor.

SC-3.03.A.3. Add the following to Paragraph 3.03.A.3.:

However, If the Contractor feels that there is insufficient information in order for him to prepare his bid and/or construct the work, he is required to make a written request for additional information. The Contractor shall not use the lack of information as a basis for requesting extra compensation.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.04 *Progress Schedule*

SC-4.04 Add the following new paragraph immediately after Paragraph 4.04.A.2.:

3. Progress schedules shall be revised once each month to show actual progress to proposed progress. A copy of the revised progress schedule shall be submitted with the Contractor's Monthly Request for Payment. The monthly request for payment may not be approved by the Engineer until the revised progress schedule has been received.

4.05 *Delays in Contractor's Progress*

SC-4.05.C. Amend Paragraph 4.05.C by adding the following subparagraphs:

5. *Weather-Related Delays*

- a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2. of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: (1) that weather conditions were abnormal for the period of time in which the delay occurred, (2) that such weather conditions could not have been reasonably anticipated, and (3) that such weather conditions had an adverse effect on the Work on the critical path at the time of the delay.

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.02 *Use of Site and Other Areas*

SC-5.02 Add the following new paragraphs immediately after Paragraph 5.02.D.:

- E. *Contractor's Buildings:* The building of structures for housing men, or the erection of tents or other forms of protection, will be permitted only at such places as the Engineer shall direct, and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the Engineer.
- F. *Sanitation:* Necessary sanitary conveniences for the use of laborers on the work, properly secluded from the public observation, shall be constructed and maintained by the Contractor in such manner and at such points as shall be approved by the Engineer, and their use shall be strictly enforced.
- G. *Utility Services for Construction:* If temporary utility services, including water, are required, contract with utility company concerned. Contractor to furnish all temporary utility services and water at his expense.
- H. *Fences and Other Obstructions:* Where necessary to take down fences, signs or other obstructions, replace facilities to their original or better condition, regardless if on public or private property. Contractor to notify Engineer, Owner, and private property owner prior to removal and/or replacement of obstruction.

5.03 *Subsurface and Physical Conditions*

SC-5.03 Delete Paragraph 5.03.A. in its entirety and insert the following new paragraph in its place:

- A. *Reports and Drawings:* There are no reports of explorations and tests of subsurface conditions at or adjacent to the Site.

SC-5.03 Delete Paragraph 5.03.B. in its entirety and insert the following new paragraph in its place:

- B. *Underground Facilities:* The Drawings show as much information as can be reasonably obtained by an engineering survey party and from City and utility company records regarding the location and nature of pipelines, storm sewers, water lines, sanitary sewer, telephone conduits, etc. However, the accuracy of or completeness of such information is not guaranteed. It shall be the Contractor's responsibility to locate such underground features sufficiently in advance of operation to preclude damage to same. In the event of damage to underground facilities whether shown or not in the drawings, the Contractor shall make the necessary repairs to place the facilities back in service at no increase in the Contract price and all such repairs shall conform to the requirements of the company or agency servicing the facility. Whenever existing utilities present obstructions to grades and alignment of structures, immediately notify Engineer who, without delay, will determine whether existing improvements are to be relocated. Where necessary to move services, poles, guy wires, pipelines or other obstructions, make arrangements with owners of utilities. Owner will not be liable for damages on account of delays due to changes made by owners of privately owned utilities which hinder progress of work.

SC-5.04.A Add the following new paragraph immediately after Paragraph 5.04.A.4.:

5. Contractor encounters human remains, recognizes the existence of burial markers, archaeological sites, historical sites, artifacts of potential archaeological or historical interest, or wetlands not shown or indicated in the Contract Documents, Contractor shall immediately cease operations that may disturb such area(s) and secure the adjacent Work; and Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations (Contractor shall continue to suspend such operations until otherwise instructed by Owner but shall continue with all other operations that do not affect those remains or features);

5.06 *Hazardous Environmental Conditions*

SC-5.06 Delete Paragraph 5.06.A. in its entirety and insert the following new paragraph in its place:

- A. *Reports and Drawings:* There are no reports or drawings known to the Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

ARTICLE 6—BONDS AND INSURANCE

6.03 *Contractor's Insurance*

SC-6.03 Delete Paragraph 6.03.A. in its entirety and insert the following new paragraph in its place:

- A. *Required Insurance:* Refer to separate "Insurance Requirements" section for a schedule of insurance coverage required for this Project.

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04 and all sub-sections in their entirety.

6.05 *Property Losses: Subrogation*

SC-6.05 Delete Paragraph 6.05 and all sub-sections in their entirety.

6.06 *Receipt and Application of Property Insurance Proceeds*

SC-6.06 Delete Paragraph 6.06 and all sub-sections in their entirety.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.02 *Supervision and Superintendence*

SC-7.02 Add the following to Paragraph 7.01, following Paragraph 7.02.B.:

- C. Unless Owner otherwise agrees in writing, the superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C.:

1. Regular working hours will be 7:00 a.m. to 6:00 p.m.

2. Owner's legal holidays are New Year's Day, Martin Luther King Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and the Day After, Christmas Eve, and Christmas Day.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C.:

- D. Contractor shall be responsible for the cost of overtime (premium) pay and other expenses incurred by Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

7.04 *Services, Materials, and Equipment*

SC-7.04 Add the following to the end of Paragraph 7.04.A.:

and whether the Contractor has been paid, partially paid, or not paid for such work.

SC-7.04 Add the following new subparagraph immediately after Paragraph 7.04C.:

1. No materials shall be stored nor shall any equipment be parked on adjacent property without the expressed consent of the owner of the property concerned. Watertight storage facilities of suitable size with floors raised above the ground shall be provided for materials liable to damage from exposure to the weather. Other materials shall be stored on blocks off the ground per Supplier's recommendation or as directed by the Engineer. Materials shall be so placed as to permit easy access for inspection and identification. Any material, which has deteriorated, become damaged or is otherwise unfit for use, shall not be used in the work. Upon completion of all work or when directed by the Engineer, the Contractor shall remove the storage facilities from the site.

7.07 *Concerning Subcontractors and Suppliers*

SC-7.07 Add a new paragraph immediately after Paragraph 7.07.M.:

- N. The Contractor shall have the manufacturer or supplier of all materials used in the construction of this project certify that the particular material being furnished conforms to the requirements of these specifications. The furnishing of this certificate does not prevent the Engineer from rejecting at the project site any material that has been damaged or that does not, in the opinion of the Engineer, meet the requirements of these specifications.

7.10 *Taxes*

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A.:

- B. Owner is exempt from payment of sales and compensating use taxes of the State of Texas and of cities and counties thereof on all materials to be incorporated into the Work.
 1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of materials and equipment to be incorporated into the Work. The Owner will make no further allowance for and will make no price adjustment above or below the originally bid unit prices on account of this tax.

2. Owner's exemption does not apply to construction tools or machinery, construction equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

7.13 *Safety and Protection*

SC-7.13 Add the following new subparagraphs immediately after subparagraph 7.13.C.3.:

- a. *Adjoining Property:* The said Contractor shall take proper means to protect the adjacent or adjoining property or properties in any way encountered, which might be injured or seriously affected by any process of construction to be undertaken under this Agreement, from any damage or injury by reason of said process of construction; and, he shall be liable for any and all claims for such damage on account of his failure to fully protect all adjoining property. The Contractor agrees to indemnify, save and hold harmless the Owner against any claim or claims for damages due to any injury to any adjacent or adjoining property, arising or growing out of the performance of the Contract; but, any such indemnity shall not apply to any claim of any kind arising out of the existence or character of the work.
- b. *Private Utilities:* The Contractor shall protect all buildings and other property, which may be endangered during progress of the work and leave same in as good condition as when found. Where sewer mains, water mains, sewer services, water services, gas mains, gas services, telephone or electrical conduits, poles and facilities of other public utilities are encountered, give protection in all cases. Where excavation is made below existing utilities, substantially support with wood blocks, beams or other means as directed, any pipe, conduit, or other units so that same may be left in good working condition with no damage of after settlement. The Contractor shall replace or repair damaged property at no cost to the Owner. No valve, switch or other control on existing utility systems shall be operated for any purposes by the Contractor without approval of the Engineer and the utility. Exercise care in performing work so as not to interrupt service. Locate and uncover existing utilities ahead of heavy excavation equipment. If utility service must be interrupted, all consumers affected by such operations shall be notified by the Contractor as directed by the Engineer and/or utility before the operation and advised of the probable time when service will be restored.
- c. *Trees, Plants and Shrubs:* Except when shown otherwise on the drawings, all existing trees, plants and shrubs shall be protected from damage during construction operations. Substantially constructed guards, barricades or other protective measures shall be provided as required to protect against moving equipment. Contractor shall replace at his own expense any trees, plants and shrubs which, in the opinion of the Engineer, are damaged or destroyed due to carelessness. Trees, plants and shrubs that fall within the limits of street, sidewalk or driveway excavation shall be removed by the Contractor. If the abutting property owner requests it, the Contractor shall remove them in a manner suitable for replanting and carefully deposit them on the landowner's property (large trees are excepted); otherwise, they shall become the property of the Contractor. Unless shown otherwise on the drawings, trees, plants and shrubs that fall within the limits of pipe trench excavation shall be removed and replanted by the Contractor in their original position as nearly as possible. As long as the Contractor uses

reasonable diligence in removing and replanting trees, plants and shrubs, he shall not be responsible for their survival.

SC-7.13 Add the following new paragraph immediately after Paragraph 7.13.E.:

- F. The Contractor shall provide barricades, signs, lights, guards and any other items required to maintain properly marked detours around his operation.

SC-7.13 Add the following new paragraph immediately after Paragraph 7.13.H.:

- I. It is the declared and acknowledged intent of these specifications that all work such as backfilling of excavations, repairs to roads and driveways, and cleanup work or other such operations shall follow as closely as practical to the laying and constructing operation in such manner that the public is not unnecessarily inconvenienced, nor a hazard to public safety created. The Owner and/or Engineer shall be entitled to notify the Contractor if his force and/or equipment are insufficient to such a degree that the public is unnecessarily inconvenienced and/or a hazard to the public safety is created. The Contractor, upon such notification by the Owner and/or Engineer, shall make the necessary changes to his force and/or equipment, or the Owner and/or Engineer may stop the work in order to insure the proper execution of the work and to avoid inconveniences to the public or avoid safety hazards as herein noted.

7.14 *Hazard Communication Programs*

SC-7.14 Add the following new paragraph immediately after Paragraph 7.14.A.:

- B. *Single Prime Contract:* Contractor shall be responsible for coordinating exchange of safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations. Contractor shall provide a centralized location for the maintenance of the safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of employers on the Site.

7.16 *Submittals*

SC-7.16 Add the following new subparagraph immediately before Paragraph 7.16.A.1.:

- 2. The Contractor shall furnish to the Engineer, for approval, within 10 days of the date of the "Notice to Proceed with Construction", a complete list of all items on which shop drawings will be prepared.

SC-7.16 Delete subparagraphs 7.16.A.2. and 3. in their entirety and insert the following in their place:

- 2. Shop drawings shall be prepared in such a form and detail that full compliance with the Contract Documents and the best practices of the industry are clearly demonstrated. All shop drawings involving equipment of any nature shall include a full and complete parts list, the current street address and current phone number of the nearest authorized dealer, the current street address and current phone number of the nearest authorized repair facility, and a full and complete list of recommended spare parts. The Contractor shall include with each and every shop drawing submitted a signed statement that the submittal has been reviewed by the Contractor and is in full compliance with the Contract Documents. In the event there are minor deviations from the Contract

Documents, the Contractor shall itemize each and every deviation and state in writing why the deviation is required and exactly how the submitted equipment or material will be equal to or better than that required by the Contract Documents. Shop Drawings received without the required statement and/or without a complete list of deviations shall be rejected and a resubmittal will be required.

3. The Contractor shall receive no direct payment for the preparation of shop drawings; that cost is considered subsidiary to the appropriate bid item.

SC-7.16 Delete subparagraphs 7.16.C.4. and in its entirety and insert the following in its place:

4. Engineer's review and approval of a Shop Drawing, Sample, or variation from the requirements of the Contract Documents shall not constitute acceptance by the Engineer of any responsibility for the accuracy, coordination and completeness of the shop drawings or the items of equipment or material represented in the submission. Accuracy, coordination and completeness of shop drawings shall be the sole responsibility of the Contractor, including full responsibility to conform with any of the Engineer's review comments, corrections, modifications or notes and to fully conform with the Contract Documents. In all cases, the Contractor and the Contractor alone is responsible for the correctness of dimensions.

7.17 *Contractor's General Warranty and Guarantee*

SC-7.17 Add the following new subparagraph immediately after subparagraph 7.17.C.2.:

3. damage due to improper operation and maintenance by the Owner, provided the Contractor provides the following:
 - a. The Contractor furnishes the Owner with written operational and maintenance instructions on all items.
 - b. During the warranty period, the Contractor makes trips to the project site at six (6) months and eleven (11) months and inspects the items for proper operation and maintenance.
 - c. After each inspection trip, the Contractor shall submit his findings in writing to the Owner and the Engineer.

Failure to fulfill any one or all of these conditions will make the Contractor liable for repairing damage (at no cost to the Owner) to items under warranty, even if in his opinion, it was due to improper operation and/or maintenance by the Owner.

SC-7.17 Add the following new paragraph immediately after Paragraph 7.17.E.:

- F. *Accelerated Implementation of Date of Guarantee*: Upon written request to the Owner, certain items of equipment will be considered for beginning their warranty period prior to the date of Certificate of Substantial Completion. To be considered, the following conditions must be present:
 1. Item must be in full, continuous and satisfactory operation for at least 30 days before beginning warranty period.
 2. Placing the item into full service must be acceptable to the Owner.

3. Like items will be considered as a group. Example: If a lift station contains 4 pumps, all 4 pumps must be in place and operating in a fully automatic mode before beginning the warranty period can be considered.

If the Owner does allow the Contractor to begin the warranty period on certain items prior to the issuance of the Certificate of Substantial Completion, that in no way affects the Guarantee on the remainder of the work.

ARTICLE 8—OTHER WORK AT THE SITE

No Supplementary Conditions in this Article.

ARTICLE 9—OWNER’S RESPONSIBILITIES

No Supplementary Conditions in this Article.

ARTICLE 10—ENGINEER’S STATUS DURING CONSTRUCTION

10.03 *Resident Project Representative*

SC-10.03 Add the following new subparagraph immediately after Paragraph 10.03.A.:

1. On this Project, by agreement with Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.

10.04 *Engineer’s Authority*

SC-10.04 Add the following new subparagraph immediately after Paragraph 10.04.D.:

1. The Engineer shall be entitled to make such changes and alterations as the Engineer may see fit in the line, location, grade, form, dimensions, scope of the work, plans or material for the work herein contemplated, or any part thereof either before or after the beginning of this construction, without affecting the validity of this Contract and the accompanying Performance and Payment Bonds. If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for a claim for damages, or anticipated profits on the work that may be dispensed with, except as provided for unit price items under the Measurement and Payment provisions. If the amount of work is increased, and the work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price, if any, established for such work under this Contract, except as provided for unit price items under the Measurement and Payment provisions; otherwise, such additional work shall be paid for as provided under Article 11 of the General Conditions. In case the Engineer shall make such changes or alterations as shall make useless any work already done or material already furnished or used in said work, then the Contractor shall be compensated for any material or labor so used, and for any actual loss occasioned by such change, due to actual expenses incurred in preparation for the work as originally planned.

10.07 *Limitations on Engineer's Authority and Responsibilities*

SC-10.07 Add the following to Paragraph 10.07.B.:

However, if at any time the working force of the Contractor is inadequate for securing the progress herein specified, the Contractor shall, if so ordered in writing by the Owner and/or the Engineer, increase his force or equipment, or both, to such an extent as to give reasonable assurance of compliance with the schedule of progress.

10.08 *Compliance with Safety Program*

SC-10.08 Add the following new paragraph immediately after Paragraph 10.08.A.:

- B. Neither the Engineer's activities, nor the presence of Engineer or its employees and sub-consultants at a construction site, shall relieve the Contractor of its obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending and coordinating the Work in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. Engineer and its personnel have no authority to exercise any control over any construction contractor or its employees in connection with their work or any health or safety programs or procedures. The Contractor shall be solely responsible for jobsite safety.

ARTICLE 11—CHANGES TO THE CONTRACT

No Supplementary Conditions in this Article.

ARTICLE 12—CLAIMS

No Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 *Cost of the Work*

SC-13.01.B.5.c.(1) Supplement Paragraph 13.01.B.5.c.(1) by adding the following subparagraphs:

- a) Prior to commencing Work at the Site, submit to Owner, through Engineer, copies of the equipment rental agreements for Owner's approval.
- b) Should Contractor perform Work using rented construction equipment or machinery without Owner's written approval of the associated rental agreement and the parties subsequently disagree on the applicable rental rates, use of such construction equipment and machinery will be compensated on the basis of the rental rate book indicated in Paragraph SC-13.01.B.5.c.(2).
- c) When the rental rate book is used basis for determining compensation for construction equipment and machinery leased from a rental firm, the hourly rate for such equipment shall be determined in accordance with Paragraph 13.01.B.5.(2) of the General Conditions.

SC-13.01.B.5.c.(2) Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of Rental Rate Blue Book published by EquipmentWatch.

SC-13.01.B.5.c Supplement Paragraph 13.01.B.5.c by adding the following subparagraphs:

- 4) *Inactive Equipment and Machinery*: Rental of construction equipment and machinery shall cease when the use thereof is no longer necessary for the Work. Periods of inactivity for such construction equipment or machinery will not be compensable unless agreed upon in writing by Owner, unless the costs of disassembly, removal, transportation, reassembly, and remobilization, as submitted to and accepted by Owner (with advice of Engineer) would exceed the cost of continuing to rent the item(s) during the period(s) of inactivity. Contractor is responsible for obtaining Owner's written approval for compensation for construction equipment and machinery for periods of inactivity. Owner is not responsible for retroactively approving such inactivity. "Period of inactivity" for such items includes periods when the construction equipment or machinery is not used or necessary for the logical and efficient progression of the Work, or when other, available equipment or machinery is suitable for performing the given task.
- 5) *Condition of Equipment and Machinery*: Construction equipment and machinery will be compensable only for serviceable construction equipment and machinery capable of efficiently performing its intended function at the Site. Construction equipment and machinery not in compliance with this Paragraph SC-13.01.B.5.c.5) is not eligible for compensation.
- 6) *Capped Compensation*: Compensation paid Contractor for a given item of Contractor-owned construction equipment or machinery will be capped at, and shall not exceed, the comparable purchase price of such item of equal or comparable capacity and capability.

SC-13.01.C.2. Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. For purposes of this paragraph, "small tools and hand tools" means items in one or more of the following categories: (1) Items that are ordinarily required for the performing worker's job function, including but not limited to equipment which ordinarily has no associated licensing, insurance, or substantive storage costs; such as hammers, wrenches, socket tools, manual saws, power saws, chainsaws, common power tools, impact drills, threaders, benders, transits and theodolites and related equipment, and other tools transportable by hand, regardless of ownership of such items; (2) Items such as gang-boxes, ladders, hand carts and similar wheeled items manually operated by workers, extension cords, and similar items; (3) common testing equipment such as insulation testers (megger-testing equipment), amp meters, gas detectors, pressure gauges, and similar items; (4) A purchase price (if purchased new, at retail) of \$500, although such limit is not absolute, and certain items may be deemed by Owner or Engineer as "small tools

or hand tools" (and not eligible for compensation) even though such item may have a purchase price greater than the amount indicated in this Paragraph 13.01.C.2.

SC-13.03 Delete Paragraph 13.03.E. in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25% percent from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No Supplementary Conditions in this Article.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 *Progress Payments*

SC-15.01.A. Delete Paragraph 15.01.A. in its entirety and insert the following in its place:

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Engineer.
 1. For lump sum bid items, the Schedule of Values shall be used for determining the value of work accomplished each month by the Contractor so that partial payments may be made. This "Cost Breakdown" shall be prepared in such a manner and in sufficient detail to allow the Engineer to certify the value of work completed and to recommend payment be made to the Contractor. The Engineer shall be the sole judge as to the suitability of the "Cost Breakdown" furnished for the above-stated purpose. The Engineer will not allow an "unbalanced cost breakdown". This "Cost Breakdown" will be used for establishing prices for Extra Work only if the prices are agreeable to both the Contractor and the Owner.
 2. For unit price bid items, payment will be made on the basis of actual measured and/or computed length, area, solid contents, number and weight, as determined under the provisions of Paragraph 13.03. No extra measurements and measurements customary in the trade shall be used as a basis for payment hereunder. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any

differences which may be found between the quantities of work actually done, the material actually furnished under this Contract and the estimated quantities contemplated and contained in the proposal, unless one or more of the conditions stipulated in SC-13.03.E. occurs.

SC-15.01.E. Delete subparagraph 15.01.E.1.j. in its entirety and replace with the following:

- j. The Time of Completion is the essence of the Contract. For each Calendar Day that any work shall remain incomplete after the time specified in the Proposal and Contract, or as automatically increased by additional work ordered after the Contract is signed, the Damages in the amount of \$500.00 Per Calendar Day will be deducted from the moneys due the Contractor, as liquidated damages. The moneys thus deducted for such delay, failure or non-completion is not to be considered as a penalty but shall be deemed, taken and treated as reasonable liquidated damages since it would be impractical and most difficult to fix the actual damages. Contractor shall not be charged with liquidated damages when the delay in completion of the work is due to any preference, priority or allocation order duly issued by the Owner or to unforeseen causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and abnormal and unforeseeable weather (such as abnormal rainfall, tornadoes and hurricanes). The Contractor is required to promptly give written notice of such delays to the Engineer.

15.03 *Substantial Completion*

SC-15.03.B. Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined by Engineer not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer or other entity retained by Owner, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.02 *Arbitration*

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 *Arbitration*

- A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of \$100,000 or less will be

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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and American Society of Civil Engineers. All rights reserved.

settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be concurrently sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or, if no specified time is applicable, within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.
- C. The arbitration will be held in the same municipality as the Owner's principal office location.
- D. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the [Construction Arbitration Rules] that contemplate in-person hearings. The arbitrator(s) will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.
- E. The Arbitrator(s) will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.
- F. The award of the arbitrator(s) must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.
- G. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.
- H. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
 - 1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;
 - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;
 - 3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and
 - 4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.

- I. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- J. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

17.03 Attorneys' Fees

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

SC-17.03 Attorneys' Fees

- A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18—MISCELLANEOUS

SC-18.11 Add a new paragraph immediately after Paragraph 18.10:

SC-18.11 Confidential Information

- A. All Drawings, Specifications, technical data, and other information furnished to Contractor either by Owner or Engineer or developed by Contractor or others in connection with the Work are, and will remain, the property of Owner or Engineer, and shall not be copied or otherwise reproduced or used in any way except in connection with the Work, or disclosed to third parties or used in any manner detrimental to the interests of Owner or Engineer.
- B. The following information is not subject to the above confidentiality requirements:
 - 1. information in the public domain through no action of Contractor in breach of the Contract Documents; or
 - 2. information lawfully possessed by Contractor before receipt from Owner or Engineer; or
 - 3. information required to be disclosed by Laws or Regulations, or by a court or agency of competent jurisdiction. However, in the event Contractor shall be so required to disclose such information, Contractor shall, prior to disclosure, provide reasonable notice to Owner and Engineer, who shall have the right to interpose all objections Owner may have to the disclosure of such information.

SC-18.12 Add a new paragraph immediately after Paragraph 18.11, to read as follows:

SC-18.12 *Publicity*

- A. Contractor shall not disclose to any third party the nature of its Work on the Project, nor engage in publicity or public media disclosures with respect to the Project without the prior written consent of Owner.

WAGE SCALE FOR ENGINEERING CONSTRUCTION

- 1.01 Pursuant to Chapter 2258 of the Texas Government Code, the public body awarding the Contract has determined the following to be the general prevailing wage rates applicable for the construction of this Project and the locality in which the Work is to be performed.
- 1.02 This prevailing wage rate does not prohibit the payment of more than the rates stated.
- 1.03 The wage scale for engineering construction is to be applied to all site work greater than 5 feet from an exterior wall of new building under construction or from an exterior wall of an existing building.
- 1.04 The appropriate wage scales shall be applied per the schedules for the appropriate work type.

"General Decision Number: TX20260021 05/18/2026

State: Texas

Construction Types: Heavy

Counties: Texas Counties of
Nueces and San Patricio

Modification Number	Publication Date
0	01/02/2026
1	05/18/2026

SUTX1987-001 12/01/1987

	Rates	Fringes
POWER EQUIPMENT OPERATORS: MOTOR GRADER.....	\$ 8.72	0.00
POWER EQUIPMENT OPERATORS: (BACKHOE).....	\$ 9.21	0.00
LABORERS: (UTILITY).....	\$ 7.68	0.00
LABORERS: (COMMON).....	\$ 7.25	0.00
ELECTRICIAN.....	\$ 13.37	2.58
CONCRETE FINISHER.....	\$ 7.56	0.00
CARPENTER (EXCLUDING FORM SETTING).....	\$ 9.05	0.00

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

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

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers

at least \$13.65 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract from May 11, 2026, through December 31, 2026. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

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

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

Union Rate Identifiers

A four-letter identifier beginning with characters other than **SU**, **UAVG**, **SA**, or **SC** denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The **SU** identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted

average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

◆SU◆ wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ◆SA◆ identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ◆SA◆ identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

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

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

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

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

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

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator

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

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

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

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

=====
END OF GENERAL DECISION

"

AGREEMENT FOR FINAL PAYMENT
AND CONTRACTOR'S SWORN RELEASE

In order to insure that the rights, obligations and responsibilities of all parties to the original contract document are fully protected, which contract document was signed and executed on the day of _____, 20_____ by _____, referred to therein as CONTRACTOR and hereinafter referred to as CONTRACTOR, and the OWNER on the day of _____, 20_____, and further in consideration for the final payment of all sums due and claimed by the CONTRACTOR against the OWNER, the CONTRACTOR makes the following representations to the OWNER, either individually if a proprietorship, jointly by all partners if a partnership, or if a corporation, by action of the president and secretary of said corporation, as duly authorized by appropriate action of the stockholders and/or board of directors of said corporation, their signatures hereon constituting a representation under oath by said individuals that they have the power and authority to execute this Agreement for and on behalf of the said corporation:

I.

The CONTRACTOR has received _____ (number) payments pursuant to _____ (number) of CONTRACTOR Payment Estimates, copies of which are attached hereto and marked Exhibit "A", presented to the OWNER and paid during the progress of the job referred to in the Contract between the parties; and in this regard, the undersigned CONTRACTOR represents to the OWNER that it does not claim nor intend to claim at any future date, any additional sums of money of any nature whatsoever under and by virtue of the payment estimates previously submitted to the Professional for approval, or any other sums of money of any nature whatsoever for materials furnished and used in the job or for work done, and hereby releases and discharges the OWNER

from any liabilities of any nature whatsoever, for any claims of any nature made by the CONTRACTOR at some future date, or by its successors or assigns.

II.

The undersigned CONTRACTOR further represents to the OWNER that the Final Payment Estimate, reflecting all associated Change Orders, if any, submitted by the CONTRACTOR to the OWNER, whether or not modified, corrected or changed in some way by deletions or other modifications by the Professional, the CONTRACTOR or the OWNER, a copy of which is attached hereto and marked Exhibit "B", is true, correct and accurate; and it is further agreed and stipulated by the undersigned CONTRACTOR that upon the receipt of final payment in the amount as set out on the Final Payment Estimate, the CONTRACTOR, by execution of this instrument of release, does, therefore, release and forever discharge the OWNER of and from all manner of debts, demands, obligations, suits, liabilities and causes of action of any nature whatsoever under and by virtue of the terms and provisions of the Contract hereinbefore referred to, and any change or modification thereof, or in any manner growing out of or arising from or by virtue of the work, labor and services performed by the CONTRACTOR.

III.

CONTRACTOR, IN ADDITION TO THE PROVISIONS SET OUT IN THE CONTRACT DOCUMENT, AGREES TO INDEMNIFY AND HOLD THE OWNER HARMLESS FROM ANY AND ALL CAUSES OF ACTION, CLAIMS, DEMANDS OR SUITS MADE BY ANY PERSON OR OTHER ENTITY AGAINST THE OWNER, BY REASON OF THE WORK PERFORMED BY SUCH CONTRACTOR, AND AGREES TO DEFEND OR TO CAUSE THE SAME TO BE DEFENDED AT THE CONTRACTOR'S SOLE EXPENSE AND OBLIGATION, WHENEVER SUCH ACTIONS MAY BE

BROUGHT, AND FURTHER TO PAY ALL COSTS INCURRED BY THE OWNER IN THE DEFENSE THEREOF, INCLUDING ADMINISTRATIVE COSTS AND ATTORNEY'S FEES, AND FURTHER TO PAY ANY JUDGMENTS OR SETTLEMENTS THAT MAY BE ENTERED INTO OR AGREED TO AGAINST OR FOR THE BENEFIT OF THE OWNER.

It is, however, specifically agreed that the OWNER shall not enter into any settlement agreements without the acquiescence and agreement of the CONTRACTOR.

IV.

The CONTRACTOR, acting by and through the person or persons whose names are subscribed hereto, swears and affirms that all bills and claims have been paid to all materialmen, suppliers, laborers, subcontractors, or other entities performing services or supplying materials, and that the OWNER shall not be subject to any bills, claims, demands, litigation or suits in connection therewith.

V.

It is further specifically understood and agreed that this Agreement for Final Payment and Contractor's Sworn Release shall constitute a part of the original Contract of the parties heretofore previously referred to, and it is also specifically understood and agreed that this Agreement shall not act as a modification, waiver or renunciation by the OWNER of any of its rights or remedies as set out in the contract itself, but this Agreement for Final Payment and Contractor's Sworn Release shall constitute a supplement thereto for the additional protection of the OWNER.

VI.

This Agreement for Final Payment and Contractor's Sworn Release shall be considered to be continuing and binding upon the parties hereto and shall not terminate upon receipt and acceptance by the CONTRACTOR of final payment, but shall be deemed continuing so long as any actions,

claims or other demands contemplated herein against the OWNER, may lawfully be brought under applicable statutes of limitations, and shall in addition be deemed to be continuing for such additional period of time as shall be necessary to compensate and repay to the OWNER, all costs or damages incurred by it by reason of such claims.

SIGNED and EXECUTED this, the _____ day of _____, 20_____.

(CONTRACTOR)

Signature

Print Name: _____

[If CONTRACTOR is a proprietorship, OWNER must sign; if a partnership, each partner must sign; if a corporation, the following language should be used.]

SIGNED and EXECUTED this, the _____ day of _____, 20_____,
by _____, a Texas corporation, under authority
granted to the undersigned by said corporation as contained in the Charter, By-Laws or Minutes of a
meeting of said corporation regularly called and held.

CONTRACTOR

By: _____
President

ATTEST:

Corporate Secretary
(Corporate Seal)

[This form is for use by either a proprietorship or a partnership. In the event CONTRACTOR is a partnership or a joint proprietorship, additional signature lines should be added for each individual.]

AFFIDAVIT

STATE OF TEXAS

COUNTY OF NUECES

BEFORE ME, the undersigned authority, on this day personally appeared the person or persons whose name(s) are subscribed to the above and foregoing Agreement for Final Payment and Contractor's Sworn Release, who each, after being by me duly sworn, on their oaths deposed and said:

I(We) am(are) the person(s) who signed and executed the above and foregoing Agreement for Final Payment and Contractor's Sworn Release, and I(we) have read the facts and statements as therein set out and the representations as made therein, and I(we) state that the above and foregoing are true and correct.

CONTRACTOR - Affiant

SWORN TO AND SUBSCRIBED TO before me this, the _____ day of _____, 20_____.

Notary Public, State of Texas

My Commission Expires: _____

[This form is for use in the event CONTRACTOR is a corporation.]

AFFIDAVIT

STATE OF TEXAS

COUNTY OF NUECES

BEFORE ME, the undersigned authority, on this day personally appeared the persons who signed and executed the above and foregoing Agreement for Final Payment and Contractor's Sworn Release, whose names are set out above, who each, after being by me duly sworn, on their oaths deposed and said:

We each are the persons whose names are subscribed above, and hold respectively the offices in the corporation as set out above, and each state under oath that we have the authority to execute this Agreement for Final Payment and Contractor's Sworn Release for and on behalf of said corporation, pursuant to authority granted to us in the Charter of said corporation, the By-Laws of said corporation and/or the Minutes of said corporation; and the facts, statements and representations as set out in the instrument to which this Affidavit is attached, are true and correct.

SWORN TO AND SUBSCRIBED TO before me this, the _____ day of _____, 20_____.

Notary Public, State of Texas

My Commission Expires: _____

STATE OF _____

COUNTY OF _____

**SUBCONTRACTOR/MATERIALMAN'S
FULL AND FINAL
RELEASE AND WAIVER OF CLAIMS AND LIENS**

For consideration in hand paid, _____, (Company) does hereby certify and acknowledge that Company has been fully paid for all work and labor done by it, and for materials supplied by it, to date on that certain project described as follows:

Contractor:

Project Description:

Obligee:

Amount:

Company does hereby waive all rights, claims and liens which it may have, or be entitled including statutory and constitutional liens on such project for such work and labor done and material supplied by it to date, or arising out of such transactions.

Company hereby releases in full all claims and liens it has heretofore filed on such property for such work including labor and material.

Executed this _____ day of _____, 20_____.

By: _____

STATE OF _____

COUNTY OF _____

BEFORE ME, the undersigned, a Notary Public in and for said County, _____ on this day personally appeared _____ Known to me to be the person and officer whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the said _____, a corporation, and that he executed the same as the act of such corporation for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this _____ day of _____, 20_____.
_____.

Notary Public

**CONSENT OF
SURETY COMPANY
TO FINAL PAYMENT**

**Conforms with the American Institute
of Architects, AIA Document G707**

Owner
Architect
Contractor
Surety
Other

PROJECT:
(Name, address)

TO (Owner)

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(here insert name and address of Surety Company)

on bond of (here insert name and address of Contractor) **, SURETY COMPANY**

CONTRACTOR,
hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve
the Surety Company of any of its obligations to (here insert name and address of Owner)

, OWNER,
as set forth in the said Surety Company's bond.

IN WITNESS, WHEREOF,
the Surety Company has hereunto set its hand this day of

Surety Company

Attest:
(Seal):

Signature of Authorized Representative

Title

NOTE: This form is to be used as a companion document to AIA DOCUMENT G706, CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS,
Current Edition

TECHNICAL SPECIFICATIONS

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 the construction of paving, drainage & utility adjustments including removal of existing features.

1.03 ALTERNATES

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

1.04 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 Engineer, inspect for completeness or damage.
 - 3. Handle, store, install, and finish products.
 - 4. Repair or replace damaged items.

1.05 CONSTRUCTION PHOTOGRAPHS

- A. Submit preconstruction and post construction photographs in accordance with Section 01300.

1.06 WORK SEQUENCE

- A. Construct Work one street at a time. Street must be completed prior to commencing construction on the other street.
- B. Coordination of the Work: Refer to Section 01040 - Coordination and Meetings, and Section 01300 - Submittals (Construction Schedule).

1.07 CONTRACTOR USE OF PREMISES

- A. Comply with procedures for access to the site and Contractor's use of rights-of-way as specified in Section 01015 - Contractor's Use of Premises.

1.08 OWNER OCCUPANCY

- A. Cooperate with the Owner to minimize conflict, and to facilitate the Owner's operations. Coordinate Contractor's activities with Engineer.
- B. Schedule Work to accommodate this requirement.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01015

CONTRACTOR 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; 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 and Engineer against claims or demands arising from such use of properties outside of rights-of-way.
- 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 Engineer.

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 Engineer.
- B. 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 Engineer and at no cost to the 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.
- B. Notify Engineer 1 week 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, at all

times.

- 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 in writing and shall not be less than 48 hours or more than 7 days prior to work being performed within 200 feet 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 Engineer for approval.

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 Engineer.

- B. Obtain the Engineer's approval when the nature of the Work requires closing of 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.
- G. Provide barricades and signs in accordance with Section VI of the State of Texas Manual on Uniform Traffic Control Devices.

1.08 TRAFFIC CONTROL

- A. Comply with traffic regulation as specified in Section 01570 - Traffic Control and Regulation.

1.09 SURFACE RESTORATION

- A. Restore site to condition existing before construction to satisfaction of Engineer.
- B. Repair turf areas which become damaged, level with topsoil conforming to Section 02920 - Topsoil, as approved by the Engineer and resod in accordance with MVWA A307. Water and level newly sodded areas with adjoining turf using steel wheel rollers appropriate for sodding. Do not use spot sodding or sprigging.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 G E N E R A L

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 Engineer.
- C. Contractor shall provide necessary equipment, workers, and survey personnel as required by Engineer 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 Engineer 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: Reinforcing steel, rolled or formed steel or other metal shapes will be measured by CRSI or AISC Manual of Steel Construction weights. Welded assemblies will be measured by CRSI or AISC Manual of Steel Construction or scale weights.
- 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 the average end area method.

- 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. Progress payments will be based on the Engineer's observations and evaluations of quantities incorporated in the Work multiplied by the unit price.
- D. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities determined by Engineer 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 Engineer, it is not practical to remove and replace the Work, the Engineer 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 Engineer.
 - 2. The nonconforming Work will be modified as authorized by the Engineer, and the unit price will be adjusted to a lower price at the discretion of Engineer, 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 authority of Engineer to assess the nonconforming work and identify payment adjustment is final.

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 Engineer.
 - 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.
 - 6. Loading, hauling, and disposing of rejected products.

PART 2 UNIT PRICES

A. GENERAL ITEMS

2.01 MOBILIZATION, DEMOBILIZATION, BONDS AND INSURANCE

- A. Measurement for Mobilization, Bonds and Insurance is based on a lump sum basis.
- B. Payment shall include mobilization, demobilization, bonds, insurance, preparatory work, movement of personnel, equipment, supplies, and incidentals necessary to begin and complete the Work.
- C. Payment for this item shall not exceed three percent of the contract price unless otherwise approved by the Owner and Engineer.

2.02 TOPOGRAPHIC SURVEY, GRADING VERIFICATION, AND FINAL AS-BUILT SURVEY

- A. Measurement and payment for Topographic Survey, Grading Verification, and Final As-Built Survey by Texas RPLS shall be on a lump sum basis.
- B. This item shall include furnishing a topographic survey signed and sealed by a Texas Registered Professional Land Surveyor. The survey shall include topographic shots of the paving surface at 15-foot intervals minimum, grade breaks, high spots, low spots, flow lines, top of curbs, storm sewer sizes and flow lines including outfall flow lines, and apparent surface utilities.
- C. This item shall include grading verification, preparation and submittal of updated grading information prior to placement of base or asphalt, and preparation of a final signed and sealed as-built survey after paving is complete.

- D. Payment shall be full compensation for all labor, materials, survey equipment, professional survey services, signed and sealed submittals, grading verification, final survey, coordination, and incidentals required to complete the Work.

2.03 TRAFFIC CONTROL AND REGULATION

- A. Measurement and payment for Traffic Control and Regulation will be made on a monthly basis for the time traffic control is installed, maintained, and required for the Work.
- B. This item shall include furnishing, installing, maintaining, relocating, and removing traffic control devices, including signs, barricades, channelizing devices, pedestrian access controls, temporary access provisions, and other measures necessary to protect the Work and the public.
- C. Contractor shall maintain access to the marina, boat ramp, parking areas, and pedestrian routes as required by the plans and as directed by the Owner and Engineer.
- D. Payment shall be full compensation for all labor, materials, equipment, maintenance, relocation, removal, coordination, and incidentals required to complete this item.

2.04 SILT FENCE

- A. Measurement and payment for Silt Fence shall be on a linear foot basis for silt fence installed within the limits shown on the plans.
- B. This item shall include furnishing, installing, maintaining, repairing, replacing damaged sections, removing sediment deposits, removing and disposing of silt fence after final stabilization, and all incidentals required to complete the Work.

2.05 INLET PROTECTION BARRIER

- A. Measurement and payment for Inlet Protection Barrier shall be by each inlet protected at the locations shown on the plans.
- B. Payment shall include furnishing, installing, maintaining, repairing, replacing damaged sections, removing sediment deposits, removing and disposing of inlet protection devices after final stabilization, and all incidentals required to complete the Work.

2.06 PAVEMENT STRIPING AND MARKINGS

- A. Measurement and payment for 4" Yellow Parking Stall Striping shall be on a linear foot basis for striping placed within the limits shown on the plans.
- B. Measurement and payment for 4" Accessible Parking Striping and Access Aisle Hatching shall be on a linear foot basis for striping and hatching placed within the limits shown on the plans.

- C. Measurement and payment for 12" White Crosswalk Markings and 24" White Crosswalk Markings shall be on a linear foot basis for markings placed within the limits shown on the plans.
- D. Payment shall include layout, surface preparation, furnishing and applying paint for Bid Items 6 and 7, furnishing and applying thermoplastic material for Bid Items 9 and 10, protection of markings until ready for traffic, cleanup, and all incidentals required to complete the Work.

2.07 THERMOPLASTIC ACCESSIBLE PARKING SYMBOL AND SIGN ASSEMBLY

- A. Measurement and payment for Accessible Parking Symbol and Sign Assembly shall be by each assembly installed at the locations shown on the plans.
- B. This item shall include layout, surface preparation, furnishing and applying thermoplastic accessible parking symbol, furnishing and installing accessible parking sign, post, foundation, hardware, alignment, protection of markings until ready for traffic, cleanup, and all incidentals required to complete the Work.

2.08 DETECTABLE WARNING SURFACE

- A. Measurement and payment for Detectable Warning Surface shall be by each complete warning surface installed and accepted at the locations shown on the Plans.
- B. This item shall include furnishing and installing the detectable warning surface, surface preparation, cutting, fitting, anchors, adhesive, sealant, concrete repair, and restoration required for a complete installation.
- C. Payment shall include all labor, materials, equipment, tools, installation, protection, cleanup, and incidentals required to complete the work.

2.09 CONCRETE WHEEL STOPS

- A. Measurement and payment for Concrete Wheel Stops shall be by each wheel stop installed at the locations shown on the plans.
- B. This item shall include furnishing, placing, anchoring, alignment, hardware, replacement of damaged wheel stops prior to acceptance, and all incidentals required to complete the Work.

2.10 BULKHEAD CAP REPAIR

- A. Measurement and payment for Bulkhead Cap Repair shall be on a lump sum basis for the repair limits shown on the plans.
- B. This item shall include sawcutting, concrete repair, removal of loose or unsound concrete, surface preparation, rebar cleaning, bonding agent, curing, cleanup, and all incidentals required to complete the Work.
- C. No payment will be made for repair limits beyond those shown on the plans unless authorized by the Engineer.

B. STORM SEWER REPAIRS ITEMS

2.11 STORM SEWER PIPE INVESTIGATION AND REPAIR AT SINKHOLE

- A. Measurement and payment for Storm Sewer Pipe Investigation and Repair at Sinkhole, All Sizes and Depths, shall be by each sinkhole repair location completed.
- B. This item shall include uncovering two joints of storm sewer for inspection and providing storm sewer repair per storm sewer repair detail on Sheet C04.
- C. Payment shall include excavation, inspection coordination, repair materials, bedding, backfill, compaction, surface restoration, cleanup, and all incidentals required to complete the Work.
- D. If the Engineer determines that full removal and replacement of storm sewer pipe is required, the additional work shall be authorized in writing and paid through an approved Contract modification.

2.12 GRATE INLET MODIFICATION

- A. Measurement and payment for Grate Inlet Modification shall be by each inlet modified at the locations shown on the plans.
- B. This item shall include new grate and frame, cast-in-place top, grate adjustment to provide positive drainage, reset existing permeable pavers, surface restoration, and all appurtenances required to complete the Work.
- C. Payment shall include excavation, forming, concrete, grout, adjustment, cleanup, and all incidentals required to complete the inlet modification.

C. PHASE 1 PAVING ITEMS

2.13 MOBILIZATION DEMOBILIZATION, BONDS AND INSURANCE

- A. Refer to General Items 2.01.

2.14 MILL 2" EXISTING HMAC PAVEMENT

- A. Measurement and payment for Mill 2" Existing HMAC Pavement shall be on a square yard basis for the area milled within the limits shown on the plans.
- B. This item shall include milling existing HMAC pavement to the depth indicated in the Bid Proposal, hauling, proper disposal, cleaning of the milled surface, and all incidentals required to complete the Work.
- C. No payment will be made for milling beyond the plan limits unless authorized by the Engineer.

2.15 CONCRETE PAVING DEMOLITION

- A. Measurement and payment for Concrete Paving Demolition shall be on a square yard basis for the area removed within the limits shown on the plans.
- B. This item shall include saw cutting, removal and disposal of existing concrete pavement, removal of underlying material as required, excavation, hauling, cleanup, and all incidentals required to complete the Work.
- C. No payment will be made for concrete demolition beyond the plan limits unless authorized by the Engineer.

2.16 8" RECYCLED PULVERIZED BASE FROM MILLED MATERIAL STABILIZED WITH 11% PORTLAND CEMENT

- A. Measurement and payment for 8" recycled pulverized base from milled material stabilized with 11% Portland cement shall be on a square yard basis for the area placed within the limits shown on the plans.
- B. This item shall include recycling and pulverizing milled material; furnishing and incorporating Portland cement at 11% by weight including grading, mixing, shaping, compacting subgrade, compacting the stabilized base, curing, testing, and all incidentals required to complete the Work. No separate payment will be made for Portland cement or added aggregate.
- C. No payment will be made for base thickness greater than the thickness indicated in the Bid Proposal unless authorized by the Engineer.

2.17 PRIME COAT

- A. Measurement and payment for Prime Coat shall be on a gallon basis for material applied within the limits shown on the plans.
- B. This item shall include surface preparation, furnishing, applying, curing, protecting the prime coat, and all incidentals required to complete the Work.
- C. No payment will be made for prime coat placed outside the limits shown on the plans unless authorized by the Engineer.

2.18 2" HMAC TYPE D

- A. Measurement and payment for 2" HMAC Type D shall be on a square yard basis for pavement placed within the limits shown on the plans.
- B. This item shall include furnishing, placing, compacting, finishing, joints, transitions, cleanup, and all incidentals required to complete the HMAC pavement.
- C. No payment will be made for pavement thickness greater than the thickness indicated in the Bid Proposal unless authorized by the Engineer.

D. PHASE 2 PAVING ITEMS

2.19 MOBILIZATION DEMOBILIZATION, BONDS AND INSURANCE

- A. Refer to General Items 2.01.

2.20 MILL 2" EXISTING HMAC PAVEMENT

- A. Measurement and payment for Mill 2" Existing HMAC Pavement shall be on a square yard basis for the area milled within the limits shown on the plans.
- B. This item shall include milling existing HMAC pavement to the depth indicated in the Bid Proposal, hauling, proper disposal, cleaning of the milled surface, and all incidentals required to complete the Work.
- C. No payment will be made for milling beyond the plan limits unless authorized by the Engineer.

2.21 8 INCH BASE REPAIRS USING RECYCLED PULVERIZED BASE STABILIZED WITH 11% PORTLAND CEMENT, BID ITEM 21

- A. Measurement and payment for 8 inch base repairs shall be on a square yard basis for the localized base repair areas completed within the limits shown on the plans or authorized by the Engineer.
- B. This item shall include recycling and pulverizing milled material; furnishing and incorporating Portland cement at 11% by weight in accordance with Section 02234; grading, mixing, shaping, compacting subgrade, compacting the stabilized base, curing, testing, and all incidentals required to complete the Work. No separate payment will be made for Portland cement.
- C. No payment will be made for base thickness greater than the thickness indicated in the Bid Proposal unless authorized by the Engineer.

2.22 TACK COAT

- A. Measurement and payment for Tack Coat shall be on a gallon basis for material applied within the limits shown on the plans.
- B. This item shall include surface preparation, furnishing, applying, curing, protecting the Tack coat, and all incidentals required to complete the Work.
- C. No payment will be made for Tack coat placed outside the limits shown on the plans unless authorized by the Engineer.

2.23 2" HMAC TYPE D

- A. Measurement and payment for 2" HMAC Type D shall be on a square yard basis for pavement placed within the limits shown on the plans.

- B. This item shall include furnishing, placing, compacting, finishing, joints, transitions, cleanup, and all incidentals required to complete the HMAC pavement.
- C. No payment will be made for pavement thickness greater than the thickness indicated in the Bid Proposal unless authorized by the Engineer.

END OF SECTION

Section 01035

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for processing Change Orders, including:
 - 1. Assignment of a responsible individual for approval and communication of changes in the Work;
 - 2. Documentation of change in Contract Price and Contract Time;
 - 3. Change procedures, using proposals and construction contract modifications, work change directive, stipulated price change order, unit price change order, time and materials change order;
 - 4. Execution of Change Orders;
 - 5. Correlation of Contractor submittals.

1.02 REFERENCES

- A. Rental Rate Blue Book for Construction Equipment (Data Quest Blue Book). Rental Rate is defined as the full unadjusted base rental rate for the appropriate item of construction equipment.

1.03 RESPONSIBLE INDIVIDUAL

- A. Contractor shall provide a letter indicating the name and address of the individual authorized to execute change documents, and who shall also be responsible for informing others in Contractor's employ and Subcontractors of changes to the Work. The information shall be provided at the Preconstruction Conference.

1.04 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

- A. Contractor shall maintain detailed records of changes in the Work. Provide full information required for identification and evaluation of proposed changes, and to substantiate costs of changes in the Work.
- B. Contractor shall document each proposal for a change in cost or time with sufficient data to allow evaluation of the proposal.
- C. Proposals shall include, as a minimum, the following information as applicable:
 - 1. Quantities of items in the original Bid Schedule with additions, reductions, deletions, and substitutions.
 - 2. When Work items were not included in the Bid Schedule, Contractor shall provide unit prices for the new items, with supporting information as required by the Engineer.
 - 3. Justification for any change in Contract Time.

4. Additional data upon request.
- D. For changes in the Work performed on a time-and-material basis, the following additional information may be required:
1. Quantities and description of products and equipment.
 2. Taxes, insurance and bonds.
 3. Overhead and profit.
 4. Dates and times work was performed, and by whom.
 5. Time records and certified copies of applicable payrolls.
 6. Invoices and receipts for products, rented equipment, and subcontracts, similarly documented.
- E. Rented equipment will be paid to the Contractor by actual invoice cost for the duration of time required to complete the extra work. If the extra work comprises only a portion of the rental invoice where the equipment would otherwise be on the site, the Contractor shall compute the hourly equipment rate by dividing the actual monthly invoice by 176. (One day equals 8 hours and one week equals 40 hours.) Operating costs shall not exceed the estimated operating costs given for the item of equipment in the Blue Book.
- F. For changes in the work performed on a time-and-materials basis using Contractor-owned equipment, compute rates with the Blue Book as follows:
1. Multiply the appropriate Rental Rate by an adjustment factor of 70 percent plus the full rate shown for operating costs. The Rental Rate utilized shall be the lowest cost combination of hourly, daily, weekly or monthly rates. Use 150 percent of the Rental Rate for double shifts (one extra shift per day) and 200 percent of the Rental Rate for more than two shifts per day. No other rate adjustments shall apply.
 2. Standby rates shall be 50 percent of the appropriate Rental Rate shown in the Blue Book. Operating costs will not be allowed.

1.05 CHANGE PROCEDURES

- A. Changes to Contract Price or Contract Time can only be made by issuance of a Change Order. Issuance of a Work Change Directive or written acceptance by the Engineer of changes will be formalized into Change Orders. All changes will be in accordance with the requirements of the General Conditions.
- B. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by the General Conditions by issuing supplemental instructions.
- C. Contractor may request clarification of Drawings, Specifications or Contract Documents or other information. Response by the Engineer to a Request for Information does not authorize the Contractor to perform tasks outside the scope of the Work. All changes must be authorized as described in this section.

1.06 PROPOSALS AND CONTRACT MODIFICATIONS

- A. The Engineer may issue a - Request for Proposal, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications. The Engineer may also request a proposal in the response to a Request for Information. Contractor will prepare and submit its Proposal within 7 days or as specified in the request.
- B. The Contractor may propose an unsolicited change by submitting a Proposal to the Engineer describing the proposed change and its full effect on the Work, with a statement describing the reason for the change and the effect on the Contract Price and Contract Time including full documentation.

1.07 WORK CHANGE DIRECTIVE

- A. Engineer may issue a signed Work Change Directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. The document will describe changes in the Work and will designate a method of determining any change in Contract Price or Contract Time.
- C. Contractor shall proceed promptly to execute the changes in the Work in accordance with the Work Change Directive.

1.08 STIPULATED PRICE CHANGE ORDER

- A. A stipulated price Change Order will be based on an accepted Proposal including the Contractor's lump sum price quotation.

1.09 UNIT PRICE CHANGE ORDER

- A. Where Unit Prices for the affected items of Work are included in the Bid Schedule, the unit price Change Order will be based on unit prices as originally bid, subject to provisions of the General Conditions.
- B. Where unit prices of Work are not pre-determined in the Bid Schedule, Work Change Directive or accepted Proposal will specify the unit prices to be used.

1.10 TIME-AND-MATERIAL CHANGE ORDER

- A. Contractor shall provide an itemized account and supporting data after completion of change, within time limits indicated for claims in the General Conditions.
- B. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the General Conditions.
- C. Contractor shall maintain detailed records of work done on time-and-material basis as specified in paragraph 1.04, Documentation of Change in Contract Price

and Contract Time.

- D. Contractor shall provide full information required for evaluation of changes, and shall substantiate costs for changes in the Work.

1.11 EXECUTION OF CHANGE DOCUMENTATION

- A. Engineer will issue Change Orders, Work Change Directives, or accepted Proposals for signatures of parties as described in the General Conditions.

1.12 CORRELATION OF CONTRACTOR SUBMITTALS

- A. For Stipulated Price Contracts, Contractor shall promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.
- B. For Unit Price Contracts, the next monthly estimate of work after acceptance of a Change Order will be revised to include any new items not previously included and the appropriate unit rates.
- C. Contractor shall promptly revise progress schedules to reflect any change in Contract Time, and shall revise schedules to adjust time for other items of work affected by the change, and resubmit for review.
- D. Contractor shall promptly enter changes to the on-site and record copies of the Drawings, Specifications or Contract Documents as required in Section 01300 - Submittal.

END OF SECTION

SECTION 01040

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED DOCUMENTS

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

1.03 ENGINEER AND REPRESENTATIVES

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

1.04 CONTRACTOR COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Specifications sections to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. 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. Engineer will schedule a preconstruction conference.
- B. Attendance Required: Engineer's representatives, City's representatives, 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
- 8. Appropriate agenda items listed for Site Mobilization Conference, paragraph 1.06 C, when preconstruction conference and site mobilization conference are combined
- 9. Procedures for testing
- 10. Procedures for maintaining record documents

1.06 SITE MOBILIZATION CONFERENCE

- A. When required by the Contract Documents, Engineer will schedule a conference at the Project site prior to Contractor occupancy.
- B. Attendance Required: Engineer representatives, City's representatives, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor
 - 2. Safety and first aid procedures
 - 3. Construction controls provided by Owner
 - 4. Temporary utilities
 - 5. Survey and layout
 - 6. Security and housekeeping procedures

1.07 PROGRESS MEETINGS

- A. Project meetings shall be held at Project field office or other location as designated by the Engineer. Meeting shall be held at intervals as directed by Engineer.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Engineer representatives, and City's representatives as appropriate to agenda topics for each meeting.
- C. Engineer or his representative will make arrangements for meetings, and recording minutes.
- D. Engineer or his representative will prepare the agenda and preside at meetings.
- E. Contractor shall provide required information and be prepared to discuss each agenda item.
- F. Agenda:
 - 1. Review minutes of previous meetings

2. Review of 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

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. No payment will be associated with this work. Cost associated with this item shall be included in the appropriate Bid Item.

1.02 CUTTING AND PATCHING

- A. Perform activities to avoid interference with facility operations and the Work of others in accordance with the General Conditions of Agreement.
- 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 Engineer 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 Engineer. Follow such instructions, as applicable.

- F. Fully integrate new materials with existing similar materials by bonding, lapping, mechanical ties, anchoring or other effective means that will prevent cracks and will not show evidence of patching. Conceal all effects of demolition and patching and provide new construction that blends with existing adjacent or abutting surfaces without obvious breaks, joints or changes of surface appearance unless specifically shown otherwise.

1.03 SUBMITTALS

- A. Submit written notice to the Engineer 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.
 - 3. Necessity for cutting.
 - 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 Engineer including:
 - 1. Conditions indicating change.
 - 2. Recommendations for alternative materials or methods.
 - 3. Submittals as required for substitutions.
- D. Submit written notice to the Engineer designating time Work will be uncovered for observation. Do not begin cutting or patching operations until authorized by the Engineer.

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 Engineer.
- B. Coordinate with the Engineer, 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 flows. 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 Engineer 48 hours in advance of proposed Work.
- D. Procedures and Operations:
 - 1. The Contractor shall obtain approval from the City to operate existing pumps, valves and gates required for sequencing procedures. Do not operate any valve, gate or other item of equipment without the knowledge of the Engineer.
 - 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 Engineer 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.

PART 4 M E A S U R E M E N T A N D P A Y M E N T

No separate payment for work under this section. Include the costs for performing the work in the unit price for related work.

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 Engineer, if required.

1.02 SUBMITTALS

- A. Submit to Engineer the name, address, and telephone number of Surveyor before starting survey work.
- B. Submit documentation verifying accuracy of survey work on request.
- C. Submit information under provisions of Section 01300 - Submittals.

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 01300 - Submittals.

1.04 EXAMINATION

- A. Verify locations of survey control points prior to starting Work.
- B. Notify Engineer 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 Engineer 48 hours in advance of need for relocation of reference points due to changes in grades or other reasons.
- D. Report promptly to Engineer the loss or destruction of any reference point.
- E. Contractor shall reimburse Owner for cost of reestablishment of permanent

reference points 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 Engineer before proceeding should specified reference standards conflict with Contract Documents.

1.03 SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACI	American Concrete Institute P.O. Box 19150 Reford Station Detroit, MI 48219-0150
AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AITC	American Institute of Timber Construction 333 W. Hampden Avenue Englewood, CO 80110

AISC	American Institute of Steel Construction 400 North Michigan Avenue, Eighth Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
APA	American Plywood Association Box 11700 Tacoma, WA 98411
API	American Petroleum Institute 1220 L Street, N.W. Washington, DC 20005
AREA	American Railway Engineering Association 50 F Street, N.W. Washington, DC 20001
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood-Preservers' Association 7735 Old Georgetown Road Bethesda, MD 20014
AWS	American Welding Society P.O. Box 35104 Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue, N.W. Washington, DC 20036

CRD	U.S.A. Corps. Of Engineers
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60173-4758
EJMA	Expansion Joint Manufacturers Association 707 Westchester Avenue White Plains, NY 10604
FS	Federal Standardization Documents General Services Administration, Specifications Unit (WFSIS) 7th and D Streets, S.W. Washington, DC 20406
ICEA	Insulated Cable Engineer Association P.O. Box 440 S. Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers 445 Hoes Lane P.O. Box 1331 Piscataway, NJ 0855-1331
MIL	Military Specifications General Services Administration, Specifications Unit (WFSIS) 7th and D Streets, S.W. Washington, DC 20406
NACE	National Association of Corrosion Engineers P. O. Box 986 Katy , TX 77450
NEMA	National Electrical Manufacturers' Association 2101 L Street, N.W., Suite 300 Washington, DC 20037
NFPA	National Fire Protection Association Batterymarch Park, P.O. Box 9101 Quincy, MA 02269-9101
OSHA	Occupational Safety Health Administration U.S. Department of Labor, Government Printing Office Washington, DC 20402
PCA	Portland Cement Association 5420 Old Orchard Road

	Skokie, IL 60077-1083
PCI	Prestressed Concrete Institute 201 North Wacker Drive Chicago, IL 60606
SDI	Steel Deck Institute Box 9506 Canton, OH 44711
SSPC	Steel Structures Painting Council 4400 Fifth Avenue Pittsburgh, PA 15213
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality P. O. Box 13087 Austin, TX 78711-3087
TxDOT	Texas Department of Transportation 11th and Brazos Austin, TX 78701 2483
UL	Underwriters' Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062
UNI-BELL	UNI-BELL Pipe Association 2655 Villa Creek Drive, Suite 155 Dallas, TX 75234

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 01292

SCHEDULE OF VALUES

PART 1 G E N E R A L

1.01 SECTION INCLUDES

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

1.02 DEFINITION

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

1.03 PREPARATION

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

- E. Type the schedule of values on 8-1/2-inch by 11-inch white bond paper.

1.04 SUBMITTAL

- A. Submit the Schedule of Values in accordance with the requirements of Section 01300 - Submittals. Submit at least 10 days prior to submitting the first application for progress payment.
- B. Revise the Schedule of Values and resubmit for items affected by contract modifications, change orders, and work change directives. After the changes are reviewed without exception by the City Engineer, make the submittal at least 10 days prior to submitting the next application for progress payment.

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

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

END OF SECTION

Section 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures for:
 - 1. Schedule of Values.
 - 2. Construction Schedules.
 - 3. Shop Drawings, Product Data, and Sampler.
 - 4. Operations and Maintenance Data.
 - 5. Manufacturer's Certificates.
 - 6. Project Record Documents.
 - 7. Design Mixes.

1.2 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 Engineer will review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 30 days for initial review by the Engineer. This time for review shall in no way be justification for delays or additional compensation to the Contractor.
 - 3. The Engineer's review of submittals covers only general conformity to the Drawings, Specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. No quantities will be

verified by the Engineer. The Contractor is responsible for any errors, omissions or deviations from the Contract requirements; review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Drawings and Specifications.

4. Submit sufficient copies of documents to permit Engineer to retain three copies, 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 Engineer 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.

C. Contractor's Certification Stamp:

1. Apply Contractor's certification stamp, 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.
2. As a minimum, Contractor's certification Stamp shall include:
 - a. Contractor's name.
 - b. Job number.
 - c. Submittal number.
 - d. Certification statement that the Contractor has reviewed the submittal and it is in compliance with the Contract Documents.
 - e. Signature of Contractor.

1.3 SCHEDULE OF VALUES

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

1.4 CONSTRUCTION SCHEDULES

- A. Submit Construction Schedules in accordance with Section 01325- Construction Schedule.

1.5 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

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

1.6 MANUFACTURER'S CERTIFICATES

- A. When specified in Specification sections, submit manufacturers' certificate of compliance for review by Engineer.
- B. Contractor's Certification Stamp, as described in paragraph 1.2C, shall be placed on front page of the certification.
- C. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.7 PROJECT RECORD DOCUMENTS

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

1.8 DESIGN MIXES

- A. When specified in Specifications, submit design mixes for review.
- B. Contractor's Certification Stamp, as described in paragraph 1.2C, 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 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 01310

CONSTRUCTION SCHEDULE

PART 1 G E N E R A L

1.01 DESCRIPTION

- A. Furnish projected construction schedule for entire work and submit to Engineer.
- 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.
- 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.

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. Engineer 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 Engineer.

1.06 DISTRIBUTION

- A. Distribute copies of reviewed schedules to:
 - 1. Engineer.
 - 2. Job-site file.
 - 3. Subcontractors.
 - 4. City 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 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. Refer to Section 01300 for submittal requirements.
- B. Prints: Prepare 2 prints of each view and submit 1 print directly to the Engineer within 7 days of taking photographs. One print shall be retained by the Contractor and made available at all times for reference.
- C. Negatives: With each submittal, include photographic negatives, in protective envelopes, identify by Project name, Contractor, and date photographs were taken.

PART 2 P R O D U C T S

2.01 PRECONSTRUCTION PHOTOGRAPHS

- A. Prior to the commencement of any construction, take 35mm color photographs of the entire route of the project.
- B. Photographs: Two prints; color, matte finish; 3 x 5-inch size, mounted on 8-1/2 x 11-inch soft card stock, with left edge binding margin for three hole punch, or in plastic pockets in three-ring notebook.
- 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 mountings.

D. Photographs should show the condition of the following:

1. Esplanades and boulevards
2. Yards (near side and far side of street)
3. Housewalk, sidewalk and driveway.
4. Curb
5. Area between walk and curb
6. Particular features (yard light, shrubs, fences, trees, etc.)
7. Trees, shrubs and grass

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

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing Laboratory Services and Contractor responsibilities related to those services.

1.02 SELECTION AND PAYMENT

- A. Owner will select and Contractor will pay for services of an independent testing laboratory to perform inspection and testing identified in individual Specification sections. Contractor shall submit testing invoices for reimbursement.
- B. Employment of testing laboratory shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- C. Contractor shall schedule and monitor testing as required to provide timely results and to avoid delay to the Work.
- D. One copy of the testing results shall be delivered to the Engineers office and one to City Hall in a timely manner.
- E. Contractor shall monitor budgeted amount for material testing. The City will only pay for the amount budgeted. If more testing is required then the Contractor shall inform the City for additional funds prior to ordering testing.

1.03 LABORATORY REPORTS

- A. The Engineer will receive 2 copies, and the Contractor will receive 2 copies of laboratory reports from the testing laboratory. One of the Contractor's copies shall remain at site field office for duration of project. Test results which indicate non-conformance shall be transmitted immediately via fax from the testing laboratory to the Contractor and Engineer.

1.04 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.

- D. Laboratory has no authority to stop the Work.

1.05 CONTRACTOR RESPONSIBILITIES

- A. Notify Engineer, and laboratory 24 hours prior to expected time for operations requiring inspection and testing services. Notify Consultant if specification section requires the presence of the Consultant.
- B. Cooperate with laboratory personnel in collecting samples to be tested or collected on site.
- C. Provide access to the Work and to manufacturer's facilities.
- D. Provide samples to laboratory in advance of their intended use to allow thorough examination and testing.
- E. Provide incidental labor and facilities for access to the Work to be tested; to obtain and handle samples at the site or at source of products to be tested; and to facilitate tests and inspections including storage and curing of test samples.
- F. 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

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 CONDUCTING TESTING

- A. Laboratory sampling and testing shall conform to ASTM D3740 and ASTM E329, plus other test standards specified in individual Specification sections.
- C. The frequency or number of tests specified in individual sections may be decreased at the discretion of the Engineer.

END OF SECTION

SECTION 01420

OBSERVATION SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Observation services and references

1.02 INSPECTION

- A. Engineer will appoint an Observer as a representative of the Owner to perform inspections, tests, and other services specified in individual specification Sections
- B. Alternately, Engineer may appoint, employ, and pay an independent firm to provide additional inspection or construction management services as indicated in Section 01410 - Testing Laboratory Services.
- C. Reports will be submitted by the independent firm to Engineer, Consultant, and Owner, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Assist and cooperate with the Inspector; furnish samples of materials, design mix, equipment, tools, and storage.
- E. Notify Engineer 24 hours prior to expected time for operations requiring services. Notify Consultant and independent firm when noted.
- F. Sign and acknowledge report for Observer.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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 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. The Contractor does not have to have a on site office for this project.
- 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.

1.03 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.
 - 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. For water to be drawn from public fire hydrants, obtain special permit or license from the proper officials. A deposit based on rates established by

- latest ordinance will be required. Install backflow preventor on fire hydrant supply.
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 degrees 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 insofar as possible. Keep toilets clean and supplied throughout the course of the Work.

1.04 FIELD OFFICE

- A. Provision of a field office is not required. If the Contractor chooses to provide one, locate it in a place approved by the Engineer.

1.05 STORAGE OF MATERIALS

- A. The Contractor shall not store material in street right-of-way. It is the Contractors responsibility to find a storage area. The City can not guarantee a storage site within the City.
- B. 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.

1.06 SAFETY REQUIREMENTS

- A. Submit and follow a safety program.
- 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 Engineer or the Engineer's representative. Immediately advise the Engineer 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 Engineer of the results. Submit one copy of accident reports to Engineer within 10 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.

1.07 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.

1.08 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.
 - 2. Comply with all applicable provisions of NFPA Standard No. 241, Safeguarding Building Construction and Demolition Operations.
 - 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.
- 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.

1.09 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.

1.10 PROTECTION OF PUBLIC UTILITIES

- A. Prevent damage to existing public utilities during construction. These utilities are shown on the Drawings at their approximate locations. Give owners of these utilities at least 48 hours notice before commencing Work in the area, for locating the utilities during construction, and for making adjustments or relocation of the utilities when they conflict with the proposed Work.

1.11 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.
 - 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. Conform to Section 01570 - Traffic Control and Regulation.
- C. Tree and Plant Protection. Conform to 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 Engineer 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 Engineer 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 Engineer 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. 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.
- 2. Control traffic to prevent damage to equipment, materials, and surfaces.

1.12 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 Engineer.
- C. Minimize use by construction traffic of existing streets and driveways.
- D. Do not allow heavy vehicles or construction equipment in existing parking areas.

1.13 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.
- D. Burning of rubbish, debris or waste materials is not permitted.

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

1.15 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.

1.16 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 Engineer.

1.17 DUST CONTROL

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

1.18 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 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 01526

TRENCH SAFETY SYSTEMS

PART 1 GENERAL

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. Refer to Section 01025 - Measurement and Payment for unit price procedures.

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. 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 Section 01300 - Submittals.
- 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 Engineer will only be in regard to compliance with the Contract Documents and will not constitute approval by the Engineer 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. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-652.
- B. A reproduction 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. 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.

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 P R O D U C T S - NOT USED

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. 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 premanufactured systems are certified for the actual installation conditions.

3.02 I N S P E C T I O N

- 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, 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.

3.03 F I E L D Q U A L I T Y C O N T R O L

- 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 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. No separate payment will be made for control of ground water and surface water. Include the cost to control ground water and surface water in unit price for work requiring such controls. In the event well pointing is required, see Section 01025 - Measurement and Payment.

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. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.

- G. 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.
- H. 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.
- I. 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.
- J. Decommission piezometers and monitoring wells installed during design phase studies and left for Contractors monitoring and use.

1.05 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.
- B. Submit a Ground Water and Surface Water Control Plan for review by the Engineer prior to start of any field work. The Plan shall be signed by a Professional Engineer registered in the State of Texas. 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. Contractor to prepare and sign documentation in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000 issued March 5, 2003 prior to conducting construction operations.
- 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.

PART 2 P R O D U C T S

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 Engineer through submittals required in Paragraph 1.06, Submittals.
- B. Eductors, 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.

PART 3 E X E C U T I O N

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 waterbearing

layers. The results shall be presented in the Ground Water and Surface Water Control Plan (See Paragraph 1.06B.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 Engineer 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 hour after placement.
- I. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove pipe drain when it has served its purpose. If removal of pipe is impractical, provide grout connections at 50-foot intervals and fill pipe with cement-bentonite grout or cement-sand grout when pipe is removed from service.
- 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. 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.
- 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 according to Paragraph 1.06B.

3.03 EXCAVATION DRAINAGE

- A. Contractor may use excavation drainage methods if necessary to achieve well drained conditions. The excavation drainage may consist of a layer of crushed stone and filter fabric, and sump pumping in combination with sufficient wells for ground water control to maintain stable excavation and backfill conditions.

3.04 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 Engineer.

3.05 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 Engineer determines that more frequent monitoring and recording are required. Comply with Engineer's direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended purpose.

3.06 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 sections.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.
- B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances.
- C. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 SALVAGEABLE MATERIAL

- A. Excavated material: When indicated on Drawings, load, haul, and deposit excavated material at a location or locations shown on Drawings outside the limits of Project.
- B. Base, surface, and bedding material: Deliver shell, gravel, bituminous, or other base and surfacing material designated for salvage to the location designated by the Engineer, if required by Engineer.
- C. Pipe culvert: Deliver culverts designated for salvage to Owner's storage area, if required by Engineer.
- D. Other salvageable materials: Conform to requirements of individual Specification Sections.
- E. Coordinate delivery of salvageable material with Engineer.

3.02 EXCESS MATERIAL

- A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become the property of Contractor and shall be removed from the job site and legally disposed of.
- B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner. See Paragraph 1.03 C above.
- C. Verify the flood plain status of any proposed disposal site. Do not dispose of excavated materials in an area designated as within the 100-year Flood Hazard Area.
- D. 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/Operator before conducting construction operations, in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000 issued March 5, 2023 (the Construction General Permit).
- 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 appropriate practices shown on the Drawings or specified elsewhere in the Contract.
- C. Review implementation of the Storm Water Pollution Prevention Plan (SW3P) implementation 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 activities, as well as other construction related activities (e.g., stock piling of fill material, demolition).
- 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. are part of a larger common plan of development that will disturb at least 1 Ac but less than five Ac.
- D. TPDES Operator:

Operator - The person or persons associated with a large or small construction activity that is either primary or secondary as defined below:

Primary Operator – the person or persons associated with a large or small construction activity that meets either of the following two criteria:

- (a) the persons have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- (b) the person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a storm water pollution prevention plan (SW3P) for the site or other permit conditions (e.g. they are authorized to direct workers at a site to carry out activities required by the SW3P or comply with other permit conditions).

Secondary Operator – The person or entity, often the property owner, whose operational control is limited to:

- (a) the employment of other operators, such as a general contractor, to perform or supervise construction activities, or
- (b) the ability to approve or disapprove changes to construction plans and specifications, but who does not have day-to-day on-site operational control over construction activities at the site.

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

PART 3 E X E C U T I O N

3.01 SITE SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SW3P)

- A. Prepare a SW3P following Part III of the Construction General Permit and under the Storm Water Management Handbook for Construction Activities. If conflicts exist between the Construction General Permit and the handbook, the more stringent requirements will apply.
- 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 updates or revisions to Project Manager for review and address comments prior to commencing, or continuing, construction activities.

3.02 NOTICE OF INTENT FOR LARGE CONSTRUCTION ACTIVITY

- A. Fill out, sign, and date TCEQ Form 20022 (03/06/2018) Notice of Intent (NOI) for an Authorization for Storm Water Discharges Associated with Construction Activity under the TPDES Construction General Permit (TXR 150000), **ATTACHMENT 1** of this Section 01565.
- B. Transmit the signed Contractor's copy of TCEQ Form 20022 (03/06/2018), along with

a \$325.00 check, made out to Texas Commission on Environmental Quality, and the completed Payment Submittal Form to Project Manager.

- C. Project Manager will complete a separate TCEQ Form 20022 (03/06/2018) 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 City and Contractor to TCEQ if mailing is required a minimum of seven days before Commencement of Construction Activities.

3.03 CONSTRUCTION SITE NOTICE FOR SMALL CONSTRUCTION ACTIVITY

- A. Fill out, sign, and date the Construction Site Notice, Attachment 2 to TPDES General Permit TXR 150000, "Small Construction Site Notice", **ATTACHMENT 2** of this Section 01565.
- B. Transmit the signed Construction Site Notice to Project Manager at least seven days prior to Commencement of Construction Activity.

3.04 CERTIFICATION REQUIREMENTS

- A. Fill out TPDES Operator's Information form, **ATTACHMENT 3** of this Section 01565, 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 01565. Include this certification with other Project certification forms.
- C. Submit properly completed certification forms to Project Manager 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 City of Houston Storm Water Pollution Prevention Plan, Construction Site Inspection Report, **ATTACHMENT 5** of this Section 01565 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 and a copy of the SW3P with all revisions to Project Manager.

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, with a signed TCEQ Construction Site Notice for Large or Small Construction Activity. Signed copies of the City's and Contractor's NOI must also be posted.
 - 2. Post notices near the main entrance of the construction site in a prominent place for where it is safely and readily available for viewing by General Public, Local, State, and Federal Authorities. Post name and telephone number of Contractors local contact person, brief description and location of SW3P.
 - a. If posting near a main entrance is not feasible due to safety concerns, coordinate posting of notice with Project Manager 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 vehicle operators, instructing them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post at each stabilized construction access 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 best management practices. Keep a copy of the description with the SW3P.

3.08 NOTICE OF TERMINATION

- A. Submit a NOT, **ATTACHMENT 6** of this Section 01565, to Project Manager 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 if the new operator has sought permit coverage.
- B. Project Manager will complete City's NOT and submit Contractor and City's notices to the TCEQ and MS4 entities.

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ATTACHMENT 1

TCEQ Office Use Only
Permit No:
CN:
RN:



Notice of Intent (NOI) for an Authorization for
Stormwater Discharges Associated with
Construction Activity under
TPDES General Permit TXR150000

IMPORTANT INFORMATION

Please read and use the General Information and Instructions prior to filling out each question in the NOI form.

Use the NOI Checklist to ensure all required information is completed correctly.

Incomplete applications delay approval or result in automatic denial.

Once processed your permit authorization can be viewed by entering the following link into your internet browser: http://www2.tceq.texas.gov/wq_dpa/index.cfm or you can contact TCEQ Stormwater Processing Center at 512-239-3700.

ePERMITS

Effective September 1, 2018, this paper form must be submitted to TCEQ with a completed electronic reporting waiver form (TCEQ-20754).

To submit an NOI electronically, enter the following web address into your internet browser and follow the instructions: <https://www3.tceq.texas.gov/steers/index.cfm>

APPLICATION FEE AND PAYMENT

The application fee for submitting a paper NOI is \$325. The application fee for electronic submittal of a NOI through the TCEQ ePermits system (STEERS) is \$225.

Payment of the application fee can be submitted by mail or through the TCEQ ePay system. The payment and the NOI must be mailed to separate addresses. To access the TCEQ ePay system enter the following web address into your internet browser: <http://www.tceq.texas.gov/epay>.

Provide your payment information for verification of payment:

- If payment was mailed to TCEQ, provide the following:
 - Check/Money Order Number:
 - Name printed on Check:
- If payment was made via ePay, provide the following:
 - Voucher Number:
 - A copy of the payment voucher is attached to this paper NOI form.

RENEWAL (This portion of the NOI is not applicable after June 3, 2018)

Is this NOI for a renewal of an existing authorization? ☐ Yes ☐ No

If Yes, provide the authorization number here: TXR15

NOTE: If an authorization number is not provided, a new number will be assigned.

SECTION 1. OPERATOR (APPLICANT)

a) If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? CN

(Refer to Section 1.a) of the Instructions)

b) 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.)

c) What is the contact information for the Operator (Responsible Authority)?

Prefix (Mr. Ms. Miss):

First and Last Name:

Suffix:

Title:

Credentials:

Phone Number:

Fax Number:

E-mail:

Mailing Address:

City, State, and Zip Code:

Mailing Information if outside USA:

Territory:

Country Code:

Postal Code:

d) Indicate the type of customer:

☐ Individual

☐ Limited Partnership

☐ General Partnership

☐ Trust

☐ Sole Proprietorship (D.B.A.)

☐ Corporation

☐ Estate

☐ Federal Government

☐ County Government

☐ State Government

☐ City Government

☐ Other Government

☐ Other:

e) Is the applicant an independent operator? ☐ Yes ☐ No

(If a governmental entity, a subsidiary, or part of a larger corporation, check No.)

f) Number of Employees. Select the range applicable to your company.

☐ 0-20

☐ 251-500

☐ 21-100

☐ 501 or higher

☐ 101-250

g) Customer Business Tax and Filing Numbers: (**Required** for Corporations and Limited Partnerships. **Not Required** for Individuals, Government, or Sole Proprietors.)

State Franchise Tax ID Number:

Federal Tax ID:

Texas Secretary of State Charter (filing) Number:

DUNS Number (if known):

SECTION 2. APPLICATION CONTACT

Is the application contact the same as the applicant identified above?

☐ Yes, go to Section 3

☐ No, complete this section

Prefix (Mr. Ms. Miss):

First and Last Name: Suffix:

Title: Credential:

Organization Name:

Phone Number: Fax Number:

E-mail:

Mailing Address:

Internal Routing (Mail Code, Etc.):

City, State, and Zip Code:

Mailing information if outside USA:

Territory:

Country Code: Postal Code:

SECTION 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) If this is an existing permitted site, what is the Regulated Entity Number (RN) issued to this site? RN

(Refer to Section 3.a) of the Instructions)

- b) Name of project or site (the name known by the community where it's located):

- c) In your own words, briefly describe the type of construction occurring at the regulated site (residential, industrial, commercial, or other):

- d) County or Counties (if located in more than one):

- e) Latitude: Longitude:

- f) Site Address/Location

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete *Section A*.

If the site does not have a physical address, provide a location description in *Section B*.
Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

Section A:

Street Number and Name:

City, State, and Zip Code:

Section B:

Location Description:

City (or city nearest to) where the site is located:

Zip Code where the site is located:

SECTION 4. GENERAL CHARACTERISTICS

- a) Is the project or site located on Indian Country Lands?

☐ Yes, do not submit this form. You must obtain authorization through EPA Region 6.

☐ No

- b) Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?

☐ Yes. Note: The construction stormwater runoff may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA Region 6.

☐ No

- c) What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?

- d) What is the Secondary SIC Code(s), if applicable?

- e) What is the total number of acres to be disturbed?

- f) Is the project part of a larger common plan of development or sale?

☐ Yes

☐ No. The total number of acres disturbed, provided in e) above, must be 5 or more.
If the total number of acres disturbed is less than 5, do not submit this form. See
the requirements in the general permit for small construction sites.

g) What is the estimated start date of the project?

h) What is the estimated end date of the project?

i) Will concrete truck washout be performed at the site? ☐ Yes ☐ No

j) What is the name of the first water body(ies) to receive the stormwater runoff or
potential runoff from the site?

k) What is the segment number(s) of the classified water body(ies) that the discharge will
eventually reach?

l) Is the discharge into a Municipal Separate Storm Sewer System (MS4)?

☐ Yes ☐ No

If Yes, provide the name of the MS4 operator:

Note: The general permit requires you to send a copy of this NOI form to the MS4
operator.

m) Is the discharge or potential discharge from the site within the Recharge Zone,
Contributing Zone, or Contributing Zone within the Transition Zone of the
Edwards Aquifer, as defined in 30 TAC Chapter 213?

☐ Yes, complete the certification below.

☐ No, go to Section 5

I certify that the copy of the TCEQ-approved Plan required by the Edwards Aquifer Rule
(30 TAC Chapter 213) that is included or referenced in the Stormwater Pollution
Prevention Plan will be implemented. ☐ Yes

SECTION 5. NOI CERTIFICATION

a) I certify that I have obtained a copy and understand the terms and conditions of the
Construction General Permit (TXR150000). ☐ Yes

b) I certify that the full legal name of the entity applying for this permit has been provided
and is legally authorized to do business in Texas. ☐ Yes

c) I understand that a Notice of Termination (NOT) must be submitted when this
authorization is no longer needed. ☐ Yes

d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be
implemented prior to construction and to the best of my knowledge and belief is
compliant with any applicable local sediment and erosion control plans, as required in
the Construction General Permit (TXR150000). ☐ Yes

Note: For multiple operators who prepare a shared SWP3, the confirmation of an
operator may be limited to its obligations under the SWP3, provided all obligations are
confirmed by at least one operator.

SECTION 6. APPLICANT CERTIFICATION SIGNATURE

Operator Signatory Name: [REDACTED]

Operator Signatory Title: [REDACTED]

I 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: _____

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NOTICE OF INTENT CHECKLIST (TXR150000)

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.

Confirm each item (or applicable item) in this form is complete. This checklist is for use by the applicant to ensure a complete application is being submitted. **Missing information may result in denial of coverage under the general permit.** (See NOI process description in the General Information and Instructions.)

APPLICATION FEE

If paying by check:

- ☐ Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)
- ☐ Check number and name on check is provided in this application.

If using ePay:

- ☐ The voucher number is provided in this application and a copy of the voucher is attached.

RENEWAL

- ☐ If this application is for renewal of an existing authorization, the authorization number is provided.

OPERATOR INFORMATION

- ☐ Customer Number (CN) issued by TCEQ Central Registry
- ☐ Legal name as filed to do business in Texas. (Call TX SOS 512-463-5555 to verify.)
- ☐ Name and title of responsible authority signing the application.
- ☐ Phone number and e-mail address
- ☐ Mailing address is complete & verifiable with USPS. www.usps.com
- ☐ Type of operator (entity type). Is applicant an independent operator?
- ☐ Number of employees.
- ☐ For corporations or limited partnerships - Tax ID and SOS filing numbers.
- ☐ Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

- ☐ Regulated Entity Number (RN) (if site is already regulated by TCEQ)
- ☐ Site/project name and construction activity description
- ☐ County
- ☐ Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>

- ☐ Site Address/Location. Do not use a rural route or post office box.

GENERAL CHARACTERISTICS

- ☐ Indian Country Lands -the facility is not on Indian Country Lands.
- ☐ Construction activity related to facility associated to oil, gas, or geothermal resources
- ☐ Primary SIC Code that best describes the construction activity being conducted at the site.
www.osha.gov/oshstats/sicser.html
- ☐ Estimated starting and ending dates of the project.
- ☐ Confirmation of concrete truck washout.
- ☐ Acres disturbed is provided and qualifies for coverage through a NOI.
- ☐ Common plan of development or sale.
- ☐ Receiving water body or water bodies.
- ☐ Segment number or numbers.
- ☐ MS4 operator.
- ☐ Edwards Aquifer rule.

CERTIFICATION

- ☐ Certification statements have been checked indicating Yes.
- ☐ Signature meets 30 Texas Administrative Code (TAC) §305.44 and is original.

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Instructions for Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

By Regular Mail:

TCEQ

Stormwater Processing Center (MC228)

P.O. Box 13087

Austin, Texas 78711-3087

By Overnight or Express Mail:

TCEQ

Stormwater Processing Center (MC228)

12100 Park 35 Circle

Austin, TX

Application Fee:

The application fee of \$325 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 delays in acknowledgment or denial of coverage under the general permit. Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

Mailed Payments:

Use the attached General Permit Payment Submittal Form. The application fee is submitted to a different address than the NOI. Read the General Permit Payment Submittal Form for further instructions, including the address to send the payment.

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and 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.

TCEQ Contact List:

Application - status and form questions:	512-239-3700, swpermit@tceq.texas.gov
Technical questions:	512-239-4671, swgp@tceq.texas.gov
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- **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(es) on the form must be verified with the US Postal service as receiving regular mail delivery. Do not give an overnight/express mailing address.

- **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.
- **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 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)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **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.texas.gov>. Search using keyword TXR150000.

Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated project or site 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 no 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 and Regulated Entity Number, if one has not already been assigned to this customer or site.

For existing customers and sites, you can find the Customer Number and Regulated Entity Number by entering the following web address into your internet browser: <http://www15.tceq.texas.gov/crpub/> or you can contact the TCEQ Stormwater Processing Center at 512-239-3700 for assistance. On the website, you can search by your permit number, the Regulated Entity (RN) number, or the Customer Number (CN). If you do not know these numbers, you can select "Advanced Search" to search by permittee name, site address, etc.

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 this permit, a Notice of Change form must be submitted to the program area.

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

Renewal of General Permit. Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied, a new permit number will be issued.

Section 1. OPERATOR (APPLICANT)

a) 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 the applicant is an existing TCEQ customer, the Customer Number is available at the following website: <http://www15.tceq.texas.gov/crpub/>. If the applicant is not an existing TCEQ customer, leave the space for CN blank.

b) Legal Name of Applicant

Provide the current legal name of the applicant. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, as filed in the county. You may contact the SOS at 512-463-5555, for more information related to filing in Texas. If filed in the county, provide a copy of the legal documents showing the legal name.

c) Contact Information for the Applicant (Responsible Authority)

Provide information for the person signing the application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the applicant.

The fax number and e-mail address are optional and should correspond to the applicant.

d) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for an authorization.

Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

Partnership

A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). If the customer is a 'General Partnership' or 'Joint Venture' filed in the county (not filed with TX SOS), the legal name of each partner forming the 'General Partnership' or 'Joint Venture' must be provided. Each 'legal entity' must apply as a co-applicant.

Trust or Estate

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

Sole Proprietorship (DBA)

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

1. be under the person's name
2. have its own name (doing business as or DBA)
3. have any number of employees.

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

Corporation

A customer that meets all of these conditions:

1. is a legally incorporated entity under the laws of any state or country
2. is recognized as a corporation by the Texas Secretary of State
3. has proper operating authority to operate in Texas

The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

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. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization is not recognized as the 'legal name'.

Other

This may include a utility district, water district, tribal government, college district, council of governments, or river authority. Provide the specific type of government.

e) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

f) 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 application.

g) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

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 the Tax ID number.

Federal Tax ID

All businesses, except for some small 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 tax ID.

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.

DUNS Number

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

Section 2. APPLICATION CONTACT

Provide the name and contact information for the person that TCEQ can contact for additional information regarding this application.

Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) Regulated Entity Number (RN)

The RN is issued by TCEQ's Central Registry to sites where an activity is regulated by TCEQ. This is not a permit number, registration number, or license number. Search TCEQ's Central Registry to see if the site has an assigned RN at <http://www15.tceq.texas.gov/crpub/>. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, an RN may already be assigned for the larger site. Use the RN assigned for the larger site.

If the site is found, provide the assigned RN and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

b) Name of the Project or Site

Provide the name of the site or project 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 name.

c) Description of Activity Regulated

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

d) County

Provide the name of the county where the site or project is located. If the site or project is located in more than one county, provide the county names as secondary.

e) Latitude and Longitude

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to:
<http://www.tceq.texas.gov/gis/sqmaview.html>.

f) Site Address/Location

If a site has an address that includes a street number and street name, enter the complete address for the site in *Section A*. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street number and street name, provide a complete written location description in *Section B*. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and zip code of the site location.

Section 4. GENERAL CHARACTERISTICS

a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA Region 6, Dallas. Do not submit this form to TCEQ.

b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas (RRC) and may need to obtain authorization from EPA Region 6.

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a

carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the RRC's jurisdiction must be authorized by the EPA and the RRC, as applicable. Activities under RRC jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the RRC; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The RRC also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the RRC. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the RRC prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

For more information about the jurisdictions of the RRC and the TCEQ, read the Memorandum of Understanding (MOU) between the RRC and TCEQ at 16 Texas Administrative Code, Part 1, Chapter 3, Rule 3.30, by entering the following link into an internet browser:

[http://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30) or contact the TCEQ Stormwater Team at 512-239-4671 for additional information.

c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Buildings Other than Single Family Homes
- 1541 - Construction of Industrial Buildings and Warehouses

- 1542 - Construction of Non-residential Buildings, other than Industrial Buildings and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, enter the following link into your internet browser: <http://www.osha.gov/pls/imis/sicsearch.html> or you can contact the TCEQ Small Business and Local Government Assistance Section at 800-447-2827 for assistance.

d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave this blank if not applicable. For help with SIC Codes, enter the following link into your internet browser: <http://www.osha.gov/pls/imis/sicsearch.html> or you can contact the TCEQ Small Business and Environmental Assistance Section at 800-447-2827 for assistance.

e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. 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 more than five 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. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at 512-239-4671 or by email at swgp@tceq.texas.gov.

f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. 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. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on what a common plan of development is, refer to the definition of "Common Plan of Development" in the Definitions section of the general permit or enter the following link into your internet browser:

www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html

For further information, go to the TCEQ stormwater construction webpage enter the following link into your internet browser: www.tceq.texas.gov/goto/construction and search for "Additional Guidance and Quick Links". If you have any further questions about the Common Plan of Development you can contact the TCEQ Stormwater Team at 512-239-4671 or the TCEQ Small Business and Environmental Assistance at 800-447-2827.

g) Estimated Start Date of the Project

This is the date that any construction activity or construction support activity is initiated at the site. If renewing the permit provide the original start date of when construction activity for this project began.

h) Estimated End Date of the Project

This is the date that any construction activity or construction support activity will end and final stabilization will be achieved at the site.

i) Will concrete truck washout be performed at the site?

Indicate if you expect that operators of concrete trucks will washout concrete trucks at the construction site.

j) Identify the water body(s) receiving stormwater runoff

The stormwater 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).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

k) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Enter the following link into your internet browser to find the segment number of the classified water body where stormwater will flow from the site:

www.tceq.texas.gov/waterquality/monitoring/viewer.html or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

You may also find the segment number in TCEQ publication GI-316 by entering the following link into your internet browser: www.tceq.texas.gov/publications/gi/gi-316 or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at 512-239-4671 for further assistance.

l) Discharge into MS4 – Identify the MS4 Operator

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a

copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at 512-239-4671.

m) Discharges to the Edwards Aquifer Recharge Zone and Certification

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

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 by entering the following link into an internet browser:

www.tceq.texas.gov/field/eapp/viewer.html or by contacting the TCEQ Water Quality Division at 512-239-4671 for assistance.

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.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

Section 5. NOI CERTIFICATION

Note: Failure to indicate Yes to all of the certification items may result in denial of coverage under the general permit.

a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. Electronic applications submitted through ePermits have immediate provisional coverage. You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site by entering the following link into an internet browser: www.tceq.texas.gov/goto/construction or you may contact the TCEQ Stormwater processing Center at 512-239-3700 for assistance.

b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. 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, for more information related to filing in Texas.

c) Understanding of Notice of Termination

A permittee shall terminate coverage under the Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has

been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

Section 6. APPLICANT CERTIFICATION SIGNATURE

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 TCEQ'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).

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Texas Commission on Environmental Quality General Permit Payment Submittal Form

Use this form to submit your Application Fee only if you are mailing your payment.

Instructions:

- 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 either of the following:

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 or Express Mail

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: TXR150000

1. Check or 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 or 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 application entries!**

If there is not enough space on the form to list all of the projects or sites the authorization will cover, then attach a list of the additional sites.

Project/Site (RE) Name:

Project/Site (RE) Physical Address:

Staple the check or money order to this form in this space.

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CITY OF HOUSTON
STANDARD GENERAL REQUIREMENT

TPDES REQUIREMENTS

ATTACHMENT 2



SMALL CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater 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 stormwater runoff from small construction sites. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/wq_construction.html

Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, estimated start date and projected end date, or date that disturbed soils will be stabilized</i>	
Location of Stormwater Pollution Prevention Plan:	

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 stormwater 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.F.3.

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ATTACHMENT 3

TPDES OPERATOR'S INFORMATION

Owner's Name and Address:

(Official)

Entity Address

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

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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 No. TXR150000 and the storm water pollution prevention plan for 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: _____

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ATTACHMENT 5

**STORM WATER POLLUTION PREVENTION PLAN
CONSTRUCTION SITE INSPECTION REPORT**

TPDES Permit Number _____
Date _____

The following must be corrected prior to continuing work:

Once the above items have been corrected, call to arrange for reinspection. No further inspections for any construction related activity shall be made until the above items have been corrected.

Inspector's Signature

Contractor's Signature

Inspector's Name

Contractor's Name

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CITY OF HOUSTON
STANDARD GENERAL REQUIREMENT

TPDES REQUIREMENTS

ATTACHMENT 6



**Notice of Termination (NOT) for Authorizations under
TPDES General Permit TXR150000**

TCEQ Office Use Only
Permit No:
CN:
RN:
Region:

IMPORTANT INFORMATION:

Please read and use the General Information and Instructions prior to filling out each question in the form.

Effective September 1, 2018, this paper form must be submitted to TCEQ with a completed electronic reporting waiver form (TCEQ-20754).

ePermits: This form is available on our online permitting system.

Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 TXRCW

Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN

b) What is the Legal Name of the current permittee?

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss):

First and Last Name: Suffix:

Title: Credentials:

Phone Number: Fax Number:

Email:

Mailing Address:

City, State, and Zip Code:

Country Mailing Information, if outside USA:

Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above?

☐ Yes, go to Section 3.

☐ No, complete section below

Prefix (Mr. Ms. or Miss): [REDACTED]

First and Last Name: [REDACTED] Suffix: [REDACTED]

Title: [REDACTED] Credentials: [REDACTED]

Phone Number: [REDACTED] Fax Number: [REDACTED]

Email: [REDACTED]

Mailing Address: [REDACTED]

City, State, and Zip Code: [REDACTED]

Country Mailing Information, if outside USA: [REDACTED]

Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) TCEQ issued RE Reference Number (RN): RN [REDACTED]

b) Name of project or site as known by the local community: [REDACTED]

c) County, or counties if more than 1: [REDACTED]

d) Latitude: [REDACTED] Longitude: [REDACTED]

e) Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.

If the site does not have a physical address, provide a location description in Section 3B.
Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

Section 3A: Physical Address of Project or Site:

Street Number and Name: [REDACTED]

City, State, and Zip Code: [REDACTED]

Section 3B: Site Location Description:

Location description: [REDACTED]

[REDACTED]

City where the site is located or, if not in a city, what is the nearest city: [REDACTED]

Zip Code where the site is located: [REDACTED]

Section 4. 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 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 identified in the SWP3 have been transferred to the new Operator.
- ☐ The discharge is now authorized under an alternate TPDES permit.
- ☐ The activity never began at this site that is regulated under the general permit.

Section 5. CERTIFICATION

Signatory Name: _____

Signatory Title: _____

I 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: _____

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Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

GENERAL INFORMATION

Where to Send the Notice of Termination (NOT):

BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
P.O. Box 13087
Austin, Texas 78711-3087

BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
12100 Park 35 Circle
Austin, TX 78753

TCEQ Contact List:

Application status and form questions:
Technical questions:
Environmental Law Division:
Records Management - obtain copies of forms:
Reports from databases (as available):
Cashier's office:

512-239-3700, swpermit@tceq.texas.gov
512-239-4671, swgpp@tceq.texas.gov
512-239-0600
512-239-0900
512-239-DATA (3282)
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; and
 - 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.

Change in Operator:

An authorization under the general permit is not transferable. If the operator 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.

INSTRUCTIONS FOR FILLING OUT THE FORM

The majority of permit information related to the current operator and regulated entity are available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.

Section 1. Operator (Current Permittee):

- a) Customer Number (CN)
TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number. The Customer Number, for the current permittee, is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- b) 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. The current operator name, as provided on the current authorization, is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- c) Contact Information for the Operator (Responsible Authority)
Provide information for person signing the NOT application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the operator.

The fax number and e-mail address are optional and should correspond to the operator.

Section 2. Application Contact:

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

Section 3. Regulated Entity (RE) Information on Project or Site:

- a) Regulated Entity Reference Number (RN)
A number issued by TCEQ's Central Registry to sites where an activity regulated by TCEQ. This is not a permit number, registration number, or license number. The Regulated Entity Reference Number is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- b) Name of the Project or Site
Provide the name of the site as known by the public in the area where the site is located.
- c) County
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- e) Site/Project (RE) Physical Address/Location Information
The physical address/location information, as provided on the current authorization, is available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.

Section 3A. If a site has an address that includes a street number and street name, enter the complete address for the site. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate the site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

Section 3B. If a site does not have an address that includes a street number and street name, provide a complete written location description. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and Zip Code of the facility location.

Section 4. Reason for Termination:

The Notice of Termination form is only for use to terminate the authorization (permit). The Permittee must indicate the specific reason for terminating 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.

Section 5. Certification:

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code §305.44.

IF YOU ARE A CORPORATION:

The regulation that controls who may sign an application form is 30 Texas Administrative Code §305.44(a), which is provided 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), which is provided 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 statutes 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).

END OF SECTION

SECTION 01566

SOURCE CONTROLS FOR EROSION AND SEDIMENTATION

PART 1 G E N E R A L

1.01 SECTION INCLUDES

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

1.02 UNIT PRICES

- A. Unless indicated in the Bid Proposal 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 of which this work is a component.

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

PART 3 E X E C U T I O N

3.01 PREPARATION AND INSTALLATION

- A. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the engineer 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 discing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil.

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. Waterhosing 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.
- 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 and evaporate or infiltrate directly into the ground, or where the runoff can be collected in a temporary holding or

seepage basin. Beneath wash areas construct a gravel or rock base to minimize mud production.

3.08 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 SANITARY FACILITIES

- A. Provide the construction sites with adequate portable toilets for workers in accordance with Section 01500 - Temporary Facilities and Controls, and applicable health regulations.

3.11 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 Unless indicated in the bid proposal 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 of which this work is a component.

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.
- D Representative Manufacturer: Mirafi, Inc., or equal.

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 Engineer 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 by the Engineer. 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 GENERAL

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 Unless indicated in the bid proposal 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 of which this work is a component.

1.03 SUBMITTALS

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

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 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.
- D Representative Manufacturers: Mirafi, Inc., or equal.

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 Engineer 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 Engineer. 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 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. Requirement for and qualifications of flaggers.

1.02 SUBMITTALS

- A. Make submittals in accordance with Section 01300 - Submittals.

1.03 UNIT PRICES

- A. See Section 01025 – Measurement and Payment.

1.04 FLAGGERS

- A. Unless otherwise specified, use only flaggers who are off-duty, regularly employed, uniformed peace officers.
- B. Flaggers are required at the following locations:
 - 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 cross-walks.
 - 5. Where construction activities might affect public safety and convenience.
 - 6. Where traffic regulation is needed due to rerouting of vehicular traffic around the work site.
- C. The use of Flaggers 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 Flaggers 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.

- D. Flaggers 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.
- 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 Engineer.
- B. 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.
- C. 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 Engineer.
- D. Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times.
- E. 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.
- F. Control vehicular parking to prevent interference with public traffic and parking, and access by emergency vehicles.
- G. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- H. Prevent parking on or adjacent to access roads or in non-designated areas.

3.03 FLARES AND LIGHTS

- A. Provide flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.04 HAUL ROUTES

- A. Utilize haul routes designated by 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. 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.
- B. Relocate traffic signs and control devices as Work progresses to maintain effective traffic control.

3.06 BRIDGING TRENCHES AND EXCAVATIONS

- A. Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic.
- 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.

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 for product options and substitutions 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 General Conditions.
- B. Furnish information the Engineer 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 Engineer can base a decision.
- D. If the Engineer 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 ENGINEER'S REVIEW

- A. Alternate products or processes may be used only if approved in writing by the Engineer. The Engineer's determination regarding acceptance of a proposed alternate product is final.
- B. Alternate products will be accepted if the product is judged by the Engineer 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 the time period allowed for substitution submittals given in the General Conditions. 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, Architect/Engineer, 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 Engineer.
- 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.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

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 regarding Final Completion and Final Payment when Work is complete and ready for Engineer's final inspection.
- B. Provide Project Record Documents in accordance with Section 01300.
- C. Complete or correct items on punch list, with no new items added. Any new items will be addressed during warranty period.
- D. The Owner will occupy portions of the Work as specified in other Sections.

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 WARRANTIES

- A. Provide one original of each warranty from Subcontractors, suppliers, and manufacturers.
- B. Provide executed One-Year Maintenance Bond.
- C. Provide Table of Contents and assemble warranties in 3-ring/D binder with durable plastic cover.
- D. Submit warranties prior to final Application for Payment.

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

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

END OF SECTION

SECTION 01710

CLEANING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Executing cleaning, during progress of work daily, 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 sight-exposed surfaces.
 - 2. Leave project clean and ready for occupancy or use.

1.02 UNIT PRICES

- A. All items within this section shall be considered incidental to the cost of the project.

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 lay dust and prevent blowing dust.
- C. At daily intervals during progress of work, clean site and public properties.
- D. Dispose of waste materials, debris, and rubbish.

- E. Provide on-site containers for collection of waste materials, debris and rubbish.
- F. Remove waste material, debris, and rubbish from site.
- G. Legally dispose of debris at public or private dumping areas off Owner's property.
- H. Handle materials in a controlled manner with as few handlings as possible.

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, paragraph 3.02.
- 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 Engineer.

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 or pencil on a set of blue line opaque drawings, provided by Engineer.

1.04 SUBMITTALS

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

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

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

END OF SECTION

SECTION 02076

REMOVING EXISTING PAVEMENTS AND STRUCTURES

PART 1 GENERAL

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. Refer to Section 01025 - Measurement and Payment for unit price procedures.
- B. 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 Engineer 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 and 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 full depth of paving.
- 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 G E N E R A L

1.01 SECTION INLCUDES

- A. Clearing and grubbing.
- B. Removal of topsoil, stripping and stockpiling.
- C. Removal of debris and trash.
- D. Removal of obstructions.
- E. Excavation and fill.
- F. Disposal of waste materials.
- G. Disposal of excess materials.
- H. Salvaging of designated items.
- I. Rough and finish grading.

1.02 UNIT PRICES

- A. Refer to Section 01025 – Measurement and Payment for unit price procedures.

PART 2 P R O D U C T S

2.01 MATERIALS

- A. Brought-in 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 E X E C U T I O N

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 01562 – Tree and Plant Protection.
- B. Protect utilities to remain from damage.
- C. Topsoil Removal:
 - 1. Remove growths of 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.
11. Grade areas of pavement removal/replacement to proper elevations for stabilizing of subgrade to accommodate construction of new pavement to

grades shown on plans. Cut and/or fill & compact as required at no separate pay.

3.03 UNSUITABLE MATERIAL

- A. Undercut and replace material which Engineer designates as unsuitable for subsequent construction.
- B. Material used to replace unsuitable material shall be suitable material from site excavation or “Brought-in 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 “Brought-in 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 Engineer 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 02225

ROADWAY EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavation of materials for roadways.
- B. Excavation of materials for roadside ditches.
- C. Section 02920 - Topsoil: Topsoil materials and placement.

1.02 UNIT PRICES

- A. Refer to Section 01025 – Measurement and Payment

1.03 TESTS

- A. Tests and analysis of soil materials will be performed in accordance with ASTM D4318, ASTM D2216, and ASTM D698 under provisions of Section 01410 - Testing Laboratory Services.

1.04 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other features outside of grading limits.
- B. Protect above and below grade utilities which are to remain.
- C. Repair damage caused by Contractor.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, and datum. Coordinate with Section 01050 - Field Surveying.
- B. Identify and flag surface and aerial utilities.
- C. Notify utility companies to remove or relocate utilities.

- D. Identify known utilities below grade. Stake and flag locations. Make temporary or permanent removals and replacements of underground pipes, ducts, or utilities where indicated on Drawings
- E. Upon discovery of unknown or badly deteriorated utilities, or concealed conditions, discontinue work. Notify Engineer and obtain instructions before proceeding in such areas.
- F. Obtain approval of top soil quality before excavating and stockpiling.
- G. 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 TOPSOIL EXCAVATION

- A. Excavate topsoil for esplanades and areas to receive grass or landscaping from areas to be further excavated. Stockpile in area designated on site.
- B. Stockpile topsoil to depth not exceeding 8 feet. Cover to protect from erosion.

3.03 EXCAVATION

- A. Excavate to lines and grades shown on drawings.
- B. Remove unsuitable material not meeting specifications. Backfill with embankment materials and compact to requirements of Section 02221 - Embankment.
- C. At intersections, grade back at minimum slope of one inch per foot. Produce a smooth riding junction with intersecting street. Maintain proper drainage.
- D. Fill over-excavated areas in accordance with requirements of Section 02221 - Embankment, at no cost to the Owner.
- E. Remove unsuitable material, and excess soil not being reused, from the site in accordance with requirements of Section 01564 - Waste Material Disposal.

3.04 COMPACTION

- A. Maintain optimum moisture content of subgrade to attain required compaction density.
- B. 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 under future paving and shoulders: Minimum density of 95 percent of maximum dry density.
2. Other areas: Minimum density of 90 percent of maximum dry density.

3.05 TOLERANCES

- A. Top of compacted surface: Plus or minus 1/2 inch in cross section, or in 16 foot length.

3.06 FIELD QUALITY CONTROL

- A. Compaction Testing will be performed in accordance with ASTM D1556 or ASTM D2922 and ASTM 3017 under provisions of Section 01410 - Testing Laboratory Services.
- B. A minimum of three tests will be taken for each 1,000 linear feet per lane of roadway.
- C. If tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at Contractor's expense.

3.07 PROTECTION

- A. Prevent erosion at all times. Maintain ditches and cut temporary swales to allow natural drainage in order to avoid damage to roadway. Do not allow water to pond.
- B. Distribute construction traffic evenly over compacted areas, where practical, to aid in obtaining uniform compaction. Protect exposed areas having high moisture content from wheel loads that cause rutting.
- C. Maintain excavation and embankment areas until start of subsequent work. Repair and recompact slides, washouts, settlements, or areas with loss of density at no cost to the Owner.

END OF SECTION

SECTION 02226

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 G E N E R A L

1.01 SECTION INCLUDES

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

1.02 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 construction of structures.

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 Section 01300 - Submittals.
- 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 City Engineer 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, inverts 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 E X E C U T I O N

3.01 PREPARATION

- A. Conduct an inspection to determine condition of existing structures and other permanent installations.
- B. Set up necessary street detours and barricades in preparation for excavation if construction will affect traffic. 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 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 01562 - 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 City.

3.03 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 Engineer.
- B. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work. Notify Engineer 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 Engineer and agency for any repairs or relocations, either temporary or permanent.
- D. Avoid settlement of surrounding soil due to equipment operations, excavation procedures, vibration, dewatering, or other construction methods.
- E. Provide surface drainage during construction to protect work and to avoid nuisance to adjoining property. Where required, provide proper dewatering and piezometric pressure control during construction.
- F. Conduct hauling operations so that trucks and other vehicles do not create a dirt nuisance in streets. Verify that truck beds are sufficiently tight and loaded in such a manner that objectionable materials will not spill onto streets. Promptly clear away any dirt, mud, or other materials that spill onto streets or are deposited onto streets by vehicle tires.
- G. Maintain permanent benchmarks, 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. Sheeting, 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 Engineer.
- J. After completion of the structure, remove sheeting, shoring, and bracing unless Engineer 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 Engineer.

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 02229 - 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 Engineer at least 48 hours prior to planned completion of foundation excavations. Do not place the foundation base until the excavation is accepted by the Engineer.
- 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 Engineer. 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 Engineer.

- C. Fill unauthorized excessive excavation with foundation backfill material or other material as directed by the Engineer.
- 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 Engineer, 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.
- 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 G E N E R A L

1.01 SECTION INCLUDES

- A. Excavation, trenching, foundation, embedment, and backfill for installation of utilities, including manholes and other pipeline structures.

1.02 UNIT PRICES

- A. No additional payment will be made for trench excavation, embedment and backfill. Include cost in the unit price for installed underground piping, sewer, conduit, or duct work.
- B. No separate or additional payment will be made for surface water control, ground water control, or for excavation drainage. Include in the unit price for the installed piping, sewer, conduit, or duct work.
- C. Refer to Section 01025 - Measurement and Payment for unit price procedures.

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 rainwater away from trench excavation. Rainwater 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.
- U. Special Shoring: A shoring system meeting Special Shoring requirements for locations identified on the Drawings.

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. Conform to Section 01300 - Submittals.
- 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.
- 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 01562 - 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.

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 Section 03305 - Concrete for Utility Construction.
- C. Geotextile (Filter Fabric): Conform to requirements of Section 02249 - Geotextile.
- D. 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 Engineer 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.

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.
- C. Determine trench excavation widths using the following schedule as related to pipe outside diameter (O.D.). Maximum trench width shall be the minimum trench width plus 24 inches.

Nominal Pipe Size, Inches	Minimum Trench Width, Inches
Less than 18	O.D. + 18
18 to 30	O.D. + 24
Greater than 30	O.D. + 36

- 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 Engineer 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 Engineer, 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.

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.

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 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.

3.07 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 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, 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, or random backfill 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. 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. Maximum lift thickness determined by Contractor to achieve uniform placement and required compaction, but not exceeding 24 inches.
 - 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.
- F. For trench excavations outside pavements, a random backfill of suitable material may be used in the trench zone.
 1. Fat clays (CH) may be used as trench zone backfill outside paved areas at the Contractor's option. If the required density is not achieved, the Contractor, at his option and at no additional cost to the Owner, may use lime stabilization to achieve compaction requirements or use a different suitable material.
 2. Maximum 9-inch compacted lift thickness for clayey soils and maximum 12-inch lift thickness for granular soils.
 3. Compact to a minimum of 90 percent of the maximum dry density determined according to ASTM D 698, or to same density as adjacent soils.
 4. Moisture content, as necessary, to achieve density.

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. Tests will be performed on a 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.

- D. At least three tests for moisture-density relationships will be performed initially for backfill materials in accordance with ASTM D 698, and for cement- stabilized sand in accordance with ASTM D 558. Additional moisture-density relationship tests will be performed whenever there is a noticeable change in material gradation or plasticity.
- E. In-place density tests of compacted pipe foundation, embedment and trench zone backfill soil materials 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 20 cubic yards of compacted embedment and for every 50 cubic yards of compacted trench zone backfill material.
 - 2. A minimum of three density tests for each full shift of Work.
 - 3. Density tests will be distributed among the placement areas. Placement areas are: foundation, bedding, haunching, initial backfill and trench zone.
 - 4. The number of tests will be increased if inspection determines that soil type or moisture content are not uniform or if compacting effort is variable and not considered sufficient to attain uniform density, as specified.
 - 5. Density tests may be performed at various depths below the fill surface by pit excavation. Material in previously placed lifts may therefore be subject to acceptance/rejection.
 - 6. Two verification tests will be performed adjacent to in-place tests showing density less than the acceptance criteria. Placement will be rejected unless both verification tests show acceptable results.
 - 7. Recompact placement will be retested at the same frequency as the first test series, including verification tests.
- 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.

END OF SECTION

SECTION 02229

UTILITY BACKFILL MATERIALS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Material Classifications
- B. Utility Backfill Materials
 - 1. Concrete sand.
 - 2. Gem sand.
 - 3. Pea gravel.
 - 4. Crushed stone.
 - 5. Crushed concrete.
 - 6. Bank run sand.
 - 7. Select backfill.
 - 8. Random backfill.
- C. Material handling and quality control requirements.

1.02 UNIT PRICES

- A. No payment will be made for backfill material unless specifically listed in Bid Proposal Form. Include payment in unit price for applicable utility installation.
- B. Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03 DEFINITIONS

- A. Backfill: Suitable material meeting specified quality requirements for the designated application as embedment or trench zone backfill.
- B. Embedment: Material placed under controlled conditions within the embedment zone extending vertically upward from top of foundation to an elevation 12 inches above top of pipe, and including pipe bedding, haunching and initial backfill.
- C. Trench Zone Backfill: Material meeting specified quality requirements and placed under controlled conditions in the trench zone from top of embedment

zone to base course in paved areas or to the surface grading material in unpaved areas.

- D. Foundation: Either suitable soil of the trench bottom, or material placed as backfill of over-excavation for removal and replacement of unsuitable or otherwise unstable soils.
- E. Source: A source selected by the Contractor for supply of embedment or trench zone backfill material. A selected source may be the project excavation, off-site borrow pits, commercial borrow pits, or sand and aggregate production or manufacturing plants.
- F. Refer to Section 02227 - Excavation and Backfill for Utilities, for other definitions regarding utility installation by trench construction.

1.04 SUBMITTALS

- A. Conform to requirements of Section 01300 - Submittals.
- B. Submit a description of source, material classification and product description, production method, and application of backfill materials.
- C. Submit test results for samples of off-site backfill materials to comply with Paragraph 3.03, Material Quality Control.
- D. Identify off-site sources for backfill materials at least 14 days ahead of intended use so that the Engineer may obtain samples for verification testing.
- E. Before stockpiling materials, submit a copy of temporary easement or approval from landowner for stockpiling backfill material on private property.

1.05 TESTS

- A. Perform tests of sources for backfill material in accordance with Paragraph 3.03A.
- B. Verification tests of backfill materials may be performed by the Owner in accordance with Section 01410 - Testing Laboratory Services and in accordance with Paragraph 3.03B.
- C. Random fill obtained from the Project excavation as source is exempt from prequalification requirements by Contractor but must be inspected for unacceptable materials based on ASTM D 2488.

PART 2 P R O D U C T S

2.01 MATERIAL CLASSIFICATIONS

- A. Materials for backfill shall be classified for the purpose of quality control in accordance with the Unified Soil Classification Symbols as defined in ASTM D 2487. Material use and application is defined in utility installation specifications and Drawings either by class, as described in Paragraph 2.01B, or by product descriptions, as given in Paragraph 2.02.
- B. Class Designations Based on Laboratory Testing:
 - 1. Class I: Well graded sands and gravels, gravel-sand mixtures, crushed well graded rock, little or no fines (GW, SW)
 - a. Plasticity Index: Nonplastic
 - b. Gradation: D_{60}/D_{10} - greater than 4 percent. Amount passing No. 200 Sieve - less than or equal to 5 percent
 - 2. Class II: Poorly graded gravels and sands, silty sands and gravels, little to moderate fines (GM, GP, SP, SM)
 - a. Plasticity Index: Nonplastic to 4
 - b. Gradation (GP, SP): Amount passing No. 200 Sieve - less than 5 percent
 - c. Gradation (GM, SM): Amount passing No. 200 Sieve - between 12 percent and 50 percent
 - 3. Class III: Clayey gravels and sands, poorly graded mixtures of sand, gravel, and clay (GC, SC)
 - a. Plasticity Index: greater than 7
 - b. Gradation: Amount passing No. 200 Sieve - between 12 percent and 50 percent
 - 4. Class IV: Lean clays (CL)
 - a. Plasticity Index: greater than 7
 - b. Liquid Limit: less than 50
 - c. Gradation: Amount passing No. 200 Sieve - greater than 50 percent
 - d. Inorganic
 - 5. Use soils with dual class designation according to ASTM D 2487 according to the more restrictive class.

2.02 PRODUCT DESCRIPTIONS

- A. Soils classified as silt (ML), silty clay (CL - ML with PI of 4 to 7), elastic silt (MH), organic clay and organic silt (OL, OH), and organic matter (PT) are not acceptable as backfill materials. These soils may be used for site grading and restoration in unimproved areas as approved by Engineer. Soils classified as fat clay (CH) may be used as backfill materials where allowed by the applicable backfill installation specification. Refer to Section 02226 - Excavation and Backfill for Structures and Section 02227 - Excavation and Backfill for Utilities.
- B. Provide backfill material that is free of stones greater than 6 inches, free of roots, waste, debris, trash, organic material, unstable material, non-soil matter, hydrocarbon or other contamination, conforming to the following limits for deleterious materials:
 - 1. Clay lumps: Less than 0.5 percent for Class I, and less than 2.0 percent for Class II, when tested in accordance with ASTM C 142.
 - 2. Lightweight pieces: Less than 5 percent when tested in accordance with ASTM C 123.
 - 3. Organic impurities: No color darker than standard color when tested in accordance with ASTM C 40.
- C. Manufactured materials may be substituted for natural soil or rock products where indicated in the product specification, and approved by Engineer, provided that the physical property criteria are determined to be satisfactory by testing.
- D. Bank Run Sand: Durable bank run sand classified as SP, SW, or SM by the Unified Soil Classification System (ASTM D 2487) meeting the following requirements:
 - 1. Less than 15 percent passing the number 200 sieve when tested in accordance with ASTM C 136. The amount of clay lumps or balls not exceeding 2 percent.
 - 2. Material passing the number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318:
 - a. Liquid limit not exceeding 25.
 - b. Plasticity index not exceeding 7.
- E. Concrete Sand: Natural sand, manufactured sand, or a combination of natural and manufactured sand conforming to the requirements of ASTM C 33 and graded within the following limits when tested in accordance with ASTM C 136:

Sieve	Percent Passing
3/8"	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

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

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

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

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

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

1. All materials of one product delivered for the same construction activity from a single source.
2. Non-plastic fines.
3. Los Angeles abrasion test wear not exceeding 40 percent when tested in accordance with ASTM C 131.
4. Gradations, as determined in accordance with TEX-110-E.

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

5. Crushed stone: Produced from oversize quarried aggregate, sized by crushing from a naturally occurring single source. Crushed gravel or uncrushed gravel are not acceptable materials for utility embedment.
6. Crushed Concrete: Crushed concrete is an acceptable substitute for crushed stone as utility backfill. Gradation and quality control test requirements are the same as crushed stone. Provide crushed concrete produced from normal weight concrete of uniform quality; containing particles of aggregate and cement material, free from other substances such as asphalt, base course material, reinforcing steel fragments, soil, debris, or deteriorated concrete fragments.
 - I. Select Backfill: Class III clayey gravel or sand or Class IV lean clay with a plasticity index between 7 and 20 or clayey soils treated with lime in accordance with Section 02570 - Pavement Repair and Resurfacing, to meet plasticity criteria.
 - J. Random Backfill: Any suitable soil or mixture of soils within Classes I, II, III and IV; or fat clay (CH) where allowed by the applicable backfill installation

specification. Refer to Section 02226 - Excavation and Backfill for Structures and Section 02227 - Excavation and Backfill for Utilities.

- K. Cement Stabilized Sand: Conform to requirements of MVWA L318 – Cement – Stabilized Sand Backfill.
- L. Concrete Backfill: Conform to Class B concrete as specified in Section 03305 - Concrete for Utility Construction or Section 03310 - Concrete for Structures.
- M. Pavement Restoration: Conform to requirements of Section 02570 - Pavement Repair and Resurfacing.

PART 3 EXECUTION

3.01 SOURCES

- A. Use of material encountered in the trench excavations is acceptable, provided applicable specification requirements are satisfied. If excavation material is not acceptable, provide from other source.
- B. Obtain approval for each material source by the Engineer before delivery is started. If sources previously approved do not produce uniform and satisfactory products, furnish materials from other approved sources. All materials may be subjected to inspection or additional verification testing after delivery. Materials which do not meet the requirements of the specifications will be rejected. Do not use material which, after approval, has become unsuitable for use due to segregation, mixing with other materials, or by contamination. Once a material is approved by the Engineer, expense for sampling and testing required to change to a different material will be credited to the Owner through a change order.
- C. Bank run sand, select backfill, and random backfill, if available in the Project excavation, may be obtained by selective excavation and acceptance testing. Obtain additional quantities of these materials and other materials required to complete the work from off-site sources.
- D. The Owner does not represent or guarantee that any soil found in the excavation work will be suitable and acceptable as backfill material.

3.02 MATERIAL HANDLING

- A. When backfill material is obtained from either a commercial or non-commercial borrow pit, have that pit opened to expose the vertical faces of the various strata of acceptable material to be used. Excavate the material by vertical cuts extending through the exposed strata to achieve uniformity in the product.
- B. Establish temporary stockpile locations for practical material handling and control, and verification testing by the Engineer in advance of final placement.

Obtain approval from landowner for storage of backfill material on adjacent private property.

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

3.03 MATERIAL QUALITY CONTROL

- A. Ensure that material selected, produced and delivered to the Project meets applicable specifications and is of sufficient uniform properties to allow practical construction and quality control. Responsibilities include:
 - 1. Source or Supplier Qualification. Perform testing, or obtain representative tests by suppliers, for selection of material sources and products. Provide test results for a minimum of three samples for each source and material type. Test samples of processed materials from current production representing material to be delivered. Tests shall verify that the materials meet specification requirements. Repeat qualification test procedures each time the source characteristic changes or there is a planned change in source location or supplier. Qualification tests shall include, as applicable:
 - a. Gradation. Complete sieve analyses shall be reported regardless of the specified control sieves. The range of sieves shall be from the largest particle through the No. 200 sieve.
 - b. Plasticity
 - c. Los Angeles abrasion
 - d. Clay lumps
 - e. Light weight pieces
 - f. Organic impurities
 - 2. Production Testing. Establish a program to provide assurance that backfill materials delivered from the sources and placed in the Work meet applicable specification requirements. Report results to the Engineer.
 - 3. Assist the Engineer in obtaining material samples for verification testing at the source or at the production plant.
 - 4. Notify the Engineer in the field when non-conforming material is detected.

B. Quality Control

1. The Engineer may sample and test backfill at:
 - a. Sources including borrow pits, production plants and Contractor's designated off-site stockpiles.
 - b. On-site stockpiles.
 - c. Materials placed in the Work.
2. The Engineer may resample material at any stage of work or location if changes in characteristics are apparent.
3. The Engineer will notify Contractor at the Project site about non-conforming materials and will, as appropriate, resample materials to verify results.

C. Tolerances

The following tolerances apply to production quality control testing.

1. Embedment Material and Select Backfill: The Engineer may accept material provided that not more than one out of the most recent five consecutive tests are out of the specification limits for:
 - a. Gradation: Not more than 5 percentage points on any individual sieve.
 - b. Plasticity: Not more than 2 percentage points.
2. Trench Zone Backfill Material: Except for select and random backfill, the Engineer may accept the material provided that not more than one out of the most recent three consecutive tests are out of the specification limits for:
 - a. Gradation: Not more than 8 percentage points on any individual sieve.
 - b. Plasticity: Not more than 5 percentage points.
3. Select and Random Backfill: No quantified tolerances. Remove non-conforming material identifiable by visual-manual procedure.

END OF SECTION

SECTION 02252

CEMENT STABILIZED SAND

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cement stabilized sand for backfill and bedding.

1.02 UNIT PRICES

- A. No payment will be made for cement stabilized sand under this Section unless an extra unit price item is included in the Bid Proposal and the application of the pay item is approved by the Engineer. Include payment for cement stabilized sand in unit price for applicable utility or structure installation section.
- B. If use of cement stabilized sand is allowed based on the Engineer's direction the extra unit price item will be paid on a per ton basis. A conversion between volume calculated based on theoretical limits and total weight will be made based on a ratio of 1.64 tons per cubic yard.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.
- B. Submit material qualification and mix design tests to include:
 - 1. Three series of tests of sand or fine aggregate material from the proposed source. Tests shall include procedures defined in Paragraph 2.01.
 - 2. Three moisture-density relationship tests prepared using the material qualified by the tests of Paragraph 1.03B.1. Blends of fine aggregate from crushed concrete and bank run sand shall be tested at the ratio to be used for the mix design testing.
 - 3. Mix design report to meet the design requirements of Paragraph 1.04. The mix design shall include compressive strength tests after 48-hours and 7 days curing.

1.04 DESIGN REQUIREMENTS

- A. Design sand-cement mixture to produce a minimum unconfined compressive strength of 100 pounds per square inch in 48 hours when compacted to 95 percent in accordance with ASTM D558 and when cured in accordance with ASTM D1632 and tested in accordance with ASTM D1633. Mix for general use shall contain a minimum of 1-1/2

sacks of cement per cubic yard. Mix for use as sanitary sewer embedment within 9 feet of waterlines shall contain 2 sacks of cement per cubic yard. Compact mix with a moisture content on the dry side of optimum.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement: Type 1 Portland cement conforming to ASTM C150.
- B. Sand: Clean, durable sand meeting grading requirements for fine aggregates of ASTM C33, or requirements for Bank Run Sand of Section 02229 - Utility Backfill Materials, and the following requirements:
 - 1. Classified as SW, SP or SM by the United Soil Classification System of ASTM D2487.
 - 2. Deleterious materials:
 - a. Clay lumps, ASTM C142; less than 0.5 percent.
 - b. Lightweight pieces, ASTM C123; less than 5.0 percent.
 - c. Organic impurities, ASTM C40; color no darker than the standard color.
 - 3. Plasticity index of 4 or less when tested in accordance with ASTM D4318.
- C. Fine aggregate manufactured from crushed concrete meeting the quality requirements for crushed rock material of Section 02229 - Utility Backfill Materials, may be used as a complete or partial substitute for bank run sand. The blending ratio of fine aggregate from crushed concrete and bank run sand shall be defined in the mix design report.
- D. Water: Potable water, free of oils, acids, alkalis, organic matter or other deleterious substances, meeting requirements of ASTM C94.

2.02 MIXING MATERIALS

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

PART 3 EXECUTION

3.01 PLACING

- A. Place sand-cement mixture in 8-inch-thick loose lifts and compact to 95 percent of ASTM D558, unless otherwise specified. The moisture content during compaction shall

be on the dry side of optimum but sufficient for hydration. Perform and complete compaction of sand-cement mixture within 4 hours after addition of water to mix at the plant.

- B. Do not place or compact sand-cement mixture in standing or free water.

3.02 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.
- B. One sample of cement stabilized sand shall be obtained for each 150 tons of material placed per day with no less than one sample per day of production. Random samples of delivered cement stabilized sand shall be taken in the field at point of delivery in accordance with ASTM 3665. Obtain three individual samples of approximately 12 to 15 lb each from the first, middle, and last third of the truck and composite them into one sample for test purpose.
- C. Prepare and mold four specimens (for each sample obtained) in accordance with ASTM D 558, Method A, without adjusting moisture content. Samples will be molded at approximately same time material is being used, but no later than 4 hours after water is added to mix.
- D. After molding, specimens will be removed from molds and cured in accordance with ASTM D 1632.
- E. Specimens will be tested for compressive strength in accordance with ASTM D 1633, Method A. Two specimens will be tested at 48 hours plus or minus 2 hours and two specimens will be tested at 7 days plus or minus 4 hours.
- F. A strength test will be average of strengths of two specimens molded from same sample of material and tested at same age. Average daily strength will be average of strengths of all specimens molded during one day's production and tested at same age.
- G. Precision and Bias: Test results shall meet recommended guideline for precision in ASTM D 1633 Section 9.
- H. Reporting: Test reports shall contain, as a minimum, the following information:
 - 1. Supplier and plant number
 - 2. Time material was batched
 - 3. Time material was sampled
 - 4. Test age (exact hours)
 - 5. Average 48-hour strength
 - 6. Average 7-day strength
 - 7. Specification section number
 - 8. Indication of compliance / non-compliance
 - 9. Mixture identification
 - 10. Truck and ticket numbers
 - 11. The time of molding

12. Moisture content at time of molding
13. Required strength
14. Test method designations
15. Compressive strength data as required by ASTM D 1633
16. Supplier mixture identification
17. Specimen diameter and height, in.
18. Specimen cross-sectional area, sq. in.

3.03 ACCEPTANCE

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

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

3.04 ADJUSTMENT FOR DEFICIENT STRENGTH

- A. When mixture produces 7-day compressive strength greater than or equal to 100 psi, then material will be considered satisfactory and bid price will be paid in full.
- B. When mixture produces 7-day compressive strength less than 100 psi and greater than or equal to 70 psi, material shall be accepted contingent on credit in payment. Compute credit by the following formula:
- $$\text{Credit per Cubic Yard} = \frac{\$30.00 \times 2 (100 \text{ psi} - \text{actual psi})}{100}$$
- C. When mixture produces 7-day compressive strength less than 70 pounds per square inch, then remove and replace cement-sand mixture and paving and other necessary work at no cost to City.

END OF SECTION

SECTION 02500

MILLING EXISTING PAVEMENT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Milling of existing asphalt surfacing from an underlying base material.

1.02 UNIT PRICES

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. All asphalt material shall be removed, leaving a uniform surface of base material.

3.02 PREPARATION

- A. Prior to and after the milling process, all dirt and foreign material shall be removed from the pavement surface by power brooming or other approved methods.

3.03 EQUIPMENT

- A. The existing material to be removed shall be milled by means of rotary cutting blades, until it is broken into particles small enough to be removed.

3.04 WASTE MATERIAL DISPOSAL

- A. Dispose of waste material in accordance with requirements of Section 01564 – Waste Material Disposal.

END OF SECTION

SECTION 02505

ASPHALT OVERLAY

PART I GENERAL

1.01 SECTION INCLUDES

- A. Application of all tack and prime coats.
- B. A surface course of asphaltic material.
- C. All transitioning to driveways and existing pavements.
- D. Adjustment of all existing surface utilities to the finished surface.
- E. Saw cut at intersection taper.

1.02 UNIT PRICES

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03 QUALITY ASSURANCE

- A. The quality assurance requirements of all Specification sections referenced within this section shall be followed.

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.

PART 2 PRODUCTS

2.01 SURFACE ASPHALT

- A. Materials as designated in Section 02510, "Asphaltic Concrete Pavement".

PART 3 EXECUTION

3.01 PREPARATION - CONCRETE ROADS

- A. On existing concrete roads with previous overlays, remove the existing overlay material in accordance with Section 02500.
- B. When removing the asphalt material, adequate measures shall be taken to protect curbs, inlets, manholes, water valves, driveways and any other appurtenance to the

roadway.

- C. The existing concrete surface prepared for overlay must be free of dirt, water and vegetation. Dirt and debris shall be swept from the surface.

3.02 TACK COAT

- A. Tack coat shall be applied as described in Section 02512.
- B. Care should be taken to insure that the tack coat completely fills any unfilled cracks in the existing pavement.

3.03 SURFACE ASPHALT

- A. Surface asphalt shall be installed as described in Section 02510, "Asphaltic Concrete Pavement".
- B. The surface asphalt shall be a minimum thickness, as designated on the drawings, and shall be placed at the proper cross section.
- C. The surface asphalt shall be placed with attention given to the directions of flow of drainage indicated on the drawings. The Contractor shall place the surface asphalt to meet these directions.
- D. Driveways and intersections shall be transitioned (feathered), where shown on the drawings, to prevent an abrupt change from the overlay material to the existing surface. This shall be accomplished by hand spreading and raking. Where abrupt changes are shown on the drawings, the change will be accomplished by successive layers and wood forms, as required.
- E. The overlay material shall be placed so that a smooth transition is provided to existing inlet throats. Positive drainage must be maintained.

3.04 ADJUSTING EXISTING UTILITIES

- A. All manholes, water valves, or any other existing utility, within the project area receiving overlay, shall be adjusted to be flush with the finish surface.

3.05 FIELD QUALITY CONTROL

- A. All quality control requirements specified in other sections of the Specifications shall apply.

END OF SECTION

SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

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

1.02 UNIT PRICES

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.
- B. Refer to paragraph 3.08 for unit price adjustments.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.
- 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.

PART 2 P R O D U C T S

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 341 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									
TEST	AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Viscosity, 140°F stokes	40	80	100	200	250	350	400	600	800	1200
Viscosity, 275°F stokes	0.4	-	0.7	-	1.1	-	1.4	-	1.9	-
Penetration, 77°F, 100 g, 5 sec.	350	-	250	-	210	-	135	-	85	-
Flash Point, C.E.C., F.	425	-	425	-	425	-	425	-	450	-
Solubility in trichloroethylene, percent	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-
Tests on residues from thin film oven										
Viscosity, 140°F stokes	-	180	-	450	-	900	-	1500	-	3000
Ductility, 77°F, 5 cms per min., cms	100	-	100	-	100	-	100	-	100	-
Spot tests	Negative for all grades									

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.
- C. Spreading and Finishing Machine: The paving machine shall be self-propelled and equipped with a heated compacting screen capable of producing a finish surface meeting with the requirements of the street cross-section indicated on the drawings and all surface criteria. Extensions to the screed shall have the same heating and compacting capabilities as the primary unit, except for use on variable depth tapered areas and/or as approved by the Engineer or designated representative.

The paving machine shall be equipped with an approved automatic dual longitudinal screed control system and an automatic transverse screed control system. The longitudinal controls shall be capable of operating from any longitudinal grade reference including a string line ski, (40' minimum length of ski), mobile string line or matching shoe. Unless indicated otherwise on the drawings, the Contractor may use any one of these grade references. The selected grade reference equipment shall be maintained in good operating condition by personnel trained in the use of the specific type of equipment.

The Contractor shall furnish all labor and equipment required for establishing and maintaining appropriate grade reference.

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:

Percent Density		Percent	HVEEM Stability Percent
<u>Min.</u>	<u>Max.</u>	<u>Optimum</u>	<u>Not Less Than</u>
95	99	97	35

- C. Proportions for Asphaltic Material: As specified in TxDOT Item 341 for the paving type shown on the Drawings.

PART 3 E X E C U T I O N

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 or Bid Proposal, 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 Engineer.
- B. Tack Coat: Conform to requirements of Section 02512. Where the mixture will adhere to the surface on which it is to be placed without use of a tack coat, tack coat may be eliminated if approved by the Engineer.
- C. Do not use cutback asphalt during the period of April 16 to September 15.

3.03 PLACEMENT

- A. Do not place asphaltic mixture when air temperature is below 50 degrees F and falling. Mixture may be placed when air temperature taken in shade and away from artificial heat is above 40 degrees F and rising.
- B. Haul prepared and heated asphaltic concrete mixture to the project in tight vehicles previously cleaned of foreign material. Mixture shall be at temperature between 250 degrees F and 325 degrees F when laid.
- C. Spread material into place with approved mechanical spreading and finishing machine of screening or tamping type. Use track-mounted finish machine to place base course directly on earth subgrade.
- D. Surface Course Material: Surface course be placed in one-two inch 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 lime lines, or as directed by the Engineer.

- 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 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. 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 500 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 Engineer.
- D. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths. In-place depth at these locations shall be average depth of four cores.
- E. Fill cores and density test sections with new compacted asphaltic concrete pavement.

3.07 NONCONFORMING PAVEMENT

- A. Recompect pavement sections not meeting specified densities or replace them with new asphaltic concrete material. If specified density is not achieved prior to the asphalt temperature reaching 175 degrees, the asphalt pavement will be removed and replaced at contractor's expense. 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 105 percent of unit price bid.
3. Average depth below 90 percent may be rejected by the Engineer.

3.09 PROTECTION

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

END OF SECTION

SECTION 02511

PRIME COAT

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Prime coat for asphaltic concrete paving

1.02 UNIT PRICES

- A. 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 product data for proposed prime coat.
- C. Submit report of recent calibration of distributor.

PART 2 P R O D U C T S

2.01 BINDER

- A. Prime coat binder material shall meet the requirements for MC-30 outlined in Table 5 of TxDOT Item 300, or AE-P, EAP&T, or PCE outlined in Table 11 of TxDOT Item 300.

PART 3 E X E C U T I O N

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 prime 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.
- B. Do not place prime coat when air temperature is below 60 degrees F and falling. Materials may be placed when air temperature taken in shade and away from artificial heat is above 50 degrees F and rising.
- C. Distribute at rate of 0.30 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 accurate 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.

<u>Prime Coat Type</u>	<u>Minimum (F)</u>	<u>Maximum (F)</u>
MC-30	70	150
AE-P	70	150
EAP&T	50	130
PCE	50	130

F. Do not allow temperature of MC-30 or AE-P to exceed 175° F at any time.

G. Do not allow temperature of EAP&T or PCE to exceed 140° 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 Engineer.

END OF SECTION

SECTION 02606

PRECAST CONCRETE INLETS, HEADWALLS, AND WINGWALLS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Precast concrete inlets for storm or sanitary sewers, including cast iron frame and plate or grate.
- B. Precast concrete headwalls and wingwalls for storm sewers.

1.02 UNIT PRICES

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03 DEFINITIONS

- A. Normal Depth Type B Inlet: Depth of 2.25 feet (2'-3") plus pipe inside diameter when measured from top of curb beam to flow line of inlet lead.
- B. Normal Depth Type BB Inlet: Depth of 2.55 feet (2'-6 5/8") plus pipe inside diameter when measured from curb beam to flow line of inlet lead.
- C. Normal Depth Type A Inlet: Depth of 8' plus pipe inside diameter when measured from ground level.
- D. Extra Depth Inlet: Specified depth exceeding normal depth for the type inlet used.

1.04 SUBMITTALS

- A. Submittal shall conform to requirements of Section 01300 - Submittals.
- B. Submit shop drawings for approval of design and construction details for precast concrete inlets, headwalls and wingwalls. Precast units differing from the standard designs shown on the Drawings will be rejected unless submittals are made and approved. Submittals must clearly show that the proposed substitution is equal or superior in every respect to the standard designs.
- C. Submit manufacturers' data and details for frames, grates, rings, and covers.

1.05 STORAGE AND SHIPMENT

- A. Store precast units on level blocking. Do not place loads on them until design strength is reached. Shipment of acceptable units may be made when the 28-day strength requirements have been met.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Concrete: Concrete for precast machine-made units meeting requirements of ASTM C76 regarding reinforced concrete, cement, aggregate, mixture, and concrete test. Minimum 28-day compressive strength shall be 4,000 psi.
- B. Reinforcing steel: Conform to requirements of Section 03210. Place reinforcing steel to conform to details shown on Drawings and as follows:
 - 1. Provide a positive means for holding steel cages in place throughout production of concrete units. The maximum variation in reinforcement position is plus or minus 10 percent of wall thickness or plus or minus 1/2 inch whichever is less. Regardless of variation, the minimum cover of concrete over reinforcement as shown on the Drawings shall be maintained.
 - 2. Welding of reinforcing steel is not permitted unless noted on the Drawings.
- C. Mortar: Conform to requirements of ASTM C 270, Type S using portland cement.
- D. Miscellaneous metal: Cast-iron frames and plates conforming to requirements of Section 02603.

2.02 SOURCE QUALITY CONTROL

- A. Tolerances: Allowable casting tolerances for concrete units are plus or minus 1/4 inch from dimensions shown on the Drawings. Concrete thickness in excess of that required will not constitute cause for rejection provided that such excess thickness does not interfere with proper jointing operations.
- B. Precast Unit Identification: Mark date of manufacture and name or trademark of manufacturer clearly on the inside of inlet, headwall or wingwall.
- C. Rejection: Precast units may be rejected for non-conformity with these specifications and for any of the following reasons:
 - 1. Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint.
 - 2. Surface defects indicating honeycombed or open texture.

- D. Damaged or misshaped ends, where such damage would prevent making a satisfactory joint.
- E. Replacement: Immediately remove rejected units from the work site and replace with acceptable units.
- F. Repairs: Occasional imperfections resulting from manufacture or accidental damage may be repaired if, in the opinion of the Engineer, repaired units conform with requirements of these specifications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines and grades are correct.
- B. Verify compacted subgrade will support loads imposed by inlets.

3.02 INSTALLATION

- A. Install inlets, headwalls, and wingwalls complete in place to the dimensions, lines and grades as shown on the Drawings.
- B. Excavate in accordance with requirements of Section 02227.
- C. Bed precast concrete units on foundations of firm, stable material accurately shaped to conform to the shape of unit bases.
- D. Provide adequate means to lift and place concrete units.

3.03 FINISHES

- A. Use a cement-sand mortar mix to seal joints, fill lifting holes, and as otherwise required.
- B. When the box section of the inlet has been completed, shape the floor of the inlet with mortar to conform to Drawings details.
- C. Accurately adjust cast iron inlet plate frames to line, grade, and slope. Grout frame in place with mortar.

3.04 INLET WATERTIGHTNESS

- A. Test each inlet for leaks. Verify that inlets are free of visible leaks. Repair leaks in an approved manner.

3.05 CONNECTIONS

- A. Connect inlet leads to the inlets as shown on the Drawings. Use jointing material as shown on the Drawing or as approved. Make connections watertight.

3.06 BACKFILL

- A. Backfill the area of excavation surrounding each completed inlet, headwall or wingwall according to the requirements of Section 02227.

END OF SECTION

SECTION 02607

ADJUSTING MANHOLES, INLETS, AND VALVE BOXES TO GRADES

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Adjusting elevation of manholes, inlets, and valve boxes to new grades.

1.02 UNIT PRICES

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.

PART 2 P R O D U C T S

2.01 CONCRETE MATERIALS

- A. For cast in place concrete, refer to Section 03305 - Concrete for Utility Construction
- B. For precast concrete manhole sections and adjustment rings, refer to Section 02601 - Precast Concrete Manholes.
- C. For mortar mix, conform to requirements of ASTM C 270, Type S using Portland Cement.

2.02 CAST IRON ADJUSTING RINGS

- A. For cast iron adjusting rings, refer to Section 02603 - Frames, Grates, Rings and Covers.

2.03 PIPING MATERIALS

- A. For riser pipes and fittings, refer to applicable piping materials specifications in MVWA Specifications.

PART 3 E X E C U T I O N

3.01 EXAMINATION

- A. Examine existing structure, valve box, frame and cover or inlet box, frame and cover or inlet, and piping and connections for damage or defects that would affect adjustment to grade. Report such damage or defects to the Engineer.

3.02 ESTABLISHING GRADE

- A. Coordinate grade related items with existing grade and finished grade or paving, and relate to established benchmark or reference line.

3.03 ADJUSTING MANHOLES AND INLETS

- A. Elevation of manhole or inlet can be raised using precast concrete rings or metal adjusting rings. Use of brick for adjustment of sanitary sewer manholes to grade is prohibited. Elevation of manhole or inlet can be lowered by removing existing masonry, adjusting rings or the top section of the barrel below the new elevation and then rebuilding or raising the elevation to the proper height.
- B. Grout inside and outside adjusting ring joints.
- C. Salvage and reuse cast iron frame and cover or grate.
- D. Protect or block off manhole or inlet bottom using wood forms shaped to fit so that no debris or soil falls to the bottom during adjustment.
- E. Set the cast iron frame for the manhole cover or grate in a full mortar bed and adjust to the established elevation. In streets, adjust covers to be 3/8 inch below pavement.
- F. Verify that manholes and inlets are free of visible leaks as a result of reconstruction. Repair leaks in a manner subject to the Engineer's approval.

3.04 ADJUSTING VALVE BOXES

- A. Salvage and reuse valve box and surrounding concrete block.
- B. Remove and replace 6-inch ductile iron riser pipe with suitable length for depth of cover required to establish the adjusted elevation to accommodate actual finish grade.
- C. Reinstall valve box and riser piping plumbed in vertical position. Provide minimum 6 inches telescoping freeboard space between riser pipe top butt end and interior contact flange of valve box for vertical movement damping.
- D. After valve box has been set, aligned, and adjusted so that top lid is level with final grade, pour a 24-inch by 24-inch by 8-inch thick concrete pad around valve box. Center valve box horizontally within concrete slab.

3.05 BACKFILL AND GRADING

- A. Backfill the area of excavation surrounding each adjusted manhole, inlet, and valve box and compact according to requirements of Section 02227 - Excavation and Backfill for Utilities.

- B. Grade the ground surface to drain away from each manhole and valve box. Place earth fill around manholes to the level of the upper rim of the manhole frame. Place earth fill around the valve box concrete block.
- C. In unpaved areas, grade surface at a uniform slope of 1 to 5 from the manhole frame to natural grade. Provide a minimum of 4 inches of topsoil conforming to requirements of Section 02920 - Topsoil and seed in accordance with MVWA A309 – Hydro Mulch Seeding.

END OF SECTION

SECTION 02615

REINFORCED CONCRETE PIPE

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 UNIT PRICES

- A. No separate payment will be made for reinforced concrete pipe under this Section. Include payment in unit price for Sections 02720 - Storm Sewers.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01300 - Submittals.
- B. Submit complete product data for pipe, fittings and gaskets for approval. Indicate conformance to appropriate reference standards.
- C. Submit certificates by a testing laboratory, hired and paid by the manufacturer, that concrete pipes meet applicable standards when tested in accordance with ASTM C497.

PART 2 PRODUCTS

2.01 REINFORCED CONCRETE PIPE

- A. Circular reinforced concrete pipe shall conform to requirements of ASTM C76, for Class III wall thickness. Joints shall be rubber gasketed conforming to ASTM C443.
- B. Reinforced concrete arch pipe shall conform to the requirements of ASTM C506 for Class A-III. Joints shall conform to ASTM C877.
- C. Reinforced concrete elliptical pipe, either vertical or horizontal, shall conform to the requirements of ASTM C507 for Class VE-III for vertical or Class HE-III for horizontal. Joints shall be rubber gaskets conforming to ASTM C877.
- D. Reinforced concrete D-load pipe shall conform to the requirements of ASTM C655.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Conform to requirements of Sections 02720 - Storm Sewers.
- B. Install reinforced concrete pipe in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 02720

STORM SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Storm sewers and appurtenances.

1.02 UNIT PRICES

- A. 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 manufacturer's literature for product specifications and installation instructions.
- C. Submit test reports as specified in Part 3 of this Section.

1.04 QUALITY ASSURANCE

- A. The condition for acceptance will be a storm sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's recommendations.
- B. Handle pipe, fittings, and accessories carefully with approved handling devices. Do not drop or roll pipe off trucks or trailers. Materials cracked, gouged, chipped, dented, or otherwise damaged will not be approved for installation.
- C. Store pipe and fittings on heavy timbers or platforms to avoid contact with the ground.
- D. Unload pipe, fittings, and specials as close as practical to the location of installation to avoid unnecessary handling.
- E. Keep interiors of pipe and fittings completely free of dirt and foreign matter.

PART 2 PRODUCTS

2.01 PIPE

- A. Piping materials for storm sewers shall be of the sizes and types indicated on the Drawings.
- B. Materials for pipe and fittings, other than those specified or referenced, may be considered for use in storm sewers.
- C. For consideration of other materials, submit complete manufacturer's data including materials, sizes, flow carrying capacity, installation procedures, and history of similar installations to Engineer for pre-bid evaluations, if allowed, or as a substitution.

2.02 PIPE MATERIAL SCHEDULE

- A. Reinforced Concrete Pipe: Conform to requirement of Section 02615 - Reinforced Concrete Pipe.
- B. Monolithic Reinforced Concrete Box Sewers: Conform to requirements of Section 02616 - Monolithic Reinforced Concrete Box Sewers.
- C. Precast Reinforced Concrete Box Sewers: Conform to requirements of Section 02617 - Precast Reinforced Concrete Box Sewers.
- D. When approved by the Engineer, high-density polyethylene, corrugated drainage pipe meeting requirements of AASHTO M252 or M294 and ASTM D3350, Hancor or equal.

2.03 BEDDING, BACKFILL, AND TOPSOIL MATERIAL

- A. Bedding and Backfill Material: Conform to requirements of Sections 02227 - Excavation and Backfill for Utilities, and 02229 - Utility Backfill Material.
- B. Topsoil: Conform to requirements of Section 02920 - Topsoil.

PART 3 EXECUTION

3.01 PREPARATION

- A. Set up street detours and barricades in preparation for excavation if construction will affect traffic. Conform to requirements of Section 01570 - Traffic Control and Regulation.
- B. Provide barricades and warning lights and signs, for excavations. Conform to 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.

- C. Perform work in accordance with OSHA standards. Employ a Trench Safety System as specified in Section 01526 - Trench Safety Systems, for excavations over 5 feet deep.
- D. Immediately notify the agency or company owning any utility line which is damaged, broken or disturbed. Obtain approval from Engineer and agency for any repairs or relocations, either temporary or permanent.
- E. Remove old pavements and structures including sidewalks and driveways in accordance with requirements of Section 02050 - Demolition and Section 02076 - Removing Existing Pavements and Structures.
- F. Install and operate necessary dewatering and surface water control measures in accordance with Section 01563 - Control of Ground Water and Surface Water.

3.02 EXCAVATION

- A. Earthwork. Refer to Section 02227 - Excavation and Backfill for Utilities and as directed on Drawings.
- B. Line and Grade. Establish the proper line and grade in the trench as shown in the drawings. Maintain this control for a minimum of 100 feet behind and ahead of the pipe-laying operation. Use appropriately sized grade boards, as necessary, which are substantially supported. Protect the boards and location stakes from damage or dislocation. Use of a laser beam equipment to establish and maintain proper line and grade of the work is acceptable.
- C. Trench Excavation. Excavate pipe trenches to a level 8-inches below the indicated invert. Backfill the excavation with the specified bedding material to the level of the lower one-third of the pipe barrel. Tamp and compact backfill to provide bedding at the indicated grade. Form the bedding foundation to a minimum depth of one-eighth of the pipe diameter, but not less than 6 inches.

3.03 PIPE INSTALLATION

- A. Install in accordance with the pipe manufacturer's recommendations and as specified in this Section.
- B. Install pipe only after excavation is completed, the bottom of the trench shaped, bedding material is installed, and the trench has been approved by the Engineer.
- C. Install pipe to the line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in the trench so the interior surfaces of the pipe follow the grades and alignments indicated.
- D. Install pipe with the spigot ends toward the direction of flow.

- E. Form a concentric joint with each section of adjoining pipe so as to prevent offsets.
- F. Place and drive home newly laid sections with come-a-long winches so as to eliminate damage to sections. Use of backhoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by the Engineer.
- G. Keep the interior of pipe clean as the installation progresses. Where cleaning after laying the pipe is difficult because of small pipe size, use a suitable swab or drag in the pipe and pull it forward past each joint immediately after the joint has been completed.
- H. Keep excavations free of water during construction and until final inspection.
- I. When work is not in progress, cover the exposed ends of pipes with an approved plug to prevent foreign material from entering the pipe.

3.04 PIPE INSTALLATION OTHER THAN OPEN CUT

- A. For installation of pipe by augering, boring, or jacking pipe, conform to requirements of Section 02315 - Pipe and Casing Augering for Sewers.

3.05 INSTALLATION OF APPURTENANCES

- A. Construction manholes and inlets to conform to requirements of Sections 02600 - Cast-in-place Concrete Manhole, 02601 - Precast Concrete Manholes, and 02602 - Fiberglass Manholes. Install frames, grate rings and covers to conform to requirements of Section 02603 - Frames, Grates, Rings and Covers.
- B. Install headwalls and wingwalls to conform to requirements of Section 02605 - Cast-in Place Inlets, Headwalls and Wingwalls and Section 02606 - Precast Concrete Inlets, Headwalls and Wingwalls.
- C. Rehabilitate existing manholes to conform to requirements of Section 02764 - Manhole Rehabilitation. Adjust manhole covers to grade conforming to requirements of Section 02607 - Adjusting Manholes, Inlets and Valve Boxes to Grade.

3.06 BACKFILL AND SITE CLEANUP

- A. Backfill the trench only after pipe installation is approved by the Engineer.
- B. Bed pipes with materials conforming to requirements of Section 02229 - Utility Backfill Material and as indicated on Drawings.
- C. Backfill and compact soil in accordance with Section 02227 - Excavation and Backfill for Utilities.

- D. Repair and replace removed or damaged pavement and sidewalks as specified in Section 02570 - Pavement Repair and Resurfacing.
- E. In unpaved areas, grade surface as a uniform slope to natural grade as indicated on the Drawings. Provide a minimum of 4 inches of topsoil and seed according to requirements of MVWA A309 – Hydro Mulch Seeding.
- F. Form to requirements of Section 01564 - Waste Material Disposal.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Design, construction, erection and removal of structural concrete formwork.

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.
- B. Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03 SUBMITTALS

- A. Conform to Section 01300 - Submittals.
- 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 PRODUCTS

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 Engineer 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 Engineer. 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 Engineer. Contractor shall demonstrate suitability of method proposed.

PART 3 EXECUTION

3.01 INSTALLATION

- 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 2 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 Engineer'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**

VARIATION FROM	VARIATION IN	FOR ANY 10-FOOT LENGTH	FOR ANY 20-FOOT LENGTH OR ANY BAY	MAXIMUM FOR ENTIRE DIMENSION
PLUMB OR SPECIFIED BATTER	Lines And Surfaces of Columns, Piers, Walls And Arrises	1/4"	---	1"
	Exposed Corner Columns, Control Joint Grooves, And Other Conspicuous Lines	---	1/4"	1/2"
LEVEL OR SPECIFIED GRADE	Slab Soffits, Ceilings, Beam Soffits, And Arrises (Measured Before Removal of Shores)	1/4"	3/8"	3/4"
	Exposed Lintels, Sills, Parapets, Horizontal Grooves And Other Conspicuous Lines	---	1/4"	1/2"
DRAWING DIMENSIONS	Position of Linear Building Lines, Columns, Walls, And Partitions	---	1/2"	1"
	Size And Location of Sleeves, Floor Openings And Wall Openings	---	---	±1/4"
	Cross Section of Columns, Beams, Slabs, And Walls	---	---	+1/2", -1/4"
	Footings* in Plan	---	---	+2", -1/2"
	Footing Misplacement or Eccentricity in Direction of Error (The Lesser Of)	---	---	2% OF WIDTH OR
	Footing Thickness Decrease	---	---	5%
	Footing Thickness Increase	---	---	NO LIMIT
	Step Rise in Flight of Stairs	---	---	±1/8"
	Step Tread in Flight of Stairs	---	---	±1/4"
	Consecutive Step Rise	---	---	±1/16"
	Consecutive Step Tread	---	---	±1/8"
* 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 03100B
TOLERANCES FOR FORMED SURFACES
CONCRETE IN BRIDGES, WHARVES AND MARINE
STRUCTURES

VARIATION FROM	VARIATION IN	MAXIMUM
PLUMB OR SPECIFIED BATTER	Surfaces of columns, piers and walls	1/2" in 10'
LEVEL OR SPECIFIED GRADE	Top surfaces of slabs	See Section 03345
	Top surfaces of curbs and railings	3/16" in 10'
DRAWING DIMENSIONS	Cross section of columns, caps, walls, beams and similar members	+1/2", -1/4"
	Thickness of deck slabs	+1/4", - 1/8"
	Size and location of slab and wall openings	$\pm 1/2"$
	Footings in plans	+2", -1/2"
	Footing misplacement or eccentricity in direction of error (the lesser of)	2% of Width or 2"
	Footing thickness decrease	5%
	Footing thickness increase	No Limit
	Step rise in flight of stairs	$\pm 1/8"$
	Step tread in flight of stairs	$\pm 1/4"$
	Consecutive step rise	$\pm 1/16"$
	Consecutive step tread	$\pm 1/8"$

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.
- B. Refer to Section 01025 - Measurement and Payment for unit price procedures.

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 Section 01300 - Submittals.
- 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 Engineer 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 PRODUCTS

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 Engineer, 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 Engineer. 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:

<u>Physical Property, Sheet Material</u>	<u>Value</u>	<u>ASTM Standard</u>
Tensile Strength-min (psi):	1750	D638, Type IV
Ultimate Elongation-min (percent):	350	D638, Type IV
Low Temp Brittleness-max (degrees F):	-35	D746
Stiffness in Flexure-min (psi):	400	D747
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.
- D. Acceptable Products: Polymeric Systems Inc. "PSI-270"; Pacific Polymers "Elastothane 227R"; Sika Corporation "Sikaflex 2C", or equal acceptable to the Engineer.
- 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 Engineer. 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.
 - 3. Cross-sectional dimensions, unexpanded waterstop: One inch by 3/4 inch.
 - 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 EXECUTION

3.01 INSTALLATION

- 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 SPLICES IN WATERSTOPS

- 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.
 - 3. Maintain continuity of waterstop ribs and tubular center axis.
- 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 Engineer, 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 Engineer.
- 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 Engineer, 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 Engineer. 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 03305

CONCRETE FOR UTILITY CONSTRUCTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place concrete work for utility construction or rehabilitation, such as slabs on grade, small vaults, site-cast bases for precast units, cast-in-place manholes, inlets, headwalls and miscellaneous small structures.

1.02 UNIT PRICES

- A. No payment will be made for concrete for utility construction under this Section unless specifically noted in bid documents. Include payment in applicable utility structure section.
- B. Obtain the services of and pay for a certified testing laboratory to prepare design mixes.

1.03 SUBMITTALS

- A. Conform to Section 01300 - Submittals.
- B. Submit proposed mix design and test data for each type and strength of concrete in the Work.
- C. Submit laboratory reports prepared by an independent testing laboratory stating that materials used comply with the requirements of this Section.
- D. Submit manufacturer's mill certificates for reinforcing steel. Provide specimens for testing when required by the Engineer.
- E. Submit certification from concrete supplier that materials and equipment used to produce and deliver concrete comply with this Specification.
- F. When required on Drawings, submit shop drawings showing reinforcement type, quantity, size, length, location, spacing, bending, splicing, support, fabrication details and other pertinent information.
- G. For waterstops, submit product information sufficient to indicate compliance with specifications, including manufacturer's descriptive literature and specifications, when required on Drawings.

1.04 HANDLING AND STORAGE

- A. Cement: Store cement off of the ground in a well-ventilated weatherproof building.
- B. Aggregate: Prevent mixture of foreign materials with aggregate and preserve gradation of aggregate.
- C. Reinforcing Steel: Store reinforcing steel to protect it from mechanical injury and formation of rust. Protect epoxy-coated steel from damage to the coating.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cementitious Material:
 - 1. Portland Cement: ASTM C150, Type II, unless the use of Type III is authorized by the Engineer; or ASTM C595, Type IP. For concrete in contact with sewage use Type II cement.
 - 2. When aggregates are potentially reactive with alkalis in cement, use cement not exceeding 0.6 percent alkali content in the form of $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$.
- B. Water: Clean, free from harmful amounts of oils, acids, alkalis or other deleterious substances, and meeting requirements of ASTM C94.
- C. Aggregate:
 - 1. Coarse Aggregate: ASTM C33. Unless otherwise indicated, use the following ASTM standard sizes: No. 357 or No. 467; No. 57 or No. 67, No. 7. Maximum size: Not larger than 1/5 of the narrowest dimension between sides of forms, nor larger than 3/4 of minimum clear spacing between reinforcing bars.
 - 2. Fine Aggregate: ASTM C33.
 - 3. Determine the potential reactivity of fine and coarse aggregate in accordance with the Appendix to ASTM C33.
- D. Air Entraining Admixtures: ASTM C260.
- E. Chemical Admixtures:
 - 1. Water Reducers: ASTM C494, Type A.

2. Water Reducing Retarders: ASTM 494, Type D.
 3. High Range Water Reducers (Superplasticizers): ASTM C494, Types F and G.
- F. Prohibited Admixtures: Admixtures containing calcium chloride, thiocyanate, or materials that contribute free chloride ions in excess of 0.1 percent by weight of cement.
- G. Reinforcing Steel:
1. Use new billet steel bars conforming to ASTM A615, ASTM A767, or ASTM A775, grade 40 or grade 60, as shown on Drawings. Use deformed bars except where smooth bars are specified. When placed in work, keep steel free of dirt, scale, loose or flaky rust, paint, oil or other harmful materials.
 2. Where shown, use welded wire fabric with wire conforming to ASTM A185 or ASTM A884. Supply the gage and spacing shown, with longitudinal and transverse wires electrically welded together at points of intersection with welds strong enough not to be broken during handling or placing.
 3. Wire: ASTM A82. Use 16-1/2 gage minimum for tie wire, unless otherwise indicated.
- H. Fiber:
1. Polypropylene Fiber:
 - a. Ratio: 1.5 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties:
 - (1). Material: Polypropylene.
 - (2). Length: 3/4 inch
 - (3). Specific Gravity: 0.91.
 - (4). Absorption: None.
 - (5). Tensile Strength: 70-110 Ksi.
 - (6). Modulus of Elasticity: 500 Ksi.
 - (7). Melt Point: 140 degrees F (60 degrees C).

- (8). Flash Point: 932 degrees F (500 degrees C).
 - (9). Density: 3 pounds/cubic yard.
 - c. Acceptable Manufacturer: W. R. Grace Company, Fibermesh, or approved equal.
- 2. Steel Fiber: Comply with applicable provisions of ACI 544 and ASTM A820.
 - a. Ratio: 50 to 200 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties
 - (1). Material: Steel.
 - (2). Aspect Ratio (for fiber lengths of 0.5 to 2.5 inch, length divided by diameter or equivalent diameter): 30:1 to 100:1.
 - (3). Specific Gravity: 7.8.
 - (4). Tensile Strength: 40-400 ksi.
 - (5). Young's Modulus: 29,000 ksi.
 - (6). Minimum Average Tensile Strength: 50,000 psi.
 - (7). Bending Requirements: Withstand bending around 0.125-inch diameter mandrel to an angle of 90 degrees, at temperatures not less than 60 degrees F, without breaking.
- I. Curing Compounds: Type 2 white-pigmented liquid membrane-forming compounds conforming to ASTM C309.

2.02 FORMWORK MATERIALS

- A. Lumber and Plywood: Seasoned and of good quality, free from loose or unsound knots, knot holes, twists, shakes, decay and other imperfections which would affect strength or impair the finished surface of concrete. Use S4S lumber for facing or sheathing. Forms for bottoms of caps: At least 2-inch (nominal) lumber, or 3/4-inch form plywood backed adequately to prevent misalignment. General use: Provide lumber of 1-inch nominal thickness or form plywood of approved thickness.
- B. Formwork for Exposed Concrete Indicated to Receive Rubbed Finish: Form or form-lining surfaces free of irregularities; plywood of 1/4-inch minimum thickness, preferably oiled at the mill.

- C. Chamfer Strips and Similar Moldings: Redwood, cypress or pine that will not split when nailed and which can be maintained to true line. Use mill-cut molding dressed on all faces.
- D. Form Ties: Metal or fiberglass of approved type with tie holes not larger than 7/8 inch in diameter. Do not use wire ties or snap ties.
- E. Metal Forms: Clean and in good condition, free from dents and rust, grease or other foreign material that tend to disfigure or discolor concrete in a gage and condition capable of supporting concrete and construction loads without significant distortion. Countersink bolt and rivet heads on facing sides. Use only metal forms which present a smooth surface and which line up properly.

2.03 PRODUCTION METHODS

- A. Use either ready-mixed concrete conforming to requirements of ASTM C94, or concrete produced by volumetric batching and continuous mixing in accordance with ASTM C685.

2.04 MEASUREMENT OF MATERIALS

- A. Measure dry materials by weight, except volumetric proportioning may be used when concrete is batched and mixed in accordance with ASTM C685.
- B. Measure water and liquid admixtures by volume.

2.05 DESIGN MIX

- A. Use design mixes prepared by a certified testing laboratory in accordance with ASTM C1077 and conforming to requirements of this section.
- B. Proportion concrete materials based on ACI 211.1 to comply with durability and strength requirements of ACI 318, Chapters 4 and 5, and this specification. Prepare mix design of Class A concrete so minimum cementitious content is 564 pounds per cubic yard. Submit concrete mix designs to the Engineer for review.
- C. Proportioning on the basis of field experience or trial mixtures in accordance with the requirements at Section 5.3 of ACI 318 may be used, if approved by the Engineer.

D. Classification:

<u>Class</u>	<u>Type</u>	Minimum Compressive Strength (Lbs/sq. in.)		Maximum W/C Ratio (Percent)	Air Content (Inches)	Consistency Range in Slump
		<u>7-Day</u>	<u>28- Day</u>			
A	Structural	3200	4000	0.45	4±1	2 to 4*
B	Pipe Block Fill, Thrust Block	----	2500	----	4±1	5 to 7

* When ASTM C494, Type F or type G admixture is used to increase workability, this range may be 6 to 9.

- E. Add steel or polypropylene fibers only when called for on the Drawings or in another section of these Specifications.
- F. Determine air content in accordance with ASTM C138, ASTM C173 or ASTM C231.
- G. Use of Concrete Classes: Use classes of concrete as indicated on the drawings and other specifications. Use Class B for un-reinforced concrete used for plugging pipes, seal slabs, thrust blocks, trench dams, and concrete fill unless indicated otherwise. Use Class A for all other applications.

2.06 PVC WATERSTOPS

- A. Extrude from virgin polyvinyl chloride elastomer. Use no reclaimed or scrap material. Submit waterstop manufacturer's current test reports and manufacturer's written certification that 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 Engineer, provided that at no place shall waterstop thickness be less than 3/8 inch.

2.07 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.
3. Cross-sectional dimensions, unexpanded waterstop: 1 inch by 3/4 inch.
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 EXECUTION

3.01 FORMS AND SHORING

- A. Provide mortar-tight forms sufficient in strength to prevent bulging between supports. Set and maintain forms to lines designated such that finished dimensions of structures are within the tolerances specified in ACI 117. Construct forms to permit removal without damage to concrete. Forms may be given slight draft to permit ease of removal. Provide adequate cleanout openings. Before placing concrete, remove extraneous matter from within forms.
- B. Install rigid shoring having no excessive settlement or deformation. Use sound timber in shoring centering. Shim to adjust and tighten shoring with hardwood timber wedges.
- C. **ign Loads for Horizontal Surfaces of Forms and Shoring:** Minimum fluid pressure, 175 pounds per cubic foot; live load, 50 pounds per square foot. Maximum unit stresses: 125 percent of allowable stresses used for form materials and for design of support structures.

- D. Back formwork with a sufficient number of studs and wales to prevent deflection.
- E. Re-oil or lacquer the liner on the job before using. Facing may be constructed of 3/4-inch plywood made with waterproof adhesive backed by adequate studs and wales. In such cases, form lining will not be required.
- F. Unless otherwise indicated, form outside corners and edges with triangular 3/4-inch chamfer strips (measured on sides).
- G. Remove metal form ties to depth of at least 3/4 inch from surface of concrete. Do not burn off ties. Do not use pipe spreaders. Remove spreaders which are separate from forms as concrete is being placed.
- H. Treat facing of forms with approved form coating before concrete is placed. When directed by the Engineer, treat both sides of face forms with coating. Apply coating before reinforcement is placed. Immediately before the concrete is placed, wet surface of forms which will come in contact with concrete.

3.02 PLACING REINFORCEMENT

- A. Place reinforcing steel accurately in accordance with approved Drawings. Secure steel adequately in position in forms to prevent misalignment. Maintain reinforcing steel in place using approved concrete and hot-dip galvanized metal chairs and spacers. Place reinforcing steel in accordance with CRSI Publication "Placing Reinforcing Bars." Request inspection of reinforcing steel by the Engineer and obtain acceptance before concrete is placed.
- B. Minimum spacing center-to-center of parallel bars: 2-1/2 times nominal bar diameter. Minimum cover measured from surface of concrete to face of reinforcing bar unless shown otherwise on the Drawings: 3 inches for surfaces cast against soil or subgrade, 2 inches for other surfaces.
- C. Detail bars in accordance with ACI 315. Fabricate reinforcing steel in accordance with CRSI Publication MSP-1, "Manual of Standard Practice." Bend reinforcing steel to required shape while steel is cold. Excessive irregularities in bending will be cause for rejection.
- D. Do not splice bars without written approval of the Engineer. Approved bar bending schedules or placing drawings constitute written approval. Splice and development length of bars shall conform to ACI 318, Chapters 7 and 12, and as shown on Drawings. Stagger splices or locate at points of low tensile stress.

3.03 EMBEDDED ITEMS

- A. Install conduit and piping as shown on Drawings. Accurately locate and securely fasten conduit, piping and other embedded items in forms.

- B. Install waterstops as specified in other sections and according to manufacturer's instructions. Securely position waterstops at joints as indicated on Drawings. Protect waterstops from damage or displacement during concrete placing operations.

3.04 BATCHING, MIXING AND DELIVERY OF CONCRETE

- A. Measure, batch, mix, and deliver ready-mixed concrete in accordance with ASTM C94, Sections 8 through 11. Produce ready-mixed concrete using an automatic batching system as described in NRMCA Concrete Plant Standards, Part 2 - Plant Control Systems.
- B. Measure, mix and deliver concrete produced by volumetric batching and continuous mixing in accordance with ASTM C685, Sections 6 through 8.
- C. Maintain concrete workability without segregation of material and excessive bleeding. Obtain approval of the Engineer before adjustment and change of mix proportions.
- D. Ready-mixed concrete delivered to the site shall be accompanied by batch tickets providing the information required by ASTM C94, Section 16. Concrete produced by continuous mixing shall be accompanied by batch tickets providing the information required by ASTM C685, Section 14.
- E. 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.

- F. Clean, maintain and operate equipment so that it thoroughly mixes material as required.
- G. Hand-mix only when approved by the Engineer.

3.05 PLACING CONCRETE

- A. Give sufficient advance notice to the Engineer (at least 24 hours prior to commencement of Operations) to permit inspection of forms, reinforcing steel,

embedded items and other preparations for placing concrete. Place no concrete prior to the Engineer's approval.

- B. Schedule concrete placing to permit completion of finishing operations in daylight hours. However, if necessary to continue after daylight hours, light the site as required. If rainfall occurs after placing operations are started, provide covering to protect the Work.
- C. Use troughs, pipes and chutes lined with approved metal or synthetic material in placing concrete so that concrete ingredients are not separated. Keep chutes, troughs and pipes clean and free from coatings of hardened concrete. Allow no aluminum material to be in contact with concrete.
- D. Limit free fall of concrete to 4 feet. Do not deposit large quantities of concrete at one location so that running or working concrete along forms is required. Do not jar forms after concrete has taken on initial set; do not place any strain on projecting reinforcement or anchor bolts.
- E. Use tremies for placing concrete in walls and similar narrow or restricted locations. Use tremies made in sections, or provide in several lengths, so that outlet may be adjusted to proper height during placing operations.
- F. Place concrete in continuous horizontal layers approximately 12 inches thick. Place each layer while layer below is still plastic.
- G. Compact each layer of concrete with concrete spading implements and mechanical vibrators of approved type and adequate number for the size of placement. When immersion vibrators cannot be used, use form vibrators. Apply vibrators to concrete immediately after depositing. Move the vibrator vertically through the layer of concrete just placed and several inches into plastic layer below. Do not penetrate or disturb layers previously placed which have partially set. Do not use vibrators to aid lateral flow concrete. Closely supervise consolidation to ensure uniform insertion and duration of immersion.
- H. Handling and Placing Concrete: Conform to ACI 302.1R, ACI 304R and ACI 309R.

3.06 WATERSTOPS

- A. Embed waterstops in concrete across joints as shown. Waterstops shall be continuous for 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.

C. Splicing PVC Waterstops:

1. Splice waterstops by heat-sealing adjacent waterstop sections in accordance with the manufacturer's printed instructions.
2. Butt end-to-end joints of 2 identical waterstop sections may be made in the forms during placement of waterstop material.
3. Prior to placement in formwork, prefabricate all waterstop joints involving more than two ends to be joined together, an angle cut, an alignment change, or the joining of two dissimilar waterstop sections, allowing not less than 24-inch long strips of waterstop material beyond the joint. Upon inspection and approval by the Engineer, 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. Setting PVC Waterstops:

1. Correctly position waterstops during installation. Support and anchor waterstops during progress of the work to ensure proper embedment in concrete and to prevent folding over of the waterstop by concrete placement. 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. 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.

E. 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 the Contract Documents.

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 Engineer, 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:
 - a. 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.
 - b. 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.
 - c. 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.
 - d. 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.
 - e. 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.
7. 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.

3.07 CONSTRUCTION JOINTS

A. Definitions:

- 1. Construction joint: Contact surface between plastic (fresh) concrete and concrete that has attained initial set.
- 2. Monolithic: Manner of concrete placement to reduce or eliminate construction joints; joints other than those indicated on Drawings will not be permitted without written approval of the Engineer. Where so approved, make additional construction joints with details equivalent to those indicated for joints in similar locations.

- #### B. Preparation for Construction Joints:
- Roughen surface of concrete previously placed, leaving some aggregate particles exposed. Remove laitance and loose materials by sandblasting or high-pressure water blasting. Keep surface wet for several hours prior to placing of plastic concrete.

3.08 CURING

- #### A.
- Comply with ACI 308. Cure by preventing loss of moisture, rapid temperature change and mechanical injury for a period of 7 curing days when Type II or IP cement has been used and for 3 curing days when Type III cement has been used. Start curing as soon as free water has disappeared from the concrete surface after placing and finishing. A curing day is any calendar day in which the temperature is above 50 degrees F for at least 19 hours. Colder days may be counted if air temperature adjacent to concrete is maintained above 50 degrees F. In continued cold weather, when artificial heat is not provided, removal of forms and shoring may be permitted at the end of calendar days equal to twice the required number of curing days. However, leave soffit forms and shores in place until concrete has reached the specified 28-day strength, unless directed otherwise by the Engineer.
- #### B.
- Cure formed surfaces not requiring rub-finished surface by leaving forms in place for the full curing period. Keep wood forms wet during the curing period. Add

water as needed for other types of forms. Or, at Contractor's option, forms may be removed after 2 days and curing compound applied.

C. Rubbed Finish:

1. At formed surfaces requiring rubbed finish, remove forms as soon as practicable without damaging the surface.
2. After rub-finish operations are complete, continue curing formed surfaces by using either approved curing/sealing compounds or moist cotton mats until normal curing period is complete.

D. Unformed Surfaces: Cure by membrane curing compound method.

1. After concrete has received a final finish and surplus water sheen has disappeared, immediately seal surface with a uniform coating of approved curing compound, applied at the rate of coverage recommended by manufacturer or as directed by the Engineer. Do not apply less than 1 gallon per 180 square feet of area. Provide satisfactory means to properly control and check rate of application of the compound.
2. Thoroughly agitate the compound during use and apply by means of approved mechanical power pressure sprayers equipped with atomizing nozzles. For application on small miscellaneous items, hand-powered spray equipment may be used. Prevent loss of compound between nozzle and concrete surface during spraying operations.
3. Do not apply compound to a dry surface. If concrete surface has become dry, thoroughly moisten surface immediately prior to application. At locations where coating shows discontinuities, pinholes or other defects, or if rain falls on a newly coated surface before film has dried sufficiently to resist damage, apply an additional coat of compound at the specified rate of coverage.

3.09 REMOVAL OF FORMS AND SHORING

- A. Remove forms from surfaces requiring rubbing only as rapidly as rubbing operation progresses. Remove forms from vertical surfaces not requiring rub-finish when concrete has aged for the required number of curing days. When curing compound is used, do not remove forms before 2 days after concrete placement,
- B. Leave soffit forms and shores in place until concrete has reached the specified 28-day strength, unless directed otherwise by the Engineer.

3.10 DEFECTIVE WORK

- A. Immediately repair any defective work discovered after forms have been removed. If concrete surface is bulged, uneven, or shows excess honeycombing or form marks which cannot be repaired satisfactorily through patching, remove and replace the entire section.

3.11 FINISHING

- A. Patch honeycomb, minor defects and form tie holes in concrete surfaces with cement mortar mixed one part cement to two parts fine aggregate. Repair defects by cutting out unsatisfactory material and replacing with new concrete, securely keyed and bonded to existing concrete. Finish to make junctures between patches and existing concrete as inconspicuous as possible. Use a stiff mixture and thoroughly tamp into place. After each patch has stiffened sufficiently to allow for greatest portion of shrinkage, strike off mortar flush with the surface.
- B. Apply a rubbed finish to exposed surfaces of formed concrete structures as noted on Drawings. After pointing has set sufficiently, wet the surface with a brush and perform first surface rubbing with No. 16 carborundum stone or equal. Rub sufficiently to bring surface to paste, to remove form marks and projections, and to produce a smooth, dense surface. Add cement to form surface paste as necessary. Spread or brush material, which has been ground to paste, uniformly over surface and allow to reset. In preparation for final acceptance, clean surfaces and perform final finish rubbing with No. 30 carborundum stone or equal. After rubbing, allow paste on the surface to reset; then wash surface with clean water. Leave structure with a clean, neat and uniform-appearing finish.
- C. Apply a wood float finish to concrete slabs.

3.12 FIELD QUALITY CONTROL

- A. Testing shall be performed under provisions of Section 01410 - Testing Laboratory Services.
- B. Unless otherwise directed by the Engineer, the following minimum testing of concrete is required. Testing shall be performed by qualified individuals employed by an approved independent testing agency, and conform to the requirements of ASTM C1077.
 - 1. Take concrete samples in accordance with ASTM C172.
 - 2. Make one set of four compression test specimens for each mix design at least once per day and for each 150 cubic yards or fraction thereof. Make, cure and test the specimens in accordance with ASTM C31 and ASTM C39.
 - 3. When taking compression test specimens, test each sample for slump according to ASTM C143, for temperature according to ASTM C1064, for

air content according to ASTM C231, and for unit weight according to ASTM C138.

4. Inspect, sample and test concrete in accordance with ASTM C94, Section 13, 14 and 15, and ACI 311-5R.
- C. Test Cores: Conform to ASTM C42.
- D. Testing High Early Strength Concrete: When Type III cement is used in concrete, the specified 7-day and 28-day compressive strengths shall be applicable at 3 and 7 days, respectively.
- E. If 7-day or 3-day test strengths (as applicable for type of cement being used) fail to meet established strength requirements, extended curing or resumed curing on those portions of structure represented by test specimens may be required. If additional curing fails to produce the required strength, strengthening or replacement of portions of structure which fail to develop required strength may be required by the Engineer, at no additional cost to the Owner.

3.13 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 Engineer.

END OF SECTION

SECTION 03310

STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place normal-weight structural concrete and mass concrete.

1.02 UNIT PRICES.

- A. Refer to Section 01025 - Measurement and Payment for unit price procedures.

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 Section 01300 - Submittals.
- 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 Engineer, 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 $\pm$ 1 hour after trial batching and immediately immerse in water at 70 degrees F $\pm$ 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 $\pm$ 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, $\pm$ 3 degrees F and 50 percent $\pm$ 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 (at zero days drying age) 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 Engineer.
 - 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 Engineer.
 - 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 Engineer, 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 Engineer 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 Engineer 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 Engineer 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.

PART 2 PRODUCTS

2.01 MATERIALS

- 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 Engineer 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.
 - 5. Coarse aggregate for lightweight concrete: ASTM C330. Grading limits: 3/4 inch to No. 4.
 - 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:

1. Bonding Agent: Two-component modified epoxy resin.
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 Engineer, 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 C 143. Slumps shall be as follows:

<u>Concrete Type</u>	<u>Minimum Slump</u>	<u>Maximum Slump</u>
Portland Cement Concrete:	2"	4"
Concrete to be dosed with superplasticizer:	1"	3"
Normal Weight Concrete after dosing with superplasticizer:	4"	9"
Lightweight Concrete after dosing with superplasticizer:	4"	7"
Drilled Shaft Concrete:	4"*	8"

* 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:

Class (Normal- weight)	Minimum 28-Day Compressive Strength (psi)	Minimum Cement Content Pounds per Cubic Yard
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Concrete for Structures Containing Water or Wastewater

A	4000	564 (6 Sacks)
B	1500	329 (3-1/2 Sacks)
C	3000	470 (5 Sacks)
D	5000	658 (7 Sacks)
H	3000	611 (6-1/2 Sacks)

Class (Normal- weight)	Minimum 28-Day Compressive Strength (psi)	Minimum Cement Content Pounds per Cubic Yard
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Concrete for Buildings, Slabs on Grade and Miscellaneous Structures

AB	4000	Not Applicable
BB	1500	Not Applicable
CB	3000	Not Applicable
DB	5000	Not Applicable

Class (Light-weight)	Minimum 28-Day Compressive Strength (psi)	Minimum Cement Content Pounds per Cubic Yard
E	3000	Not Applicable
F	4000	Not Applicable
G	5000	Not Applicable

3. Maximum size aggregate for Class H concrete: 3/8 inch. Maximum size aggregate for all other normal-weight concrete: 1-1/2 inches, except as specified in Paragraph 2.01D.4.
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.
- c. Class BB: Un-reinforced concrete fill under structures.

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. Batch Mixing at Site:

- 1. Mix concrete in batch mixer conforming to requirements of CPMB "Concrete Plant Mixer Standards". Use mixer equipped with suitable charging hopper, water storage tank and water measuring device. Batch mixer shall be capable of mixing aggregates, cement and water into uniform mass within specified mixing time, and of discharging mix without segregation. Operate mixer according to rated capacity and recommended revolutions per minute printed on manufacturer's rating plate.
- 2. Charge batch into mixer so some water will enter before cement and aggregates. Keep water running until one-fourth of specified mixing time has elapsed. Provide controls to prevent discharging until required mixing time has elapsed. When concrete of normal weight is specified, provide controls to prevent addition of water during mixing. Discharge entire batch before mixer is recharged.
- 3. Mix each batch of 2 cubic yards or less for not less than 1 minute and 30 seconds. Increase minimum mixing time 15 seconds for each additional cubic yard or fraction of cubic yard.
- 4. Keep mixer clean. Replace pick-up and throw-over blades in drum when they have lost 10 percent of original depth.

D. 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.

E. 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.
5. Complete mixing using procedures for normal-weight concrete.

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 Engineer. When shown or permitted, deposit concrete under water by methods acceptable to the Engineer 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 Engineer'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 Engineer, 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 Engineer.
 - 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 Engineer'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 Engineer. 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 Engineer'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 Engineer. Notify the Engineer 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 Engineer. 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. Scream 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.

3.04 PUMPING OF CONCRETE

- A. If pumped concrete does not produce satisfactory results, in the judgement of the Engineer, 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 Engineer. 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 TAMPING 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 Engineer 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 Engineer.

END OF SECTION

SECTION 03345

CONCRETE FINISHING

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Repairing surface defects.
- B. Finishing concrete surfaces including both formed and unformed surfaces.
- C. Sealing concrete surfaces.
- D. Installation of concrete fill and installation of concrete topping in bottoms of clarifiers and thickeners.

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 Section 01300 - Submittals.
- B. Submit manufacturer's technical literature on the following products proposed for use. Include manufacturer's installation and application instructions and, where specified, manufacturer's certification of conformance to requirements and suitability for use in the applications indicated.
 - 1. Floor hardener.
 - 2. Sealer.
 - 3. Epoxy floor topping.
 - 4. Epoxy penetrating sealer.
 - 5. Latex bonding agent.
 - 6. Epoxy adhesive.
 - 7. Abrasive aggregate.
 - 8. Evaporation retardant.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sealer/Dustproofer (VOC Compliant): Water-based acrylic sealer; non-yellowing under ultraviolet light after 200-hour test in accordance with ASTM 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 "Thorseal 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 Engineer, all surfaces to be finished shall be free of exposed aggregate.

3.02 REPAIRING SURFACE DEFECTS

- A. Defective Areas: Repair immediately after removal of forms. Remove honeycombed and other defective concrete down to sound concrete but in no case

to a depth less than 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 prior to making repairs.
- D. Structural Repair: When required, make structural repairs after prior approval of the Engineer as to method and procedure, using specified epoxy adhesive or approved epoxy mortar.

3.03 FINISHING OF FORMED SURFACES

- A. Unfinished Surfaces: Finish is not required on surfaces concealed from view in completed structure by earth, ceilings or similar cover, unless indicated otherwise on Drawings.
- B. Rough Form Finish:
 - 1. No form facing material is required on rough form finish surfaces.
 - 2. Patch tie holes and defects. Chip off fins exceeding 1/4 inch in height.
 - 3. Rough form finish may be used on concrete surfaces which will be concealed from view by earth in completed structure, except concealed surfaces required to have smooth form finish, as shown on Drawings.
- C. Smooth Form Finish:

1. Form facing shall produce smooth, hard, uniform texture on concrete. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.
2. ch tie holes and defects. Rub fins and joint marks with wooden blocks to leave smooth, unmarred finished surface.
3. Provide smooth form finish on the wet face of formed surfaces of water-holding structures, and of other formed surfaces not concealed from view by earth in completed structure, except where otherwise indicated on Drawings. Walls that will be exposed after future construction, at locations indicated on Drawings, shall have smooth form finish. Smooth form finish on exterior face of exterior walls shall extend 2 feet below final top of ground elevation. Exterior face of all perimeter grade beams shall have smooth form finish for full depth of grade beam.

D. Rubbed Finish:

1. Use plywood or fiberboard linings or forms in as large sheets as practicable, and with smooth, even edges and close joints.
2. Remove forms as soon as practicable, repair defects, wet surfaces, and rub with No. 16 carborundum stone or similar abrasive. Continue rubbing sufficiently to bring surface paste, remove form marks and fins, and produce smooth, dense surface of uniform color and texture. Do not use cement paste other than that drawn from concrete itself. Spread paste uniformly over surface with brush. Allow paste to reset, then wash surface with clean water.
3. Use rubbed finish at locations indicated on Drawings, except where rubbed finish is indicated for a wall which will be containing a liquid, use spray-applied coating.

E. Spray-applied Coating: At Contractor's option, in lieu of rubbed finish, spray-applied coating may be applied after defects have been repaired and fins removed. Remove form oil, curing compound and other foreign matter that would prevent bonding of coating. Apply coating in uniform texture and color in accordance with coating manufacturer's instructions.

F. Related Unformed Surfaces: Tops of piers, walls, bent caps, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed. Float unformed surfaces to texture reasonably consistent with that of formed surfaces. Continue final treatment on formed surfaces uniformly across unformed surfaces.

3.04 HOT WEATHER FINISHING

- A. When hot weather conditions exist, as defined by Section 03310 - Structural Concrete and as judged by the Engineer, apply evaporation retardant to the surfaces of slabs, topping and concrete fill placements immediately after each step in the finishing process has been completed.

3.05 FINISHING SLABS AND SIMILAR FLAT SURFACES TO CLASS A, B AND C TOLERANCES

- A. Apply Class A, B and C finishes at locations indicated on Drawings.
- B. Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. See Section 03100 - Concrete Formwork for edge forms and screeds.
- C. Consolidation and Leveling: Concrete to be consolidated shall be as stiff as practicable Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not permit manipulation of surfaces prior to finishing operations.
- D. Tolerances for Finished Surfaces: Check tolerances by placing straightedge of specified length anywhere on slab. Gap between slab and straightedge shall not exceed tolerance listed for specified class.

Class	Straightedge Length in Feet	Tolerance in Inches
A	10	1/8
B	10	1/4
C	2	1/4

- E. Raked Finish: After concrete has been placed, struck off, consolidated and leveled to Class C tolerance, roughen surface before final set. Roughen with stiff brushes or rakes to depth of approximately 1/4 inch. Notify the Engineer prior to placing concrete requiring initial raked surface finish so that acceptable raked finish standard may be established for project. Protect raked, base-slab finish from contamination until time of topping. Provide raked finish for following:
- 1.
 2. Surfaces to receive bonded concrete topping or fill.
 3. Steep ramps, as noted on Drawings.
 4. Additional locations as noted on Drawings.
- F. Float Finish:

1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.
2. After initial floating, re-check tolerance of surface with 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots to Class B tolerance. Immediately re-float slab to a uniform, smooth, granular texture.
3. Provide float finish at locations not otherwise specified and not otherwise indicated on Drawings.

G. Trowel Finish:

1. Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional troweling by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.
2. Produce finished surface free of trowel marks, uniform in texture and appearance and conforming to Class A tolerance. On surfaces intended to support floor coverings, remove defects which might show through covering by grinding.
3. Provide trowel finish for floors which will receive floor covering and additional locations indicated on Drawings.

H. Broom or Belt Finish:

1. Apply float finish as previously specified. Immediately after completing floated finish, draw broom or burlap belt across surface to give coarse transverse scored texture.
2. Provide broom or belt finish at locations indicated on Drawings.

3.06 FINISHING SLABS AND SIMILAR FLAT SURFACES TO "F-NUMBER SYSTEM" FINISH

- A. Shaping to Contour: Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to proper contour. Edge forms and screeds: Conform to Section 03100 - Concrete Formwork.

- B. Consolidation and Leveling: Concrete to be consolidated shall be as dry as practicable. Thoroughly consolidate concrete in slabs and use internal vibration in beams and girders of framed slabs and along bulkheads of slabs on grade. Consolidate and level slabs and floors with vibrating bridge screeds, roller pipe screeds or other approved means. After consolidation and leveling, do not manipulate surfaces prior to finishing operations.
- C. Tolerances for Finished Surfaces: Independent testing laboratory will check floor flatness and levelness in accordance with Paragraph 3.12, Field Quality Control.
- D. Float Finish:
 - 1. After concrete has been placed, struck off, consolidated and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, or when mix has stiffened sufficiently to permit proper operation of power-driven float. Consolidate surface with power-driven floats. Use hand floating with wood or cork-faced floats in locations inaccessible to power-driven machine and on small, isolated slabs.
 - 2. Check tolerance of surface after initial floating with a 10-foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots. Immediately refloat slab to uniform, smooth, granular texture to F_F20/F_L17 tolerance, unless shown otherwise on Drawings.
 - 3. Provide "F-Number System" float finish at locations indicated on Drawings.
- E. Trowel Finish:
 - 1. Apply float finish as previously specified. After power floating, use power trowel to produce smooth surface which is relatively free of defects but which may still contain some trowel marks. Do additional trowelings by hand after surface has hardened sufficiently. Do final troweling when ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling operations.
 - 2. Produce finished surface free of trowel marks, uniform in texture and appearance and conforming to an F_F25/F_L20 tolerance for slabs on grade and F_F25/F_L17 for elevated slabs, unless shown otherwise on Drawings. On surfaces intended to support floor coverings, remove defects, which might show through covering, by grinding.
 - 3. Provide "F-Number System" trowel finish at locations indicated on Drawings.

3.07 BONDED CONCRETE TOPPING AND FILL

A. Surface Preparation:

1. Protect raked, base-slab finish from contamination until time of topping. Mechanically remove oil, grease, asphalt, paint, clay stains or other contaminants, leaving clean surface.
2. Prior to placement of topping or fill, thoroughly dampen roughened slab surface and leave free of standing water. Immediately before topping or fill is placed, scrub coat of bonding grout into surface. Do not allow grout to set or dry before topping or fill is placed.

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 Engineer, fill the tank with sufficient water to cover the entire floor for 14 days.
5. Provide bonded concrete topping in bottom of all clarifiers and thickeners.

3.08 EPOXY PENETRATING SEALER

- A. Surfaces to receive epoxy penetrating sealer: Apply wood float finish. Clean surface and apply sealer in compliance with manufacturer's instructions.
- B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: Apply minimum 2-inch-high coverage of floor coating on vertical surface.
- C. Mask walls, doors, frames and similar surface to prevent floor coating contact.
- D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.
- E. Provide epoxy-penetrating sealer at locations indicated on Drawings.

3.09 EPOXY FLOOR TOPPING

- A. Surfaces to receive epoxy floor topping: Apply wood float finish unless recommended otherwise by epoxy floor topping manufacturer. Clean surface and apply epoxy floor topping in compliance with manufacturer's recommendations and instructions. Thickness of topping: 1/8 inch.
- B. Rooms with concrete curbs or bases: Continue application of floor coating on curb or base to its juncture with masonry wall. Rooms with solid concrete walls or wainscots: apply 2-inch-high coverage of floor coating on vertical surface.
- C. Mask walls, doors, frames and similar surfaces to prevent floor coating contact.
- D. When coving floor coating up vertical concrete walls, curbs, bases or wainscots, use masking tape or other suitable material to keep a neat level edge at top of cove.
- E. Finished surface shall be free of trowel marks and dimples.
- F. Provide epoxy floor topping at locations indicated on Drawings.

3.10 SEALER/DUSTPROOFER

- A. Where sealer or sealer/dustproofers is indicated on Drawings, just prior to completion of construction, apply coat of specified clear sealer/dustproofing compound to exposed interior concrete floors in accordance with manufacturer's instructions.

3.11 NONSLIP FINISH

- A. Apply float finish as specified. Apply two-thirds of required abrasive aggregate by method that ensures even coverage without segregation and re-float. Apply remainder of abrasive aggregate at right angles to first application, using heavier application of aggregate in areas not sufficiently covered by first application. Re-float after second application of aggregate and complete operations with troweled finish. Perform finishing operations in a manner that will allow the abrasive aggregate to be exposed and not covered with cement paste.
- B. Provide 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."

$$F_F = \frac{4.57}{\text{Maximum difference in elevation, in decimal inches, between successive 12" elevation differences.}}$$

- 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."

$$F_L = \frac{12.5}{\text{Maximum difference in elevation, in inches, between two points separated by 10 feet.}}$$

3. Achieve specified overall slab tolerance. Minimum local tolerance (1/2 bay, unless otherwise designated by the Engineer): 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 Section 01300 - Submittals.
- 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 Engineer.
- C. Restrictions on Use of Curing Compounds: Unless curing compound manufacturer certifies that curing compound will not prevent bond to cured surface, do not use curing compound on surfaces that will be rubbed or receive additional concrete, mortar, topping, terrazzo or other cementitious finishing materials, on slabs under resilient floors or built-up roofing, or on surfaces to be waterproofed, sealed, hardened or painted.
 - D. Curing and Sealing Compounds: At locations indicated, cure exposed interior slabs and troweled slabs receiving mastic-applied adhesives with specified clear curing and sealing compound in accordance with manufacturer's recommendations. Do not store materials directly on curing membranes. Use plywood to protect curing membrane from damage. Immediately repair membranes damaged by foot traffic or other operations.
 - E. Duration of Curing: Continue curing until cumulative number of days or fractions of days during which ambient temperature is above 50 degrees F has totaled 7. Continue curing of water-retaining structures for a total of 14 days. When high-early-strength concrete has been used, continue curing for total of 3 days. Prevent rapid drying at end of curing period.
 - F. Formed Surfaces: During the curing period keep wet steel forms heated by sun and wood forms in contact with concrete. When forms are to be removed during curing period, employ curing materials or methods immediately. Continue such curing for remainder of curing period.
 - G. Temperature:
 1. Cold Weather: When mean daily temperature of atmosphere is less than 40 degrees F, maintain temperature of concrete between 50 and 70 degrees F for required curing period. When necessary, make arrangements for heating, covering, insulating or housing concrete work in advance of placement to maintain required temperature and moisture conditions. Prevent damage or injury due to concentration of heat. When combustion heaters are necessary in enclosed or protected area where concrete slabs are being placed, vent heaters.
 2. Hot Weather: In advance of placement make arrangements for shading, fog spraying, sprinkling, ponding or installation of windbreaks or wet covering of light color. Take such protective measures as quickly as concrete hardening and finishing operations will allow.

3. Temperature Changes: Control so rate of change in temperature of concrete is as uniform as possible. Do not permit temperature change to exceed 5 degrees F in any one hour or 50 degrees F in any 24-hour period.
- H. Protection from Mechanical Injury: During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water. Do not load self-supporting structures in a way that over stresses concrete.

3.02 CURING MASS CONCRETE

- A. Observe the following additional restrictions when curing mass concrete.
 1. Minimum curing period: 2 weeks.
 2. When ambient air temperature falls below 32 degrees F, protect surface of concrete against freezing.
 3. Do not use steam or other curing methods that will add heat to concrete.
 4. Keep forms and exposed concrete continuously wet for at least the first 48 hours after placing, and whenever surrounding air temperature is above 90 degrees F during final curing period.
 5. During 2-week curing period, provide necessary controls to prevent ambient air temperature immediately adjacent to concrete from falling more than 30 degrees F in 24 hours.

END OF SECTION

SECTION 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 Section 01300 - Submittals.
- 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.

- 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 P R O D U C T S

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. Refer to Section 01025 - Measurement and Payment for unit price procedures.

1.03 SUBMITTALS

- A. Conform to Section 01300 - Submittals.
- 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 Engineer to ensure continued compliance with these Specifications. The specimens will be made by the Engineer 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 Engineer. 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 Engineer in 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.

<u>Application:</u>	<u>Type of Grout</u>
Structural member base plates	Non-shrink Class II
Storage tanks and other equipment	Non-shrink Class I
Filling blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-shrink Class II (Class I where placement time exceeds 15 minutes)
Under precast concrete elements	Non-shrink Class I
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 03820

JOINT REPAIR

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. These specifications detail the requirements for the joint repair of storm drainage pipes and box culverts. The purpose of this process is to seal the box culvert and drainage pipe joints.

1.02 UNIT PRICES

- A. No separate payment will be made for the repair of joints found non-compliant with plans and specifications.

1.03 SUBMITTAL

- A. Submittals shall conform to requirements of Section 01300- Submittals.
- B. The Contractor shall submit a minimum of six (6) copies of the manufacturer's written product data sheets for the proposed materials, for the approval by the Engineer, before proceeding with the work. Product data should include manufacturer's recommended installation instructions and certified results of the testing on the mechanical properties of the material by an independent testing laboratory.

1.04 HANDLING AND STORAGE

- A. All materials used for joint repair shall remain dry, clean and stored as per manufacturer's standards.
- B. Material mixed with dirt, weeds or foreign matter will be rejected.
- C. Packaging of component materials must be compatible with field storage and handling requirements. Packaging must provide for worker safety and minimize spillage during handling.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Chemical Grout:
 - 1. While being injected, the chemical sealant must be able to react/perform in the presence of water.
 - 2. The cured material must be capable of withstanding submergence in water without degradation.

3. The resultant sealant formation must prevent the passage of water.
4. The sealant material, after curing, must be flexible as opposed to brittle or rigid.
5. In place, the resultant sealant formation should be able to withstand freeze/thaw and wet/dry cycles without adversely affecting the seal.
6. The sealant formulation must not be biodegradable, and an acceptable integral herbicide shall be used where roots are present. Additives may be used to meet this requirement.
7. The cured sealant should be chemically stable and resistant to concentrations of acids, alkalis, and organics found in normal sewage
8. Capable of having an integral root inhibitor.
9. Compressive recovery; returns to original shape after repeated deformations.
10. Toxicity; essentially non-toxic in cured form.
11. Sealing materials shall be non-corrosive.
12. Solid content shall be 82 to 88%.

The chemical grout sealing compound shall be hydrophilic. When cured, the grouting compound shall exhibit strength properties of at least 90 PSI and 800% elongation. The material shall not change in linear dimension more than 18% when subjected to wet and dry cycles.

B. Acceptable products for the processes are:

Cementitious Grout - EMACO S88 CI

ChemRex
889 Valley Park Drive
Shakopee, MN 55379
1-800-243-6739

Jute Fiber (OAKUM) - Fibrolite

Avanti International
822 Bay Star Boulevard
Webster, Texas 77598-1528
281-486-5600

Builders Products
2440 McAllister
Houston, Texas 77092
713-686-8203

Chemical Grout

- Avanti International - AV 202
- Prime Resins - Prime Flex 900 LVSF
- de neef Construction Chemicals, Inc. - Hydro-Active Flex LVW/Hydro-Active Flex Cat Accelerator
Hydro-Active cut with Hydro-Active Cat Accelerator

Avanti International
822 Bay Star Boulevard
Webster, Texas 77598-1528
281-486-5600

Prime Resins
2381 Rockaway Industrial Blvd.
Conyers, GA 30012
770-388-0936

Builders Products
2440 McAllister
Houston, Texas 77092
713-686-8203

- A tested, approved equivalent.

2.02 EQUIPMENT

- A. Equipment: Conform to requirements of manufacturer's standards.

2.03 MIXING

- A. In every case, mixing and handling of chemical sealing materials shall be in strict accordance with the manufacturer's recommendations.
- B. Mixing of component materials must be compatible with field operations and not require precise measurements.

PART 3 EXECUTION

3.01 SAFETY

- A. Contractor shall provide all necessary training, material, equipment, and personnel, etc. to comply with all applicable OSHA regulations for confined-space entry.
- B. The Contractor shall provide written evacuation and safety plan, which shall be posted on the project site. Workers shall be made aware of the plan before the work proceeds and reviewed in weekly safety meetings.

3.02 WATER AND SOIL CONTROL

- A. Adequate drainage shall be maintained at all times during construction, cleaning, and repair.
- B. Contractor's activities are not to alter or change existing drainage pattern.

- C. To effectively conduct the joint sealing operation, flow in the culvert must be controlled to an extent that the joint being sealed is not inundated by water. It is not necessary for the joint to be dry; but the water level shall be maintained at as low a level as is practical. Pumps, cofferdam, sandbags, or other means shall be used to maintain the water at a low level.
- D. Existing fill shall be removed from the top of bottom joint. After the joint is repaired and inspected, the existing fill shall be replaced back to its original location and height. This project does not require contractor to remove existing fill from the system, but does require it to be returned to original condition as not to create additional problems for the system.
- E. The Contractor is responsible for removing any impedance to flow, such as temporary cofferdams, sandbags, and equipment from the box culvert and junction boxes in the event of rain.

3.03 CLEANING

- A. Contractor is responsible for cleaning of streets caused by associated construction at close of each workday.
- B. The Contractor shall remove debris off site and dispose of in accordance with local, state, and/or Federal laws and regulations.
- C. Cleanup must be done without inordinate use of flammable or hazardous chemicals.
- D. Residual sealing materials must be removable from the sewer after injection to insure no flow reduction, restriction, or blockage of normal sewage flows.
- E. Prior to sealing, the joints shall be cleaned by pressurized water blaster to remove all loose materials, dirt and grease where necessary. Soils and slimes will be effectively removed from the joint by the scouring action of the water. If necessary, the Contractor shall use a wet aggregate blasting method to provide for an acceptable joint surface. Additionally, the storm drainage pipe specified shall be generally cleared of debris adjacent to the joints prior to individual joint sealing.

3.04 CONTAINMENT DAM PROCESS

- A. Joints are to have a patch or “containment dam” prior to injection. This includes approved cementitious grout, or chemical grout saturated jute oakum,. This will provide containment for the grout injection. Cementitious grout shall be used only in containment dam process.
- B. Cementitious grout shall only be used in non-submerged sections of joint . Non-submerged sections are identified as sections of joints that are a minimum of one (1) foot above the standing water level of the box culvert, at either pre-construction or construction phase, whichever is higher. All other areas of the joint are considered submerged and shall therefore require saturated jute oakum containment dam. Joints

shall be filled with grout and allowed to cure for 24 hours before the injection process is to begin.

- C. Cementitious Grout Sealing: Contractor shall clean and prepare joints prior to sealing of joint. Installation procedures shall comply with manufacturer's recommendation.
- D. Chemical Grout Saturated Jute Oakum Sealing: A quantity of jute fiber is first placed in a mixing container. Plastic bags or other disposable containers such as plastic buckets are desirable. Hydrophilic polymer grout compound is then added and allowed to soak into the jute fiber strips. Squeezing and working the jute fiber by hand is important for complete and rapid saturation. After the application surface has been wetted, the jute fiber strand is picked up by one end and the excess grout stripped off by curling the thumb and index finger around the strand. The strand is then placed in the joint and lightly tamped in to place by use of putty knives, wooden dowels or other tools.

Water is applied during the tamping process by either a small hose or weed sprayer. Application of the water during the tamping causes hydration of the grout compound. Additional layers of material are built up in the same fashion with each being wetted and tamped in turn until the full gasket thickness is obtained. Only a light spray of water should be used since large volumes or high pressures wash away the grout before it sets. It is usually desirable to stop the application of materials somewhat below the surface so that hydration will not cause the seal to expand into the flow area.

The jute fiber shall be twisted rope form without tar or oil and practically free from hard, source fibers and extraneous matter.

Acceptable materials are:

- Fibrolite as distributed by Avanti International or de neef Construction Chemicals, Inc.
- A tested, approved equivalent

3.06 CHEMICAL GROUT INJECTION (ONLY)

- A.
 - Multiple injection holes shall be drilled thru the wall of the structure, or an injection needle will puncture the oakum dam at locations and at spacing as determined by field conditions, and approved by Engineer.
 - Chemical Grout is injected in multiple shots thru the injection holes or punctures, allowed to expand, void fill and seal the back side of the repair area.
 - Chemical Grout shall be pumped until outcropped is seen or pressure of grout reaches 125 psi or as manufacturers suggested pressure.
 - Outcropped grout material is removed with hand tools and disposed of.
 - The new seal is inspected visually for completeness.
 - A repair documentation form is completed by the technician.
- B. Contractor shall monitor the movement of the box culverts to insure no damage is done to the repaired joints.

3.07 FINISHING

- A. Residual sealing materials that extend into the pipe, reduce the pipe diameter, or restrict the flow shall be removed from the joint. The sealed joints shall be left reasonably “flush” with the existing pipe surface.

3.08 WARRANTY

- A. Contractor warrants all materials and workmanship for a period of three year including shrinkage and deterioration.
- B. Contractor shall re-inject material for any failure during the warranty period.
- C. If the Contractor damages any utilities, he will immediately notify the appropriate utility provider (and the Engineer) and pay for all cost of repair at his own expense.
- D. Cracks in pavement which occurs during the injection of grout will be considered as damage to the pavement due to the Contractor’s operations. The damage shall be repaired by the Contractor at the Contractor’s expense and as directed by the Engineer.

END OF SECTION

SECTION 05410

MISCELLANEOUS METALS

1.00 GENERAL

1.01 WORK INCLUDED

- A. All items of Metal Construction and related accessory items required for the project and which are not specified elsewhere. Such items include, but are not limited to the following:

1. Welding and Splicing
2. Grinding, Cleaning and Preparation for Finish

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The following items of associated work are included in other sections of these Specifications:

1. Painting: Section 09900
2. Metal Fabrication: Section 05500

1.03 REFERENCES AND STANDARDS

- A. The following references and standards are hereby made a part of this Section and miscellaneous metal work shall conform to the applicable requirements therein, except as otherwise specified herein, or shown on the drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements or governing rules and regulations.

1. "Code for Arc and Gas Welding in Building Construction" of American Welding Society, AWS D1.0, latest edition with current supplements and addenda.

B. REFERENCE STANDARDS

1. American Society for Testing and Materials (ASTM)
 - a. A-36 Specifications for Structural Steel
(Including Base Plates)

- b. A500-73: Cold-Formed, Welded and Seamless Carbon Steel
Structural Tubing in Rounds and Shapes
- 2. American Institute of Steel Construction (AISC)
 - a. Standards for Details and Connections of Structural Steel

1.04 SUBMITTALS

A. Shop Drawings

- 1. Submit complete and accurately detailed steel shop drawings to Engineer for review. Detail steel in accordance with requirements of AISC.
 - a. Indicate types and grades of all metals used.
 - b. Indicate relationship to adjacent construction (walls, etc.)
 - c. Provide certified mill reports on steel.
 - d. Indicate splices and splicing methods.

B. Samples

- 1. Submit two (2) samples of each finished steel shape to Owner. *(if required)*
- 2. Assemble one set of samples with required welds or fasteners to demonstrate fitting. *(if required)*
- 3. Do not fabricate steel, until samples are approved.

1.05 PRODUCT HANDLING

- A. Deliver steel to site with identification tags securely wired into place. Store wheel to prevent damage and protect from corrosion and deformation.

2.00 PRODUCTS

2.01 STEEL

A. Structural Steel

- 1. ASTM 500, clean and free from rust, scales, or coating that will reduce bond.

2. Steel shall conform to dimensional requirements, straightness, and flatness of face.

B. Fastenings (General)

1. Furnish all bolts, nuts, screws, clips, washers and any other fastenings necessary for proper erection of items specified herein.
2. All metal fasteners, nails, screws, nuts & bolts, and angle plates shall be stainless steel.
3. Provide nails, screws, and other anchoring devices of type, size, material and finish required for application indicated to provide secure attachment, concealed where possible and complying with applicable Federal Specifications.
4. All metal fasteners shall be manufactured by Simoson Strong-Tie Company.
5. Metal fasteners to be 304 stainless steel except where noted on plan. Deck nails and screws to be 316 stainless steel and comply with ASTM F5936.
6. Pilot holes to be drilled for all fasteners.
7. Installation of all nails and screws to be straight, inline and plumb with all surrounding fasteners.

2.02 WELDING ELECTRODES

- A. Shall be E 70 XX

3.00 EXECUTION

3.01 CONDITION OF SURFACES

- A. Inspect all surfaces to receive the metal trellis sculpture and report all defects which would interfere with this installation. Starting work implies acceptance of surfaces as satisfactory.

3.02 WORKMANSHIP

- A. General Requirements

1. Verify all measurements at job.

2. Coordinate all metal work with adjoining work for detail of attachment, fittings, etc. Do all cutting, shearing, drilling, punching, threading, tapping, etc. required for the work or for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.
3. Splicing of structural members is prohibited without prior approval of the Engineer, who will approve final location and type of splice. Any member having a splice not shown and detailed on shop drawings will be rejected.
4. Set all work plumb, true, rigid, and neatly trimmed out.
5. Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.

3.03 GALVANIZING

A. Structural steel

1. Rolled shapes, plates, bars, strips, and other miscellaneous steel members shall be hot-dip galvanized after fabrication, in accordance with ASTM A123, latest edition.
2. Bolts, nuts, embedded items, and other hardware shall be galvanized in accordance with ASTM A153, latest edition.
3. The temperature of the galvanized bath shall not exceed 920 degrees F.

B. For structures that are designed for shop-welded or bolted fabrication and bolted erection, individual members in each assembly shall, when possible, be galvanized in a single dip. The edges of tightly contacting surfaces shall be completely sealed by welding. Pinholes in welds will not be permitted. All welds shall be sandblasted by the fabricator. Details of galvanizing shall conform to ASTM A385, latest edition: "Providing High Quality Zinc Coatings of Assembled Steel Productions".

1. The zinc must be removed from the weld area prior to welding, to prevent zinc penetration of the weld and subsequent cracking.

2. After welding, the affected area shall be water washed to remove salts, and wire brushed to remove welding slag and other foreign material.
3. Reapply zinc coating at welded areas or “Drygalv”, “Galvanox”, or an approved equal shall be applied over the affected area, in accordance with manufacturer’s recommendations.

END OF SECTION

SECTION 09900

PAINTING

1.00 GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Painting and finishing of all interior and exterior exposed surfaces except where the natural finish of the material is obviously intended as surface not to be painted.
2. Types of materials, number of coats and dry mil. Thickness shall be listed in the Paint Schedule in this specification.

B. Related Work Described Elsewhere:

1. Prefinishing: Shop priming and factory prefinishing are required on some items described in other Section of the specifications.
2. Miscellaneous Metal: Section 05410

C. Definitions: The term "paint" as used herein, includes enamels, paints, sealers, fillers, emulsions, & other coating whether used as prime, intermediate, or finish coats.

1.02 QUALITY ASSURANCE

A. Qualifications of Painters: Use only qualified journeymen painters for mixing and applications of paint; in acceptance or rejection of work, no allowance will be made for lack of skill on the part of the painters.

B. Codes and Standards:

1. Comply with pertinent codes and regulations.
2. Comply with "Standard (type 1)" as defined in the latest edition of the Painting and Decorating Contractors of America in their "Modern Guide to Paint Specifications".

1.03 SUBMITTALS

A. Materials List:

1. Submit in accordance with the provisions of Section 01300 a complete list of materials proposed to be furnished and installed under this portion of the work.
2. This shall in no way be construed as permitting substitutions of materials for those specified.
3. Color of paint after all steel and concrete headwall at Soldiers Creek will be Green RAL #6009.

B. Samples:

1. Prepare two sets of samples of schedule colors painted onto wood for Engineer's approval.

C. Manufacturer's Recommendations: Submit to Owner's review the current recommended method of application published by the manufacturer of each specified material.

1.04 PRODUCT HANDLING

A. Delivery: Deliver materials to job site in original unopened containers with legible labels intact.

B. Protection:

1. Store approved materials in a suitable and designated area at the jobsite.
2. The designated area shall be restricted to storage of paint materials and related equipment.
3. Use necessary means to ensure safe storage and use of materials and prompt and safe disposal of waste.
4. Protect materials before, during and after application.
5. Protect installed work and materials of other trades.

C. Replacements: In event of damage, make repairs and replacements as necessary.

1.05 EXTRA STOCK

- A. Deliver to Owner an extra stock of paint equaling 5% of each color used in each material.
- B. Extra stock shall be in tightly sealed and clearly labeled containers.

2.00 PRODUCTS

2.01 PAINT MATERIALS

- A. Wood Finishes: *(for reference only)*
 - 1. Above Ground: 2 coats Sherwin Williams A100 ALKYD, Y24W20 Primer, 1 coat Sherwin Williams Super Exterior Paint A89W51, Color: Super White. (Color to match existing structure).
- B. Galvanized Finishes:
 - 1. 2 part epoxy by Carboline or equal. Finishes-Tenehuac Primer with enamel topcoat.
- C. Manufacturers:
 - 1. Materials selected for coating system for each surface shall be the product of a single manufacturer.
 - 2. Materials listed by manufacturer in the Painting Schedule require no further approval as to manufacturer or catalog number.
 - 3. Products of other manufacturers are subject to approval by the Owner or their Agent.
- D. Compatibility:
 - 1. Paint materials and equipment shall be compatible in use.
 - a. Finish coats shall be compatible with prime coats.
 - b. Prime coats shall be compatible with surface to be coated.
 - c. Tools and equipment shall be compatible with coating to be applied.
 - 2. Thinners shall only be those recommended by the manufacturer of the material being thinned.

3.00 EXECUTION

3.01 SURFACE CONDITIONS:

A. Inspection:

1. Inspect installed work of other trades and verify that such work is complete to point where this installation may commence.
2. Verify that finishes may be applied in accordance with pertinent codes, regulations, and requirements of these specifications.

B. Discrepancies:

1. In event of discrepancy, notify the Owner or their Agent.
2. Do not proceed until discrepancies have been resolved.

3.02 PREPARATION OF SERVICES, GENERAL

A. Protection: Mask, remove or otherwise protect all hardware, accessories, machined surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not scheduled to receive paint.

B. Priming: Spot prime exposed nails and other metals which are to be painted, using primer recommended by manufacturer of the coating system.

C. Cleaning:

1. Clean all surfaces before applying paint or other surface treatment.
3. Schedule cleaning and painting so that dust or other contaminants from cleaning process will not fall on wet, newly painted surface.

3.03 PREPARATION OF METAL SURFACES

A. Galvanized Metal:

1. Clean with solvent until completely free from dirt, oil and grease.
2. Treat cleaned surface with phosphoric acid etch
3. Remove excess etching solution and allow to dry completely before application of paint.

B. Other Metals:

1. Clean all surfaces until completely free from dirt, oil and grease.
2. Allow to dry thoroughly before application of paint.

3.04 TOUCH-UP PAINTING:

Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint, and paint all such areas with the same material as used for shop painting. Apply by brush to provide a minimum dry film thickness of 2.0 mils. Change color of field coat to distinguish from shop coat.

3.05 PAINT APPLICATION

A. General:

1. Paint all surfaces except items not pre-finished and not called out as unfinished.

B. Dying:

1. Allow sufficient drying time between coats.
2. Modify drying period as recommended by material manufacturer to suit adverse weather conditions.
3. Oil-base and oleo-resinous solvent type paints shall be considered dry for recoating when paint feels firm, does not deform or feel sticky under moderate pressure of the thumb and application of another coat.

C. Environmental Conditions:

1. Comply with manufacturer's recommendation as to environmental conditions under coating systems may be applied.
2. Do not apply paint in areas where dust is being generated.

D. Moisture Content:

1. Use an approved moisture-meter to test surfaces.
2. Do not apply initial coating until meter reading is within limits recommended by paint manufacturer.

E. Defects: Sand and dust between coats to remove defects visible to the unaided eye from distance of five feet.

F. Color of Undercoats: Slightly vary the color of succeeding coats.

3.06 INSPECTION

A. General: Do not apply additional coats until completed coat has been inspected and approved.

B. Number of Coats: Only inspected and approved coats will be considered in determining number of coats applied.

3.07 DRY MIL THICKNESS

A. General: Apply coatings to the dry mil thickness indicated in the "Painting Schedule".

C. Measurements: Provide and use a "Tooke Dry Mil Thickness Gage", or other approved gage, to provide dry mil thickness of paint applied.

3.08 REINSTALLATION OR REMOVED ITEMS

Following completion of painting in each space, reinstall items removed for painting, using only workmen skilled in the particular trade.

3.09 CLEAN UP

A. General:

1. Do not allow accumulation of empty containers of others excess items except in areas set aside for that purpose.

2. Prevent accidental spilling of paint materials; in event of spill:

a. Remove spilled material and waste or other equipment used to clean up spill.

b. Clean surfaces to their original undamaged conditions.

B. Prior to Final Inspection: Visually inspect all surface and remove all paint and traces of paint from surfaces not scheduled to be painted.

3.10 PAINT SCHEDULE

A. STEEL

1. Surface Preparation prior to Abrasive Blast Cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour.
2. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning. Anchor profile shall be 1.5 to 2.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.
3. Coating System:
 - A. 1st Coat: Tnemec Series 90-97 Tneme-Zinc applied at 2.5 to 3.5 dry mils.
 - B. 2nd Coat: Tnemec Series 1075-Color Endura-Shield applied at 3.0 to 5.0 dry mils. Thin only with approved thinner, Tnemec 41-42 Thinner for spray, brush or roller.
 - C. 3rd Coat: Tnemec Series 1070-Color Flouonar applied at 2.0 to 3.0 dry mils. Thin only with approved thinner, Tnemec 41-39 Thinner for spray, brush or roller.
 - D. Total dry film thickness shall be a minimum of 9.5 mils per SSPC-PA 2 dry film inspection standards, with exception as noted in this specification.
 - E. For cold weather applications, Series 44-710 Urethane Accelerator may be added to Series 90-97 and Series 1075 at the rate specified on the Series 44-710 product data sheet.

B. CONCRETE

1. CAST IN PLACE CONCRETE WALLS.

- A. Surface Preparation: Abrasive blast or mechanically abrade as per SSPC-SP13 "Surface Preparation of Concrete." Contractor must blast all concrete clean and remove all old existing paint. For damp surfaces, skim-coat with Tnemec Series 218 MortarClad.

B. Coating System:

1. First Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 150 to 180 square feet per gallon.
2. Second Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 180 to 225 square feet per gallon.
3. Contractor must apply an additional coat of Tnemec Series 290CRU for color and gloss retention.

2. CAST IN PLACE CONCRETE FLOORS.

A. Surface Preparation: Abrasive blast or mechanically abrade as per SSPC-SP13 "Surface Preparation of Concrete."

B. Coating System:

1. Bast Coat: Tnemec Series 218 MortarClad applied at 1-16" thickness.
2. First Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 150 to 180 square feet per gallon.
3. Second Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 180 to 225 square feet per gallon.

END OF SECTION

ADDITIONAL TECHNICAL SPECIFICATIONS

CEMENT STABILIZED BASE COURSE

1.1 SCOPE:

This specification shall govern for all work necessary to scarify and pulverize existing asphalt wearing surface and base course to a depth as required to provide (when conforming to the purposed grades) a 8" thick soil cement (Portland Cement) base course as required to complete the project.

1.2 GENERAL:

This section includes furnishing of all equipment, plant, materials, labor and the performance of all operations required to complete a base course composed of a combination of pulverized asphalt, soil (sand) and Portland cement uniformly mixed, moistened, compacted and cured in accordance with this specification. The base course shall be shaped to conform to sections, lines and grades as shown on the drawings. It is the intent of this specification that that all damaged areas (in areas designated to receive overlay) be repaired using either 8" of base conforming to this specification approved by the Engineer.

1.3 MATERIAL:

1.3.1 Portland Cement:

Portland cement shall comply with the latest specifications for Portland cement (ASTM C150, Type 1, CSA Standard A5, or AASHTO M85) or blended hydraulic cements (ASTM C595 or AASHTO M240, excluding slag cement Types S and SA) for the type specified.

2.3.2 Water: Water shall be free from substances deleterious to the hardening of the soil-cement.

2.3.3 Base Material:

Base material shall consist a combination of scarified and pulverized asphalt, existing base material and soil (sand). The soil and existing base material shall be free from vegetation or other objectionable material. The Contractor shall add or remove material as required to conform to the pro- posed lines and grades .

2.3.4 Soil Cement Mixture:

Both the base material and Portland cement shall be of such quality that when properly proportioned and mixed, a satisfactory base mixture will be produced. The base material and cement shall be properly proportioned such that the finished base mixture contains **11% Portland cement by weight.**

2.4 EQUIPMENT:

2.4.1 General:

Any combination of equipment may be used that will produce a uniform cement stabilized mixture, free from loose or segregated areas and of uniform density and moisture. All equipment is subject to the approval of the Engineer.

2.4.2 Scarifiers/Pulverizers:

Scarifier/Pulverizer shall be a self-propelled unit designed specifically for the purpose of scarify and pulverizing existing asphalt wearing surface and base course in place.

2.4.3 Mixers:

Equipment used for mixing base material and Portland cement shall be either a single pass or multiple pass traveling mixing plant designed specifically for that purpose.
Mixing with a motor grader or similar equipment will not be allowed.

2.4.4 Blade Graders:

Blade graders shall have a wheel base of not less than 15 feet and a blade of not less than 10 feet and shall be self-propelled.

2.4.5 Tamping Rollers:

Tamping Rollers, sheepfoot type, shall consist of one or more units. Each unit shall consist of a watertight cylindrical drum not less than 60-inches in lengths, surrounded by metal studs with tamping feet projecting not less than 7-inches from the surface of the drum and spaced not less than 6-inches nor more than 10-inches apart, measured diagonally from center to center. The tamping feet shall be an approved type suitable for compacting flexible base courses. Each unit shall be equipped with a suitable device for cleaning the tamping feet. The rolling units of multiple-type tamping rollers shall be pivoted on the main frame in a manner that will permit the units to adapt themselves to uneven ground surface and to rotate independently. When fully loaded, the rollers shall produce a pressure of at least 750 pounds per square inch on the combined areas of the tamping feet in contact with the ground.

2.4.6 Three-Wheel General Purpose Rollers:

Shall be self-propelled, weighing not less than 10 tons and having a minimum compression of 300 pounds per inch width of rear wheel. The wheels of the rollers shall be equipped with adjustable scrapers.

2.4.7 Pneumatic-Tired Rollers:

Shall be single or double axle vibrating or non-vibrating type, equipped with tires of equal size and diameter, uniformly inflated, so that the air pressure of the several tires shall not vary more than 5 pounds per square inch. The self-propelled roller, or the power unit and towed roller shall be considered a pneumatic-tired roller unit.

- A. Light Pneumatic-Tired Rollers shall have two axles on which are mounted not less than 9 pneumatic-tired wheels in such a manner that the rear group of tires will not follow in the tracks of the forward group. The axles shall be mounted in a rigid frame provided with a loading platform or body suitable for ballast loading. The roller shall develop a compression of not less than 225 pounds per inch width of the tire tread and shall be capable of being loaded to provide loads up to 300 pounds per inch of normal tire width. The rollers shall be weighed as directed.

- B. Heavy Pneumatic-Tired Rollers shall be of the vibratory or non-vibratory type with a minimum loading of 25,000 lbs. per tire. The tires shall be suitable for inflation to not less than 90 p.s.i. The loading shall be distributed equally to all wheels.

2.5 CONSTRUCTION METHODS:

2.5.1 General:

The primary requirement of this specification is to secure a complete course of soil containing a uniform Portland cement mixture, free from loose or segregated areas, of uniform density and moisture content, well bound and compacted for its full depth with a smooth surface suitable for placing surface courses.

2.5.2 Preparation:

The existing base and surface shall be scarified and pulverized for its full width and depth and then bladed and shaped to conform to the purposed lines and grades. All bituminous material shall be broken into particles that will pass a 2" sieve and incorporated uniformly with the existing base material. Unsuitable soil material shall be removed and replaced with acceptable material. The subgrade shall be firm and able to support without displacement the construction equipment and the compaction hereinafter specified. Soft or yielding subgrade shall be stabilized before construction proceeds.

2.5.3 Pulverization:

Before cement is applied the base material shall be pulverized so that at the completion of moist- mixing, when all non-slaking aggregate retained on the No. 4 sieve are removed, the remaining material shall meet the following requirements (when tested from the roadway in the roadway condition by Test Method Tex-101-E [part III]).

Minimum passing 1-inch sieve. 100% by dry weight

Minimum passing a No. 4 sieve .. 80% by dry weight

(Exclusive of gravel stone or bituminous material retained on these sieves.)

The Contractor shall insure that existing bituminous material is uniformly distributed in the cement soil base.

2.5.4 Cement Application, Mixing and Spreading:

A. General:

Mixing of the soil material, cement and water shall be accomplished by the mixed-in-place method (using either a single pass or multiple pass traveling mixing plant). No cement or soil- cement mixture shall be spread when the soil or subgrade is frozen or when the air temperature is less than 40°F in the shade. The percent of moisture in the soil material, at the time of cement application, shall not exceed the quantity that will permit uniform and intimate mixture of soil and cement during dry mixing operations. It shall not exceed the specified optimum moisture content

for the soil-cement mixture. The operations of cement application, water application, mixing, hauling, spreading, compacting, and finishing shall be continuous and completed in daylight. The total elapsed time between the addition of water to the soil-cement mixture and the completion of finishing shall not exceed 4 hours. Any soil-and-cement mixture that has not been compacted and finished shall not remain undisturbed for more than 30 minutes.

B. Application of Cement:

Portland cement shall be spread uniformly on the soil at the rate specified herein and as approved by the Engineer. If a bulk cement spreader is used, it shall be positioned by stringlines or other approved methods during spreading to ensure a uniform distribution of cement. No equipment, except that used in spreading and mixing, will be allowed to pass over the freshly spread cement until it is mixed with the soil. Contractors shall monitor the weather and perform the application in less windy conditions.

C. Single-Pass Traveling Mixing Plant Method:

After the cement has been applied it shall be sufficiently dry-mixed with the soil to prevent the formation of cement balls when water is applied. Unpulverized soil lumps in the soil cement mixture immediately behind the mixer that are dry will not be allowed. Should this condition prevail, the Contractor shall "pre-wet" the raw soil as necessary to correct this condition. The mixer shall be provided with means for visibly and accurately gauging the water application. The water shall be applied uniformly through a pressure spray bar. After cement is spread, mixing operations shall proceed as follows:

The mixer shall in one continuous operation mix the air-dry soil and cement full depth, and the required moisture uniformly, thoroughly moist mix the soil, cement and water, spread the completed soil cement mixture evenly over the machine processed width of the subgrade and leave it in a loose condition ready for immediate compaction.

D. Multiple-Pass Traveling Mixing Plant:

After the cement has been applied it shall be dry-mixed with the soil. Mixing shall continue until the cement has been sufficiently blended with the soil to prevent the formation of cement balls when water is applied. Immediately after the dry mixing of soil and cement is complete, water as necessary shall be uniformly applied and incorporated into the mixture. Pressurized equipment and supply provided shall be adequate to insure continuous application of the required amount of water to sections being processed within 3 hours of application of the cement. Proper care shall be exercised to insure proper moisture distribution at all times. After the last increment of water has been added, mixing shall continue until a thorough and uniform mix has been obtained.

2.5.5 Unsatisfactory Methods:

When using either type mixing plant (see 2.5.4.c or 2.5.4.d above) if any of the operation after the initial application of water to the soil-cement mixture is interrupted for more than thirty (30) minutes for any reason, or when the uncompacted soil-cement mixture is wetted by rain so that the average moisture content exceeds the tolerance given below at the time of final compaction, the entire section shall be reconstructed in accordance with this specification at the contractor's own expense. All material along longitudinal or transverse construction joints, not properly compacted, shall be removed and replaced with properly moistened and mixed soil-cement which shall be compacted to specified density.

2.5.6 Compaction:

At the start of compaction, the percentage of moisture in the mixture and in unpulverized soil lumps shall not be below or more than two percentage points above the specified optimum moisture content, and shall be less than that quantity which will cause the soil-cement mixture to become unstable during compaction and finishing. The specified optimum moisture content and density shall be determined in the field by a moisture-density test, AASHTO T134 or ASTM D558, on representative samples of soil-cement mixture obtained from the area being processed at the time compaction begins. Prior to compaction, the mixture shall be in a loose condition for its full depth. The compactive effort shall be applied to the full depth. The loose mixtures shall then be compacted uniformly to the specified density. During compaction operations, initial shaping may be required to obtain uniform compaction and required grade and cross section. All places inaccessible to rollers and/or finishing equipment, the mixture shall be thoroughly compacted by hand tamping and shaped and finished by hand methods. The Contractor shall schedule his work and provide equipment that will insure that the base course is completed before the Portland cement can take its initial set. At the end of the day, or in case of unavoidable interruption of operations that would form a joint in the base course, a transverse header shall be placed in such manner that the end of the base course can be satisfactorily compacted and shaped. On resuming operations, the header shall be removed and if the exposed edge of the base course is not approximately vertical, or if necessary to secure a satisfactory riding surface at the joint, the edge of the base course shall be cut back to leave a vertical face or as necessary to secure a satisfactory riding surface. All base course material removed shall be replaced by the Contractor at his own expense.

2.5.7 Finishing:

When initial compaction is nearing completion, the surface of the soil-cement shall be shaped to the required lines, grades, and cross section. The moisture content of the surface material shall be maintained at not less than its specified optimum moisture content during finishing operations. If necessary, the surface shall be lightly scarified to remove any tire imprints or smooth surfaces left by equipment. Compaction shall then be continued until uniform and adequate density is obtained. Rolling shall be supplemented by broom- dragging if required. The soil cement shall be uniformly

compacted to a minimum of **96% of maximum density**. Compaction and finishing shall be done in such a manner as to produce, in no longer than 2 hours, a smooth, dense surface free of compaction planes, cracks, ridges or loose material.

2.5.8 Curing, Protection and Cover:

After the base course has been finished as specified herein, it shall be immediately protected against rapid drying by applying an asphaltic prime coat (See Subsection 2H6) at the rate of 0.20 gal/per square yard, or as necessary, in the opinion of the Engineer, to completely seal the surface and fill all voids. Immediately prior to application of the asphaltic material, the base course shall be wetted, by the use of water distributors, so that all voids in the soil-cement mixture are filled with water but without free water standing on the surface. The asphaltic material shall be applied while the surface of the soil-cement base is wet so that undue asphaltic penetration will be avoided. It shall be the responsibility of the contractor to protect this asphaltic curing coat against picking up under traffic by sanding the surface. The bituminous curing coat shall remain in place for the proposed additional asphalt surface treatment, unless otherwise directed by the Engineer. Any finished portion of the soil- cement base adjacent to construction, which is traveled by equipment used in constructing an adjoining section, shall be covered with at least 8 (eight) inches of earth to prevent equipment from marring the surface of the completed work.

2.5.9 Maintenance:

The contractor shall be required to maintain at his own expense the entire pavement area within the limits of his contract in good condition satisfactory to the Engineer from the time he first starts work until all work shall have been completed. Maintenance shall include immediate repairs of any defect that may occur in the base course after the cement has been applied, which work shall be done by the contractor at his own expense and repeated as often as may be necessary to keep the area continuously intact. Repairs are to be made in a manner to insure restoration of a uniform surface and durability of the part repaired. Faulty work shall be replaced for the full depth of treatment. Any low area shall be remedied by replacing the material for the full depth of treatment, rather than adding a thin layer of soil-cement on the completed work.